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MyProjectName : Your Title
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

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Chapter 2

General Description

2.1 Domain Stakeholders

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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-suAddNewPI

The goal is the check the requested point of interest from the actor Person, treat the request and add the new PI to the system.

USE-CASE DESCRIPTION	
Name	suAddNewPI
Scope	system
Level	summary
<i>Primary actor(s)</i>	
1	actPerson[active]
<i>Secondary actor(s)</i>	
1	actMsrCreator[active]
2	actCoordinator[proactive]
3	actAdministrator[proactive]
<i>Goal(s) description</i>	
The goal is the check the requested point of interest from the actor Person, treat the request and add the new PI to the system.	
<i>Reuse</i>	
1	<u>oeCreateSystemAndEnvironment [1..1]</u>
2	<u>ugSecurelyUseSystem [1..1]</u>
3	<u>oeSearchPI [1..*]</u>
4	<u>oeSendNewRequest [1..*]</u>
5	<u>ugCheckRequest [1..*]</u>
6	<u>ugManageRequest [1..*]</u>
7	<u>oeAddPI [1..*]</u>
<i>Protocol condition(s)</i>	
1	the iCrash system has never been deployed the coordinator actor involved in the use case has been declared by the actor actAdministrator
<i>Pre-condition(s)</i>	
1	none

continues in next page ...

... Use-Case Description table continuation

<i>Main post-condition(s)</i>	
1	modifications have been made by the coordinator on existing requests (ignored attribute) the administrator has modified the status of the requests message solved request has been sent to the administrator the administrator added the new PI message added PI has been sent to the administrator and the person
<i>Main Steps</i>	
a	the actor <u>actMsrCreator</u> executes the <u>oeCreateSystemAndEnvironment</u> use case
b	the actor <u>actPerson</u> executes the <u>ugSecurelyUseSystem</u> use case
c	the actor <u>actPerson</u> executes the <u>oeSearchPI</u> use case
d	the actor <u>actPerson</u> executes the <u>oeSendNewRequest</u> use case
e	the actor <u>actCoordinator</u> executes the <u>ugSecurelyUseSystem</u> use case
f	the actor <u>actCoordinator</u> executes the <u>ugCheckRequest</u> use case
g	the actor <u>actCoordinator</u> executes the <u>ugSecurelyUseSystem</u> use case
h	the actor <u>actAdministrator</u> executes the <u>ugManageRequest</u> use case
i	the actor <u>actAdministrator</u> executes the <u>oeAddPI</u> use case
<i>Steps Ordering Constraints</i>	
1	step (a) is the first step to perform.
2	step (b), (d) and (f) must always be performed before (c), (e) and (g).
3	Subsequently, all the steps follow after step (a) is performed.
<i>Additional Information</i>	
none	

2.3.1.2 summary-suGenerateNewAlert

The goal is that the person searches for a point of interest, retrieves the GPS location and sends an Sms to the communication company with the needed information.

USE-CASE DESCRIPTION	
<i>Name</i>	suGenerateNewAlert
<i>Scope</i>	system
<i>Level</i>	summary
<i>Primary actor(s)</i>	
1	<u>actPerson</u> [active, multiple]
2	<u>actComCompany</u> [active, multiple]
<i>Secondary actor(s)</i>	
1	<u>actMsrCreator</u> [active]
<i>Goal(s) description</i>	
The goal is that the person searches for a point of interest, retrieves the GPS location and sends an Sms to the communication company with the needed information.	
<i>Reuse</i>	
1	<u>oeCreateSystemAndEnvironment</u> [1..1]
2	<u>ugSecurelyUseSystem</u> [1..1]
3	<u>oeSearchPI</u> [1..*]
4	<u>oeGetGPSLocation</u> [1..*]
5	<u>oeAlert</u> [1..*]
<i>Protocol condition(s)</i>	

continues in next page ...

... Use-Case Description table continuation

1	the iCrash system has never been deployed the point of interest already exists
Pre-condition(s)	
1	none
Main post-condition(s)	
1	the actor person gets a match after searching for a PI the person gets a message with the GPS location of the PI a message that the Sms has been sent, is sent to the person the communication company gets a message with the detailed information of a potential crisis
Main Steps	
a	the actor actMsrCreator executes the <u>oeCreateSystemAndEnvironment</u> use case
b	the actor actPerson executes the <u>ugSecurelyUseSystem</u> use case
c	the actor actPerson executes the <u>oeSearchPI</u> use case
d	the actor actPerson executes the <u>oeGetGPSLocation</u> use case
e	the actor actComCompany executes the <u>oeAlert</u> use case
Steps Ordering Constraints	
1	step (a) and (b) must always be performed before all the other steps.
2	step (a) is the first step to perform.
3	Subsequently, all the steps follow after step (a) is performed.
Additional Information	
none	

2.3.1.3 summary-suGlobalCrisisHandling

the actCoordinator's goal is to monitor the alerts received and the corresponding crisis in order to act as necessary to handle the crisis.

USE-CASE DESCRIPTION	
Name	suGlobalCrisisHandling
Scope	system
Level	summary
Primary actor(s)	
1	actCoordinator[active]
Goal(s) description	
the actCoordinator's goal is to monitor the alerts received and the corresponding crisis in order to act as necessary to handle the crisis.	
Reuse	
1	<u>ugSecurelyUseSystem</u>
2	<u>ugManageCrisis</u>
3	<u>ugMonitor</u>
Protocol condition(s)	
1	1 the iCrash system has been deployed 2 the coordinator actor involved in the use case has been declared by the actor actAdministrator
Pre-condition(s)	
1	
Main post-condition(s)	
1	modifications have been made by the coordinator on existing alerts or crisis OR the coordinator requested an updated status on existing alerts or crisis.

continues in next page ...

... Use-Case Description table continuation

<i>Main Steps</i>	
a	the actor actCoordinator executes the <u>ugSecurelyUseSystem</u> use case
b	the actor actCoordinator executes the <u>ugManageCrisis</u> use case
c	the actor actCoordinator executes the <u>ugMonitor</u> use case
<i>Steps Ordering Constraints</i>	
1	Step a must be executed before executing all other steps
<i>Additional Information</i>	
none	

2.3.1.4 summary-suScenarioPresentation

scenario shown in a presentation

USE-CASE DESCRIPTION	
<i>Name</i>	suScenarioPresentation
<i>Scope</i>	system
<i>Level</i>	summary
<i>Primary actor(s)</i>	
1	actMsrCreator[active]
2	actAdministrator[active]
3	actCoordinator[active]
4	actPerson[active]
5	actComCompany[active]
<i>Goal(s) description</i>	
scenario shown in a presentation	
<i>Reuse</i>	
1	<u>oeCreateSystemAndEnvironment</u> [1..1]
2	<u>oeLoginWithCaptcha</u> [1..*]
3	<u>oeSearchPI</u> [1..*]
4	<u>oeSendNewRequest</u> [1..*]
5	<u>ugCheckRequest</u> [1..*]
6	<u>ugManageRequest</u> [1..*]
7	<u>oeSearchPI</u> [1..*]
8	<u>oeGetGPSLocation</u> [1..*]
9	<u>oeAlert</u> [1..*]
10	<u>ugAdministrateTheSystem</u> [1..*]
11	<u>ugMonitor</u> [1..*]
12	<u>ugManageCrisis</u> [1..*]
<i>Protocol condition(s)</i>	
1	
<i>Pre-condition(s)</i>	
1	
<i>Main post-condition(s)</i>	
1	
<i>Main Steps</i>	
a	the actor actMsrCreator executes the <u>oeCreateSystemAndEnvironment</u> use case
b	the actor actAdministrator executes the <u>ugAdministrateTheSystem</u> use case

continues in next page ...

... Use-Case Description table continuation

c	the actor actCoordinator executes the <u>oeLoginWithCaptcha</u> use case
d	the actor actPerson executes the <u>oeSearchPI</u> use case
e	the actor actPerson executes the <u>oeSendNewRequest</u> use case
f	the actor actCoordinator executes the <u>ugCheckRequest</u> use case
g	the actor actAdministrator executes the <u>ugManageRequest</u> use case
h	the actor actPerson executes the <u>oeSearchPI</u> use case
i	the actor actPerson executes the <u>oeGetGPSILocation</u> use case
j	the actor actComCompany executes the <u>oeAlert</u> use case
k	the actor actCoordinator executes the <u>ugMonitor</u> use case
l	the actor actCoordinator executes the <u>ugManageCrisis</u> use case
Steps Ordering Constraints	
1	Step a must be executed before executing all other steps
2	Step b must follow step a
Additional Information	
none	

2.3.1.5 usergoal-ugAdministateTheSystem

the actAdministrator's goal is to follow an identification procedure to be allowed to add or delete the necessary crisis coordinators that will be granted the responsibility to handle alerts and crisis.

USE-CASE DESCRIPTION	
Name	ugAdministateTheSystem
Scope	system
Level	usergoal
Primary actor(s)	
1	actAdministrator [active]
Goal(s) description	
the actAdministrator's goal is to follow an identification procedure to be allowed to add or delete the necessary crisis coordinators that will be granted the responsibility to handle alerts and crisis.	
Reuse	
1	<u>ugSecurelyUseSystem</u> [1..1]
2	<u>oeAddCoordinator</u> [1..*]
3	<u>oeDeleteCoordinator</u> [1..*]
4	<u>oeUpdateCoordinatorAccessRights</u> [1..*]
Protocol condition(s)	
1	the iCrash system has been deployed
Pre-condition(s)	
1	
Main post-condition(s)	
1	modifications have been made to the system and its environment concerning existing or new coordinators.
Main Steps	
a	the actor actAdministrator executes the <u>ugSecurelyUseSystem</u> use case
b	the actor actAdministrator executes the <u>oeAddCoordinator</u> use case
c	the actor actAdministrator executes the <u>oeDeleteCoordinator</u> use case

continues in next page ...

... Use-Case Description table continuation

d	the actor actAdministrator executes the <u>oeUpdateCoordinatorAccessRights</u> use case
Steps Ordering Constraints	
1	Step a must be executed before all other steps
2	Step b must be executed before executing steps c or d
Additional Information	
none	

2.3.1.6 usergoal-ugCheckRequest

The goal is to compare the new potential point of interest to the existing PIs in the system.

USE-CASE DESCRIPTION	
Name	ugCheckRequest
Scope	system
Level	usergoal
Primary actor(s)	
1	actCoordinator [active]
Goal(s) description	
The goal is to compare the new potential point of interest to the existing PIs in the system.	
Reuse	
1	<u>ugSecurelyUseSystem</u> [1..1]
2	<u>oe GetAllRequests</u> [1..1]
3	<u>oeCheckAvailability</u> [1..*]
4	<u>oeDeliverRequest</u> [1..*]
Protocol condition(s)	
1	the iCrash system has been deployed
Pre-condition(s)	
1	none
Main post-condition(s)	
1	there exist one request whose ignored information has been changed.
Main Steps	
a	the actor actCoordinator executes the <u>ugSecurelyUseSystem</u> use case
b	the actor actCoordinator executes the <u>oe GetAllRequests</u> use case
c	the actor actCoordinator executes the <u>oeCheckAvailability</u> use case
d	the actor actCoordinator executes the <u>oeDeliverRequest</u> use case
Steps Ordering Constraints	
1	step (a) must always be performed before all the other steps.
2	Subsequently, all the steps follow after step (a) is performed.
Additional Information	
none	

Figure 2.1 The coordinator checks if the requested point of interest is not already in the system.

2.3.1.7 usergoal-ugLoginWithCaptcha

The goal is to authenticate an actor as not being a machine/robot.

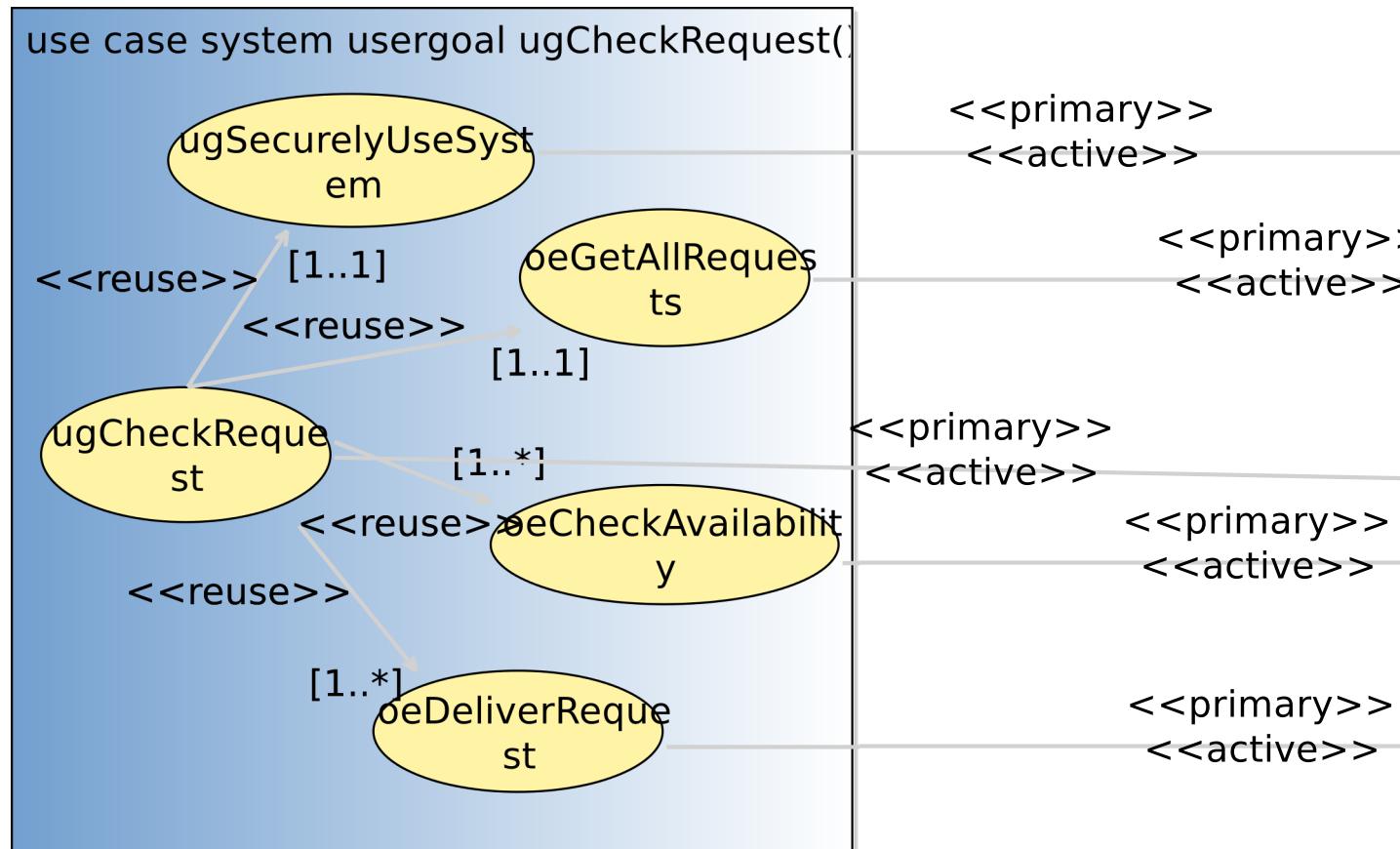


Figure 2.1: ugCheckRequest user goal use case

USE-CASE DESCRIPTION	
<i>Name</i>	ugLoginWithCaptcha
<i>Scope</i>	system
<i>Level</i>	usergoal
<i>Primary actor(s)</i>	
1	actAuthenticated [active]
<i>Goal(s) description</i>	
The goal is to authenticate an actor as not being a machine/robot.	
<i>Reuse</i>	
1	<u>oeLogin [3..*]</u>
2	<u>oeLoginWithCaptcha [1..*]</u>
<i>Protocol condition(s)</i>	
1	
<i>Pre-condition(s)</i>	
1	
<i>Main post-condition(s)</i>	
1	
<i>Main Steps</i>	
a	the actor actAuthenticated executes the <u>oeLogin</u> use case
b	the actor actAuthenticated executes the <u>oeLogin</u> use case
c	the actor actAuthenticated executes the <u>oeLogin</u> use case
d	the actor actAuthenticated executes the <u>oeLoginWithCaptcha</u> use case
<i>Steps Ordering Constraints</i>	
1	Step a to c must be executed before executing all other steps
2	Step d must be the last step
<i>Additional Information</i>	
none	

2.3.1.8 usergoal-ugManageCrisis

The goal is to do an action that makes the handling of a crisis or an alert progress.

USE-CASE DESCRIPTION	
<i>Name</i>	ugManageCrisis
<i>Scope</i>	system
<i>Level</i>	usergoal
<i>Primary actor(s)</i>	
1	actCoordinator [active]
<i>Goal(s) description</i>	
The goal is to do an action that makes the handling of a crisis or an alert progress.	
<i>Reuse</i>	
1	<u>ugSecurelyUseSystem [1..1]</u>
2	<u>oeValidateAlert [1..*]</u>
3	<u>oeInvalidateAlert [1..*]</u>
4	<u>oeSetCrisisStatus [1..*]</u>
5	<u>oeSetCrisisType [1..*]</u>
6	<u>oeSetCrisisHandler [1..*]</u>

continues in next page ...

... Use-Case Description table continuation

7	<u>oeReportOnCrisis [1..*]</u>
8	<u>oeCloseCrisis [1..*]</u>
Protocol condition(s)	
1	the iCrash system has been deployed
Pre-condition(s)	
1	
Main post-condition(s)	
1	
Main Steps	
a	the actor actCoordinator executes the <u>ugSecurelyUseSystem</u> use case
b	the actor actCoordinator executes the <u>oeValidateAlert</u> use case
c	the actor actCoordinator executes the <u>oeInvalidateAlert</u> use case
d	the actor actCoordinator executes the <u>oeSetCrisisHandler</u> use case
e	the actor actCoordinator executes the <u>oeSetCrisisStatus</u> use case
f	the actor actCoordinator executes the <u>oeSetCrisisType</u> use case
g	the actor actCoordinator executes the <u>oeReportOnCrisis</u> use case
h	the actor actCoordinator executes the <u>oeCloseCrisis</u> use case
Steps Ordering Constraints	
1	Step a must be executed before executing all other steps
2	Step b must be executed before executing step d
3	Step d must be executed before executing steps e, f, g and h
Additional Information	
none	

Figure 2.2 shows how crisis are managed.

2.3.1.9 usergoal-ugManageRequest

The goal is to do an action that makes the handling of a request progress.

USE-CASE DESCRIPTION	
Name	ugManageRequest
Scope	system
Level	usergoal
Primary actor(s)	
1	actAdministrator [active]
Goal(s) description	
The goal is to do an action that makes the handling of a request progress.	
Reuse	
1	<u>ugSecurelyUseSystem [1..1]</u>
2	<u>oe GetAllRequestsFromCoordinator [1..1]</u>
3	<u>oeTreatRequest [1..*]</u>
4	<u>oeSolveRequest [1..*]</u>
Protocol condition(s)	
1	the iCrash system has been deployed
Pre-condition(s)	

continues in next page ...

... Use-Case Description table continuation

1	none
<i>Main post-condition(s)</i>	
1	there exist one request whose related information has been changed.
<i>Main Steps</i>	
a	the actor actAdministrator executes the <u>ugSecurelyUseSystem</u> use case
b	the actor actAdministrator executes the <u>oe GetAllRequestsFromCoordinator</u> use case
c	the actor actAdministrator executes the <u>oeTreatRequest</u> use case
d	the actor actAdministrator executes the <u>oeSolveRequest</u> use case
<i>Steps Ordering Constraints</i>	
1	step (a) must always be performed before all the other steps.
2	Subsequently, all the steps follow after step (a) is performed.
<i>Additional Information</i>	
none	

Figure 2.3 The administrator's role is to get all the pending requests to add a new PI, treat it and solve the specific PIs.

2.3.1.10 usergoal-ugMonitor

the actCoordinator's goal is to get the detailed list of existing crisis or alerts to decide on next actions to undertake.

USE-CASE DESCRIPTION	
Name	ugMonitor
Scope	system
Level	usergoal
<i>Primary actor(s)</i>	
1	actCoordinator [active]
<i>Goal(s) description</i>	
the actCoordinator's goal is to get the detailed list of existing crisis or alerts to decide on next actions to undertake.	
<i>Reuse</i>	
1	<u>ugSecurelyUseSystem</u> [1..1]
2	<u>oeGetCrisisSet</u> [1..*]
3	<u>oeGetAlertSet</u> [1..*]
<i>Protocol condition(s)</i>	
1	the iCrash system has been deployed
<i>Pre-condition(s)</i>	
1	
<i>Main post-condition(s)</i>	
1	
<i>Main Steps</i>	
a	the actor actCoordinator executes the <u>ugSecurelyUseSystem</u> use case
b	the actor actCoordinator executes the <u>oeGetCrisisSet</u> use case
c	the actor actCoordinator executes the <u>oeGetAlertSet</u> use case

continues in next page ...

... Use-Case Description table continuation

<i>Steps Ordering Constraints</i>
1 Step a must be executed before all other step
<i>Additional Information</i>
none

Figure 2.4 shows how coordinators monitor crisis

2.3.1.11 usergoal-ugSecurelyUseSystem

the actAdministrator's goal is to follow an identification procedure to be allowed to add or delete the necessary crisis coordinators that will be granted the responsibility to handle alerts and crisis.

USE-CASE DESCRIPTION
<i>Name</i> ugSecurelyUseSystem
<i>Scope</i> system
<i>Level</i> usergoal
<i>Primary actor(s)</i>
1 actAuthenticated[active]
<i>Goal(s) description</i>
the actAdministrator's goal is to follow an identification procedure to be allowed to add or delete the necessary crisis coordinators that will be granted the responsibility to handle alerts and crisis.
<i>Reuse</i>
1 oeLogin [1..1]
2 oeLogout [1..1]
<i>Protocol condition(s)</i>
1 the iCrash system has been deployed
<i>Pre-condition(s)</i>
1 none
<i>Main post-condition(s)</i>
1 the actAuthenticated is known by the system not to be logged.
<i>Main Steps</i>
a the actor actAuthenticated executes the oeLogin use case
b the actor actAuthenticated executes the oeLogout use case
<i>Steps Ordering Constraints</i>
1 step (a) must always precede step (b).
<i>Additional Information</i>
none

Figure 2.5 All the users of the system can log in and out.

2.3.1.12 subfunction-oeAddCoordinator

goal is to add a new coordinator to the system

USE-CASE DESCRIPTION
<i>Name</i> oeAddCoordinator

continues in next page ...

... Use-Case Description table continuation

<i>Scope</i>	system
<i>Level</i>	subfunction
Parameters	
AdtCoordinatorID: dtCoordinatorID 1	
AdtLogin: dtLogin 2	
AdtPassword: dtPassword 3	
CoordinatorAccessRights: etCrisisType 4	
Primary actor(s)	
1	actAdministrator [active]
Goal(s) description	
goal is to add a new coordinator to the system	
Protocol condition(s)	
1	1
Pre-condition(s)	
1	1
Main post-condition(s)	
1	1
Additional Information	
none	

2.3.1.13 subfunction-oeAddPI

The administrator's goal is to add a new requested point of interest.

USE-CASE DESCRIPTION	
<i>Name</i>	oeAddPI
<i>Scope</i>	system
<i>Level</i>	subfunction
Parameters	
APIName: dtName 1	
APICity: dtCity 2	
APIGPSLocation: dtGPSLocation 3	
APIDescription: dtDescription 4	
APICategory: etCategory 5	
Primary actor(s)	
1	actAdministrator [active]
Secondary actor(s)	
1	actPerson [passive]

continues in next page ...

... Use-Case Description table continuation

Goal(s) description
The administrator's goal is to add a new requested point of interest.
Protocol condition(s)
1 the iCrash system has been deployed. the requested PI exists among the requests. the requested PI must have the status as solved.
Pre-condition(s)
1 none
Main post-condition(s)
1 the requested PI is successfully added. a message is returned to the administrator and the person that the PI has been added.
Additional Information
none

2.3.1.14 subfunction-oeAlert

Used by actor actComCompany to create a new alert.

USE-CASE DESCRIPTION	
Name	oeAlert
Scope	system
Level	subfunction
Parameters	
APersonType: etPersonType 1	
APIName: dtName 2	
APIGPSLocation: dtGPSLocation 3	
AdtDate: dtDate 4	
AdtTime: dtTime 5	
AProblemDescription: dtDescription 6	
PhoneNumber: dtPhoneNumber 7	
Primary actor(s)	
1	actComCompany [active]
Goal(s) description	
Used by actor actComCompany to create a new alert.	
Protocol condition(s)	
1	
Pre-condition(s)	
1	
Main post-condition(s)	
1	

continues in next page ...

... Use-Case Description table continuation

<i>Additional Information</i>
none

2.3.1.15 subfunction-oeCheckAvailability

The coordinator's goal is to check whether the requested PI exists already.

USE-CASE DESCRIPTION
<i>Name</i> oeCheckAvailability
<i>Scope</i> system
<i>Level</i> subfunction
<i>Parameters</i>
ARequestID: dtID 1
<i>Primary actor(s)</i>
1 actCoordinator[active]
<i>Secondary actor(s)</i>
1 actPerson[passive]
<i>Goal(s) description</i>
The coordinator's goal is to check whether the requested PI exists already.
<i>Protocol condition(s)</i>
1 the iCrash system has been deployed. a request must exist in the system.
<i>Pre-condition(s)</i>
1 none
<i>Main post-condition(s)</i>
1 the ignored attribute of the request is modified.
<i>Additional Information</i>
none

2.3.1.16 subfunction-oeCloseCrisis

goal is to set the status of a crisis to closed

USE-CASE DESCRIPTION
<i>Name</i> oeCloseCrisis
<i>Scope</i> system
<i>Level</i> subfunction
<i>Parameters</i>
AdtCrisisID: dtCrisisID 1
<i>Primary actor(s)</i>
1 actCoordinator[active]
<i>Goal(s) description</i>
goal is to set the status of a crisis to closed
<i>Protocol condition(s)</i>
1 1

continues in next page ...

... Use-Case Description table continuation

<i>Pre-condition(s)</i>
1 1
<i>Main post-condition(s)</i>
1 1
<i>Additional Information</i>
none

2.3.1.17 subfunction-oeCreateSystemAndEnvironment

The goal is to install the iCrash system on its infrastructure and to exploit its capacities related to the secure administration and efficient handling of car crash situations depending on alerts received.

USE-CASE DESCRIPTION	
<i>Name</i>	oeCreateSystemAndEnvironment
<i>Scope</i>	system
<i>Level</i>	subfunction
<i>Primary actor(s)</i>	
1	actMsrCreator [active]
<i>Goal(s) description</i>	
The goal is to install the iCrash system on its infrastructure and to exploit its capacities related to the secure administration and efficient handling of car crash situations depending on alerts received.	
<i>Protocol condition(s)</i>	
1	
<i>Pre-condition(s)</i>	
1	
<i>Main post-condition(s)</i>	
1	
<i>Additional Information</i>	
none	

2.3.1.18 subfunction-oeDeleteCoordinator

goal is to delete coordinator in the system

USE-CASE DESCRIPTION	
<i>Name</i>	oeDeleteCoordinator
<i>Scope</i>	system
<i>Level</i>	subfunction
<i>Parameters</i>	
AdtCoordinatorID: dtCoordinatorID 1	
<i>Primary actor(s)</i>	
1	actAdministrator [active]
<i>Goal(s) description</i>	
goal is to delete coordinator in the system	
<i>Protocol condition(s)</i>	
1	1

continues in next page ...

... Use-Case Description table continuation

<i>Pre-condition(s)</i>
1 1
<i>Main post-condition(s)</i>
1 1
<i>Additional Information</i>
none

2.3.1.19 subfunction-oeDeletePI

The administrator's goal is to delete an existing point of interest.

USE-CASE DESCRIPTION
<i>Name</i> oeDeletePI
<i>Scope</i> system
<i>Level</i> subfunction
<i>Parameters</i>
APIID: dtID 1
<i>Primary actor(s)</i>
1 actAdministrator [active]
<i>Goal(s) description</i>
The administrator's goal is to delete an existing point of interest.
<i>Protocol condition(s)</i>
1 the iCrash system has been deployed. the to be deleted point of interest exists in the system.
<i>Pre-condition(s)</i>
1 none
<i>Main post-condition(s)</i>
1 the point of interest is deleted. a message is returned to the administrator that the PI was successfully deleted.
<i>Additional Information</i>
none

2.3.1.20 subfunction-oeDeliverRequest

The coordinator's goal is to change the status of the request and hand it over to the administrator.

USE-CASE DESCRIPTION
<i>Name</i> oeDeliverRequest
<i>Scope</i> system
<i>Level</i> subfunction
<i>Parameters</i>
ARequestID: dtID 1
<i>Primary actor(s)</i>
1 actCoordinator [active]
<i>Secondary actor(s)</i>

continues in next page ...

... Use-Case Description table continuation

1	actPerson [passive]
2	actAdministrator [passive]
Goal(s) description	
The coordinator's goal is to change the status of the request and hand it over to the administrator.	
Protocol condition(s)	
1	the iCrash system has been deployed. a request must exist in the system.
Pre-condition(s)	
1	none
Main post-condition(s)	
1	the request status is changed to pending. the coordinator gets a message that the request has been delivered to the administrator.
Additional Information	
none	

2.3.1.21 subfunction-oeGetAlertSet

goal is to request a list with every existing alert in the system matching the given parameters

USE-CASE DESCRIPTION	
Name	oeGetAlertSet
Scope	system
Level	subfunction
Parameters	
AetAlertStatus: etAlertStatus 1	
Primary actor(s)	
1	actCoordinator [active]
Goal(s) description	
goal is to request a list with every existing alert in the system matching the given parameters	
Protocol condition(s)	
1	1
Pre-condition(s)	
1	1
Main post-condition(s)	
1	1
Additional Information	
none	

2.3.1.22 subfunction-oe GetAllRequests

The coordinator's goal is to get a list of requests sent by the person.

USE-CASE DESCRIPTION	
Name	oe GetAllRequests
Scope	system
Level	subfunction

continues in next page ...

... Use-Case Description table continuation

<i>Primary actor(s)</i>
1 actCoordinator[active]
<i>Secondary actor(s)</i>
1 actPerson[multiple]
<i>Goal(s) description</i>
The coordinator's goal is to get a list of requests sent by the person.
<i>Protocol condition(s)</i>
1 the iCrash system has been deployed.
<i>Pre-condition(s)</i>
1 none
<i>Main post-condition(s)</i>
1 the coordinator gets a list of requests sent by the person.
<i>Additional Information</i>
none

2.3.1.23 subfunction-oe GetAllRequestsFromCoordinator

The administrator's goal is to retrieve pending requests.

USE-CASE DESCRIPTION	
Name	oe GetAllRequestsFromCoordinator
Scope	system
Level	subfunction
<i>Primary actor(s)</i>	
1	actAdministrator[active]
<i>Secondary actor(s)</i>	
1	actCoordinator[passive]
2	actPerson[multiple]
<i>Goal(s) description</i>	
The administrator's goal is to retrieve pending requests.	
<i>Protocol condition(s)</i>	
1	the iCrash system has been deployed.
<i>Pre-condition(s)</i>	
1	none
<i>Main post-condition(s)</i>	
1	the administrator gets a list of pending requests.
<i>Additional Information</i>	
none	

2.3.1.24 subfunction-oeGetCrisisSet

goal is to request a list with every existing crisis in the system matching the given parameters

USE-CASE DESCRIPTION	
Name	oeGetCrisisSet
Scope	system

continues in next page ...

... Use-Case Description table continuation

<i>Level</i>	subfunction
Parameters	
AetCrisisStatus: etCrisisStatus 1	
Primary actor(s)	
1 actCoordinator[active]	
Goal(s) description	
goal is to request a list with every existing crisis in the system matching the given parameters	
Protocol condition(s)	
1 1	
Pre-condition(s)	
1 1	
Main post-condition(s)	
1 1	
Additional Information	
none	

2.3.1.25 subfunction-oeGetDescription

The person's goal is to get an exact description of the selected point of interest.

USE-CASE DESCRIPTION	
<i>Name</i>	oeGetDescription
<i>Scope</i>	system
<i>Level</i>	subfunction
Parameters	
APIID: dtID 1	
Primary actor(s)	
1 actPerson[active]	
Secondary actor(s)	
1 actAdministrator[passive]	
Goal(s) description	
The person's goal is to get an exact description of the selected point of interest.	
Protocol condition(s)	
1 the iCrash system has been deployed. the point of interest must figure between the PIs in the system.	
Pre-condition(s)	
1 none	
Main post-condition(s)	
1 a message with the exact description of the PI is sent to the person.	
Additional Information	
none	

2.3.1.26 subfunction-oeGetGPSLocation

The person's goal is to get an exact GPS location of the selected point of interest.

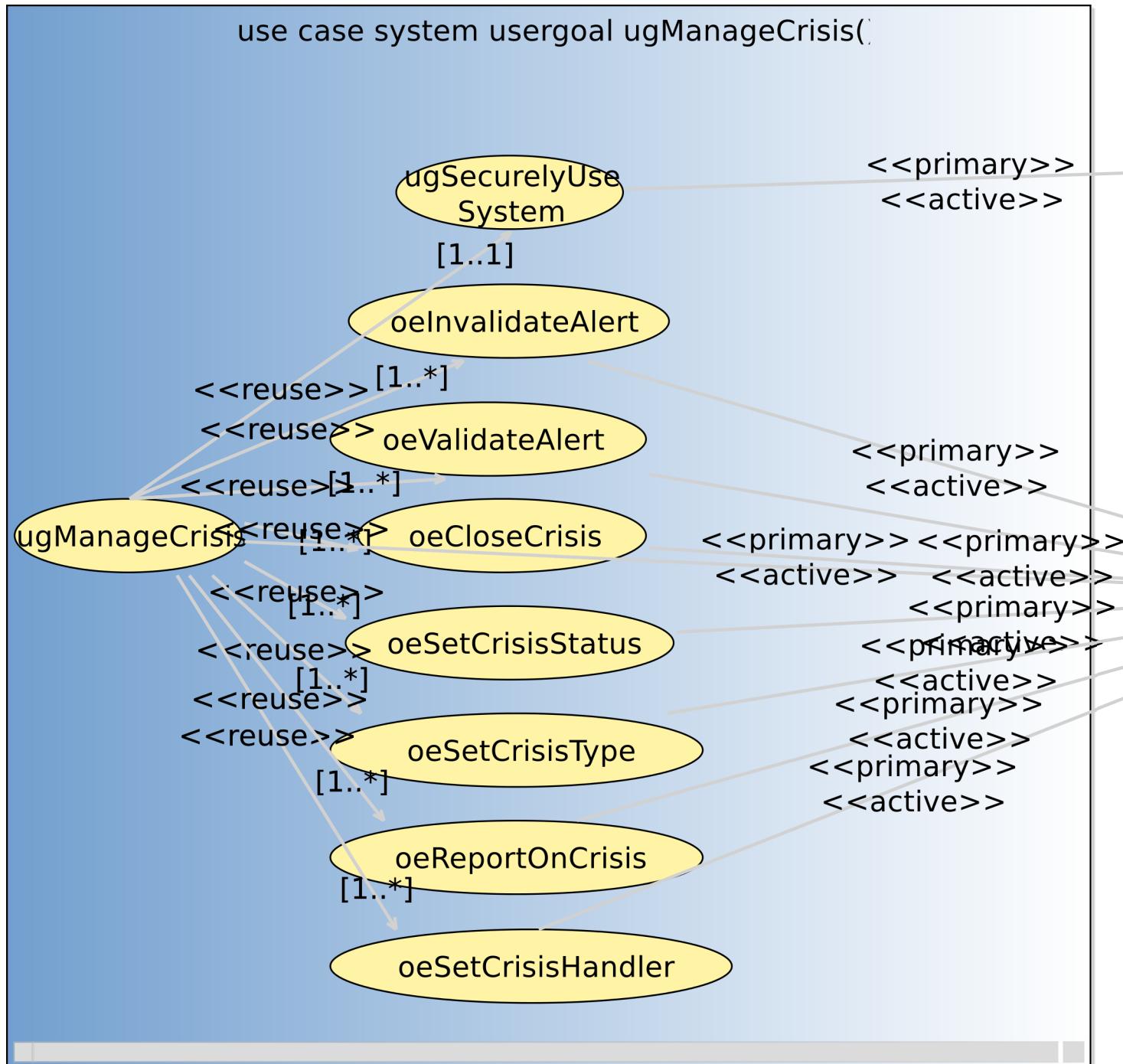


Figure 2.2: user goal Manage Crisis

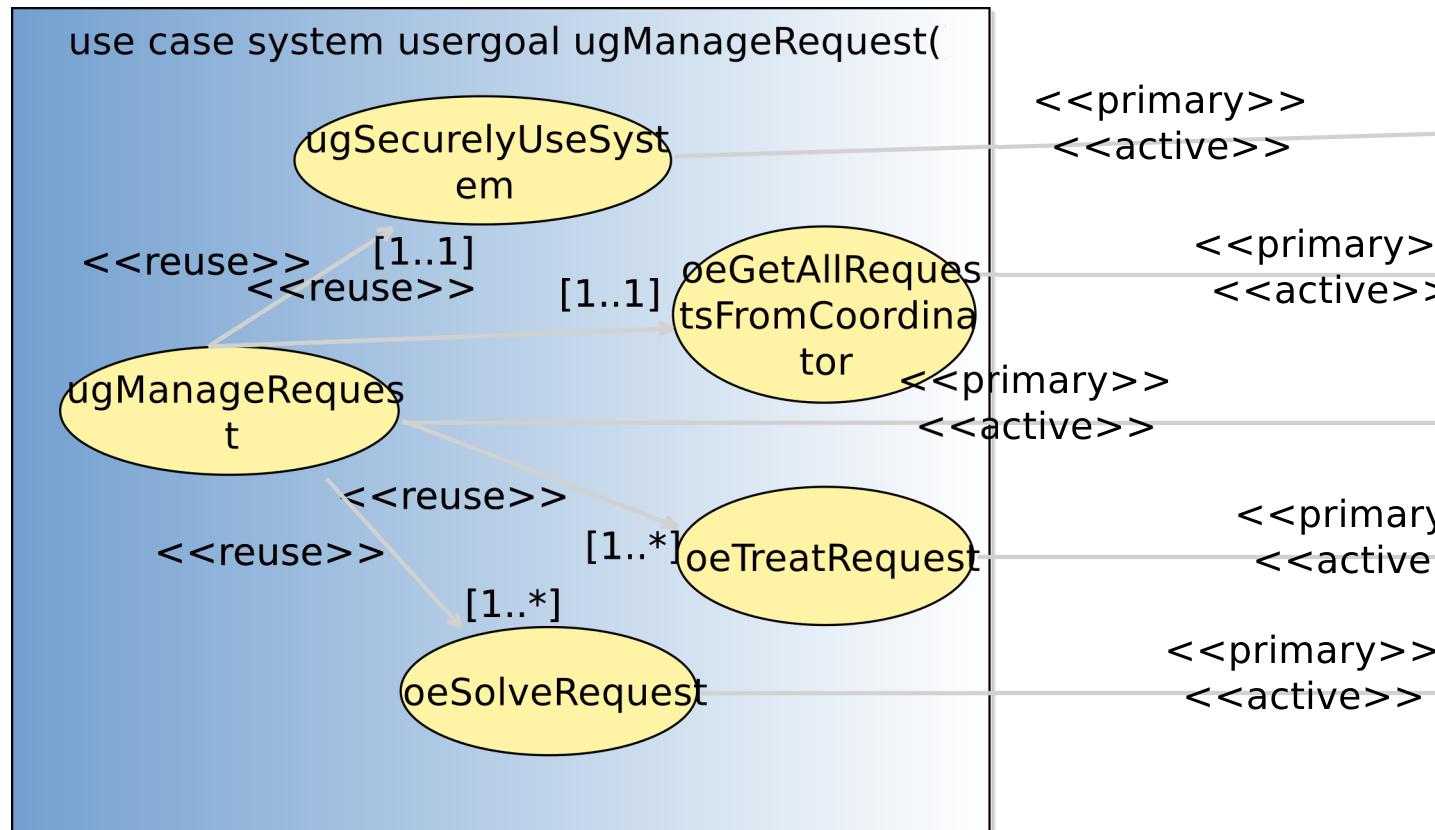


Figure 2.3: ugManageRequest user goal use case

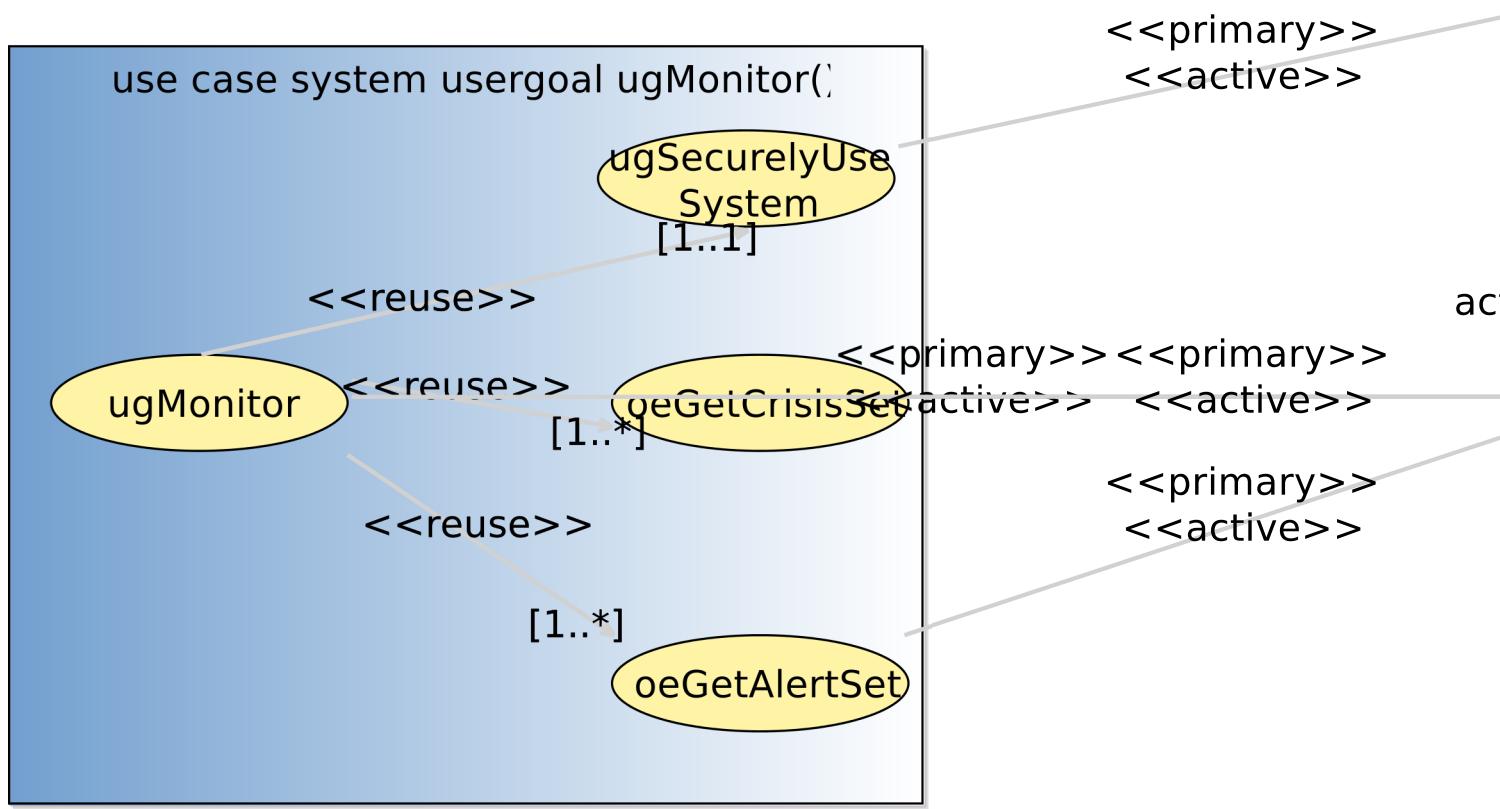


Figure 2.4: ugMonitor view

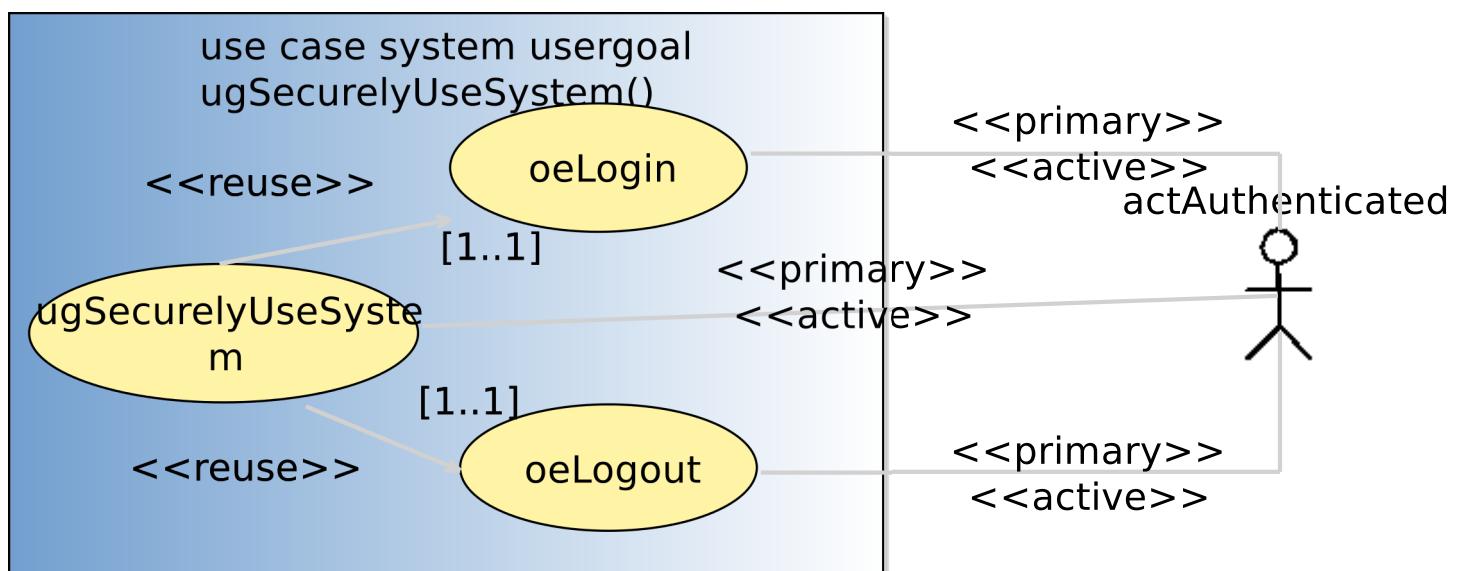


Figure 2.5: ugSecurelyUseSystem user goal use case

USE-CASE DESCRIPTION	
<i>Name</i>	oeGetGPSLocation
<i>Scope</i>	system
<i>Level</i>	subfunction
<i>Parameters</i>	
APIID: dtID 1	
<i>Primary actor(s)</i>	
1	actPerson[active]
<i>Secondary actor(s)</i>	
1	actAdministrator[passive]
<i>Goal(s) description</i>	
The person's goal is to get an exact GPS location of the selected point of interest.	
<i>Protocol condition(s)</i>	
1	the iCrash system has been deployed. the point of interest must figure between the PIs in the system.
<i>Pre-condition(s)</i>	
1	none
<i>Main post-condition(s)</i>	
1	a message with the exact exact GPS location of the PI is sent to the person.
<i>Additional Information</i>	
none	

2.3.1.27 subfunction-oeInvalidateAlert

goal is to set an alerts status to invalid

USE-CASE DESCRIPTION	
<i>Name</i>	oeInvalidateAlert
<i>Scope</i>	system
<i>Level</i>	subfunction
<i>Parameters</i>	
AdtAlertID: dtAlertID 1	
<i>Primary actor(s)</i>	
1	actCoordinator[active]
<i>Goal(s) description</i>	
goal is to set an alerts status to invalid	
<i>Protocol condition(s)</i>	
1	
<i>Pre-condition(s)</i>	
1	
<i>Main post-condition(s)</i>	
1	
<i>Additional Information</i>	
none	

2.3.1.28 subfunction-oeLogin

Used by any actor that is inherited by actAuthenticated to try and authenticate himself.

USE-CASE DESCRIPTION	
<i>Name</i>	oeLogin
<i>Scope</i>	system
<i>Level</i>	subfunction
Parameters	
ALogin: dtLogin 1	
APassword: dtPassword 2	
Primary actor(s)	
1	actAuthenticated[active]
Goal(s) description	
Used by any actor that is inherited by actAuthenticated to try and authenticate himself.	
Protocol condition(s)	
1	
Pre-condition(s)	
1	
Main post-condition(s)	
1	
Additional Information	
none	

2.3.1.29 subfunction-oeLoginWithCaptcha

To use by any actor that inherits actAuthenticate to authenticate the actor as not being a robot/machine.

USE-CASE DESCRIPTION	
<i>Name</i>	oeLoginWithCaptcha
<i>Scope</i>	system
<i>Level</i>	subfunction
Parameters	
ALogin: dtLogin 1	
APassword: dtPassword 2	
ACaptcha: dtCaptcha 3	
Primary actor(s)	
1	actAuthenticated[active]
Goal(s) description	
To use by any actor that inherits actAuthenticate to authenticate the actor as not being a robot/machine.	
Protocol condition(s)	

continues in next page ...

... Use-Case Description table continuation

1
<i>Pre-condition(s)</i>
1
<i>Main post-condition(s)</i>
1
<i>Additional Information</i>
none

2.3.1.30 subfunction-oeLogout

Used by any actor that is inherited by actAuthenticated to logout of the system.

USE-CASE DESCRIPTION
<i>Name</i> oeLogout
<i>Scope</i> system
<i>Level</i> subfunction
<i>Primary actor(s)</i>
1 actAuthenticated[active]
<i>Goal(s) description</i>
Used by any actor that is inherited by actAuthenticated to logout of the system.
<i>Protocol condition(s)</i>
1
<i>Pre-condition(s)</i>
1
<i>Main post-condition(s)</i>
1
<i>Additional Information</i>
none

2.3.1.31 subfunction-oeReportOnCrisis

goal is to add a report to a crisis

USE-CASE DESCRIPTION
<i>Name</i> oeReportOnCrisis
<i>Scope</i> system
<i>Level</i> subfunction
<i>Parameters</i>
AdtCrisisID: dtCrisisID 1
AdtComment: dtComment 2
<i>Primary actor(s)</i>
1 actCoordinator[active]
<i>Goal(s) description</i>
goal is to add a report to a crisis

continues in next page ...

... Use-Case Description table continuation

<i>Protocol condition(s)</i>
1
<i>Pre-condition(s)</i>
1
<i>Main post-condition(s)</i>
1
<i>Additional Information</i>
none

2.3.1.32 subfunction-oeResetPassword

Used by any actor that is inherited by actAuthenticated to receive a new password.

USE-CASE DESCRIPTION	
<i>Name</i>	oeResetPassword
<i>Scope</i>	system
<i>Level</i>	subfunction
<i>Parameters</i>	
ALogin: dtLogin 1	
<i>Primary actor(s)</i>	
1	actAuthenticated[active]
<i>Goal(s) description</i>	
Used by any actor that is inherited by actAuthenticated to receive a new password.	
<i>Protocol condition(s)</i>	
1	
<i>Pre-condition(s)</i>	
1	
<i>Main post-condition(s)</i>	
1	
<i>Additional Information</i>	
none	

2.3.1.33 subfunction-oeSearchPI

The person's goal is to get a match by searching for a point of interest.

USE-CASE DESCRIPTION	
<i>Name</i>	oeSearchPI
<i>Scope</i>	system
<i>Level</i>	subfunction
<i>Parameters</i>	
APIName: dtName 1	
APICategory: etCategory 2	

continues in next page ...

... Use-Case Description table continuation

APICity: dtCity 3
<i>Primary actor(s)</i>
1 actPerson[active]
<i>Secondary actor(s)</i>
1 actAdministrator[passive]
<i>Goal(s) description</i>
The person's goal is to get a match by searching for a point of interest.
<i>Protocol condition(s)</i>
1 the iCrash system has been deployed.
<i>Pre-condition(s)</i>
1 none
<i>Main post-condition(s)</i>
1 a message is returned to the person that the PI has been found, or not.
<i>Additional Information</i>
none

2.3.1.34 subfunction-oeSendNewRequest

The person's goal is to request a new point of interest to be added to the system.

USE-CASE DESCRIPTION
<i>Name</i> oeSendNewRequest
<i>Scope</i> system
<i>Level</i> subfunction
<i>Parameters</i>
APIName: dtName 1
APICategory: etCategory 2
APICity: dtCity 3
<i>Primary actor(s)</i>
1 actPerson[active]
<i>Secondary actor(s)</i>
1 actCoordinator[passive]
<i>Goal(s) description</i>
The person's goal is to request a new point of interest to be added to the system.
<i>Protocol condition(s)</i>
1 the iCrash system has been deployed.
<i>Pre-condition(s)</i>
1 none
<i>Main post-condition(s)</i>
1 a new request is created. a message is returned to the person that the request has been sent.
<i>Additional Information</i>
none

2.3.1.35 subfunction-oeSetClock

Used by actActivator to change the value of the time.

USE-CASE DESCRIPTION	
Name	oeSetClock
Scope	system
Level	subfunction
<i>Parameters</i>	
AcurrentTime: dtDateAndTime 1	
<i>Primary actor(s)</i>	
1	actActivator [proactive]
<i>Goal(s) description</i>	
Used by actActivator to change the value of the time.	
<i>Protocol condition(s)</i>	
1	
<i>Pre-condition(s)</i>	
1	
<i>Main post-condition(s)</i>	
1	
<i>Additional Information</i>	
none	

2.3.1.36 subfunction-oeSetCrisisHandler

goal is to declare himself as been the handler of a crisis having a specified id.

USE-CASE DESCRIPTION	
Name	oeSetCrisisHandler
Scope	system
Level	subfunction
<i>Parameters</i>	
AdtCrisisID: dtCrisisID 1	
<i>Primary actor(s)</i>	
1	actCoordinator [active]
<i>Goal(s) description</i>	
goal is to declare himself as been the handler of a crisis having a specified id.	
<i>Protocol condition(s)</i>	
1	1
<i>Pre-condition(s)</i>	
1	1
<i>Main post-condition(s)</i>	
1	1
<i>Additional Information</i>	
none	

2.3.1.37 subfunction-oeSetCrisisStatus

goal is to change the status of a crisis

USE-CASE DESCRIPTION	
Name	oeSetCrisisStatus
Scope	system
Level	subfunction
<i>Parameters</i>	
AdtCrisisID: dtCrisisID 1	
AetCrisisStatus: etCrisisStatus 2	
<i>Primary actor(s)</i>	
1	actCoordinator[active]
<i>Goal(s) description</i>	
goal is to change the status of a crisis	
<i>Protocol condition(s)</i>	
1	1
<i>Pre-condition(s)</i>	
1	1
<i>Main post-condition(s)</i>	
1	1
<i>Additional Information</i>	
none	

2.3.1.38 subfunction-oeSetCrisisType

goal is to change the type of a crisis

USE-CASE DESCRIPTION	
Name	oeSetCrisisType
Scope	system
Level	subfunction
<i>Parameters</i>	
AdtCrisisID: dtCrisisID 1	
AetCrisisType: etCrisisType 2	
<i>Primary actor(s)</i>	
1	actCoordinator[active]
<i>Goal(s) description</i>	
goal is to change the type of a crisis	
<i>Protocol condition(s)</i>	
1	1
<i>Pre-condition(s)</i>	
1	1
<i>Main post-condition(s)</i>	

continues in next page ...

... Use-Case Description table continuation

1	1
<i>Additional Information</i>	
none	

2.3.1.39 subfunction-oeSollicitateCrisisHandling

the actActivator's goal is to decrease the number of unhandled crisis.

USE-CASE DESCRIPTION	
<i>Name</i>	oeSollicitateCrisisHandling
<i>Scope</i>	system
<i>Level</i>	subfunction
<i>Primary actor(s)</i>	
1	actActivator [proactive]
<i>Goal(s) description</i>	
the actActivator's goal is to decrease the number of unhandled crisis.	
<i>Protocol condition(s)</i>	
1	1. the iCrash system has been deployed. 2. there exist some crisis still pending and for which no solicitation has been sent to the administrator and the coordinators for more than a predefined maximum delay.
<i>Pre-condition(s)</i>	
1	
<i>Main post-condition(s)</i>	
1	
<i>Additional Information</i>	
none	

2.3.1.40 subfunction-oeSolveRequest

The administrator's goal is to solve a treated request.

USE-CASE DESCRIPTION	
<i>Name</i>	oeSolveRequest
<i>Scope</i>	system
<i>Level</i>	subfunction
<i>Parameters</i>	
ARequestID: dtID 1	
<i>Primary actor(s)</i>	
1	actAdministrator [active]
<i>Secondary actor(s)</i>	
1	actPerson [passive]
<i>Goal(s) description</i>	
The administrator's goal is to solve a treated request.	
<i>Protocol condition(s)</i>	
1	the iCrash system has been deployed. a treated request must exist in the system.

continues in next page ...

... Use-Case Description table continuation

Pre-condition(s)
1 none
Main post-condition(s)
1 the request status is changed to solved. a message request solved is sent to the administrator.
Additional Information
none

2.3.1.41 subfunction-oeTreatRequest

The administrator's goal is to treat a pending request.

USE-CASE DESCRIPTION
<i>Name</i> oeTreatRequest
<i>Scope</i> system
<i>Level</i> subfunction
Parameters
ARequestID: dtID 1
Primary actor(s)
1 actAdministrator [active]
Secondary actor(s)
1 actPerson [passive]
Goal(s) description
The administrator's goal is to treat a pending request.
Protocol condition(s)
1 the iCrash system has been deployed. a pending request must exist in the system.
Pre-condition(s)
1 none
Main post-condition(s)
1 the request status is changed to treated. a message request being treated is sent to the administrator.
Additional Information
none

2.3.1.42 subfunction-oeUpdateCoordinatorAccessRights

goal is to update a coordinator's access rights in the system

USE-CASE DESCRIPTION
<i>Name</i> oeUpdateCoordinatorAccessRights
<i>Scope</i> system
<i>Level</i> subfunction
Parameters
AdtCoordinatorID: dtCoordinatorID 1
CoordinatorAccessRights: etCrisisType 2

continues in next page ...

... Use-Case Description table continuation

<i>Primary actor(s)</i>
1 actAdministrator [active]
<i>Goal(s) description</i>
goal is to update a coordinator's access rights in the system
<i>Protocol condition(s)</i>
1 1
<i>Pre-condition(s)</i>
1 1
<i>Main post-condition(s)</i>
1 1
<i>Additional Information</i>
none

2.3.1.43 subfunction-oeUpdatePI

The administrator's goal is to update the existing point of interest information.

USE-CASE DESCRIPTION	
Name	oeUpdatePI
Scope	system
Level	subfunction
<i>Parameters</i>	
APIID: dtID 1	
APIName: dtName 2	
APICity: dtCity 3	
APIGPSLocation: dtGPSLocation 4	
APIDescription: dtDescription 5	
APICategory: etCategory 6	
<i>Primary actor(s)</i>	
1	actAdministrator [active]
<i>Goal(s) description</i>	
The administrator's goal is to update the existing point of interest information.	
<i>Protocol condition(s)</i>	
1	the iCrash system has been deployed. there exists already the point of interest which has to be updated.
<i>Pre-condition(s)</i>	
1	none
<i>Main post-condition(s)</i>	
1	the point of interest has its new values. a message is returned to the administrator that the PI is up to date.

continues in next page ...

... Use-Case Description table continuation

<i>Additional Information</i>
none

2.3.1.44 subfunction-oeValidateAlert

goal is to set an alerts status to valid

USE-CASE DESCRIPTION
<i>Name</i> oeValidateAlert
<i>Scope</i> system
<i>Level</i> subfunction
<i>Parameters</i>
AdtAlertID: dtAlertID 1
<i>Primary actor(s)</i>
1 actCoordinator[active]
<i>Goal(s) description</i>
goal is to set an alerts status to valid
<i>Protocol condition(s)</i>
1
<i>Pre-condition(s)</i>
1
<i>Main post-condition(s)</i>
1
<i>Additional Information</i>
none

2.3.2 Use Case Instance(s)

2.3.2.1 Use-Case Instance - ucisuAddNewPI:suAddNewPI

Represents the instance of adding a new point of interest to the system.

SUMMARY USE-CASE INSTANCE
<i>Instantiated Use Case</i> suAddNewPI
<i>Instance ID</i> ucisuAddNewPI

Figure 2.6 The person searches for a specific PI which is not in the system. The coordinator checks if the problem is really true and sends it to the administrator. The administrator treats the request and adds the new PI to the system.

2.3.2.2 Use-Case Instance - ucisuGenerateNewAlert:suGenerateNewAlert

Represents the instance of alert the system of a potential crisis.

SUMMARY USE-CASE INSTANCE
<i>Instantiated Use Case</i> suGenerateNewAlert
<i>Instance ID</i> ucisuGenerateNewAlert

Figure 2.7 The person sends a Sms to the communication company about a possible alert to handle.

2.3.2.3 Use-Case Instance - ucisuGlobalCrisisHandling:suGlobalCrisisHandling

shows how the coordinator handles crisis

SUMMARY USE-CASE INSTANCE
<i>Instantiated Use Case</i> suGlobalCrisisHandling
<i>Instance ID</i> ucisuGlobalCrisisHandling

Figure 2.8 an example of how crisis are handled globally

2.3.2.4 Use-Case Instance - ucisuScenarioPresentation:suScenarioPresentation

Represents the instance of the three combined variants.

SUMMARY USE-CASE INSTANCE
<i>Instantiated Use Case</i> suScenarioPresentation

continues in next page ...

... summary Use-Case Instance table continuation

<i>Instance ID</i>
ucisuScenarioPresentation

Figure 2.9 Present the collaboration of the three variants.

2.3.2.5 Use-Case Instance - uciugAdministateTheSystem:ugAdministateTheSystem

A concrete instance how you can administrate the system.

USERGOAL USE-CASE INSTANCE
<i>Instantiated Use Case</i>
ugAdministateTheSystem

Instance ID
uciugAdministateTheSystem

Figure 2.10 example of how an administartor creates new coordinators

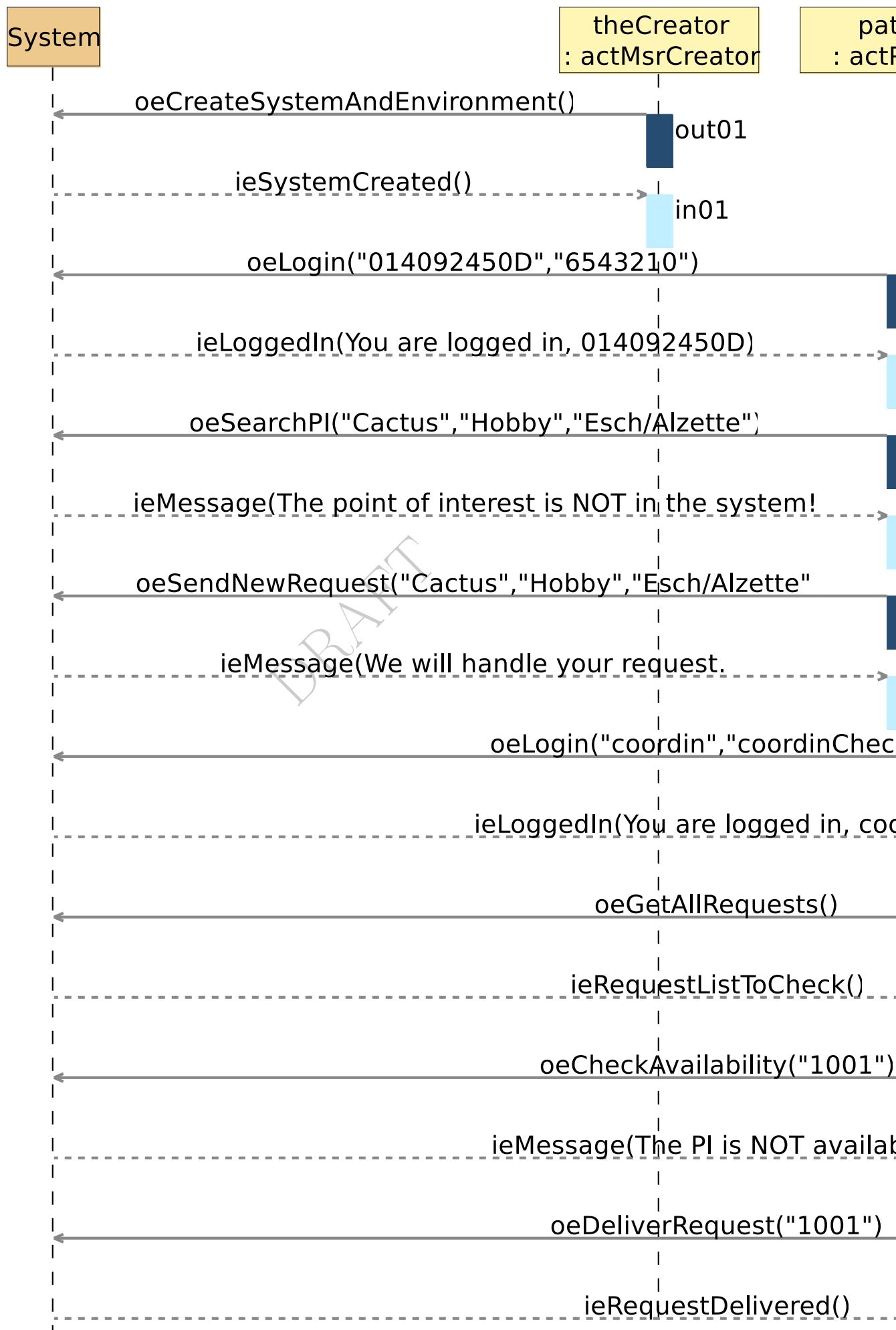
2.3.2.6 Use-Case Instance - uciugLoginWithCaptcha:ugLoginWithCaptcha

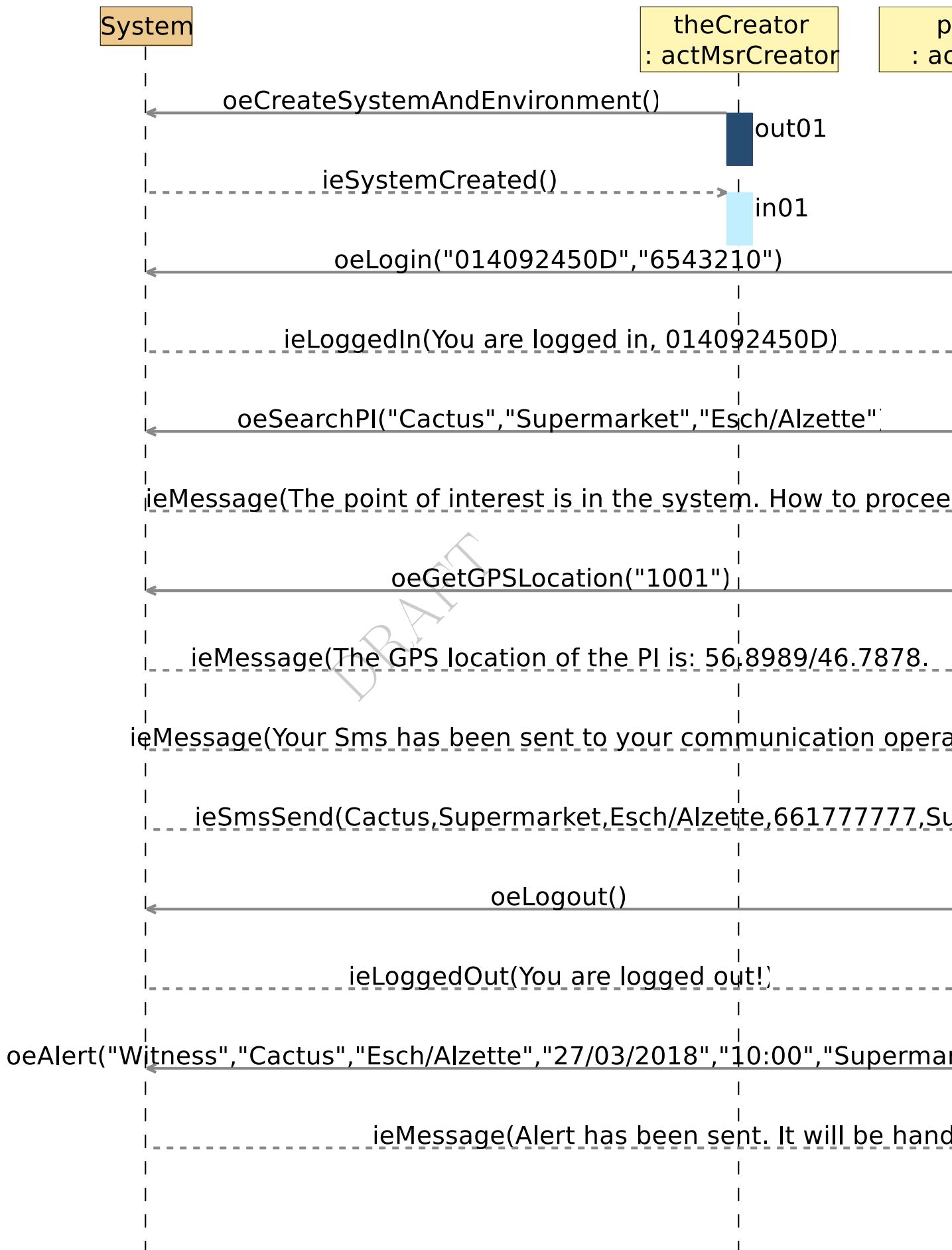
A concrete scenario how a coordinator fails to login three times in a row and has to solve the captcha.

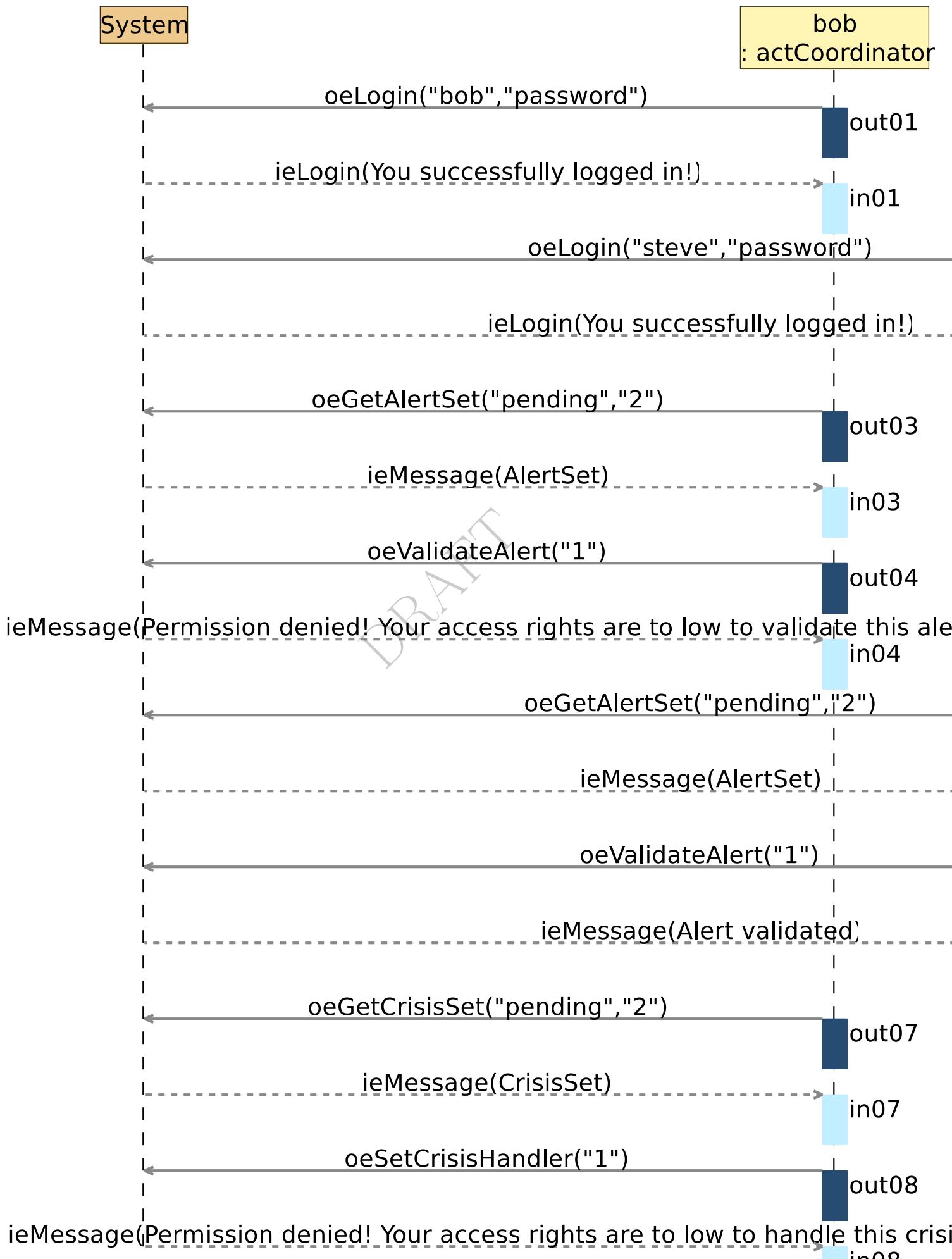
USERGOAL USE-CASE INSTANCE
<i>Instantiated Use Case</i>
ugLoginWithCaptcha

Instance ID
uciugLoginWithCaptcha

Figure 2.11 Logging in using the captcha. You first need to fail to login three times in a row.







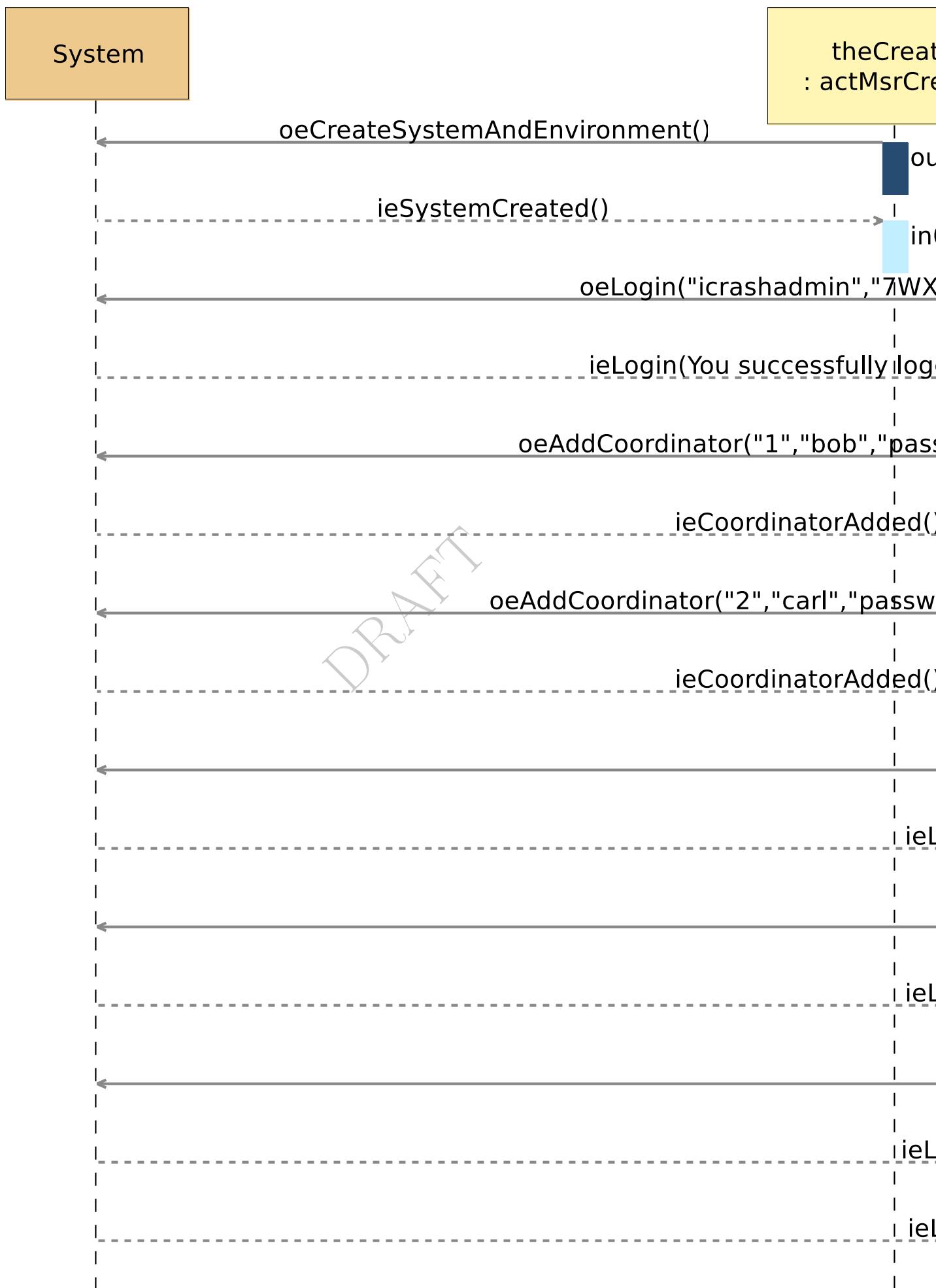




Figure 2.10:

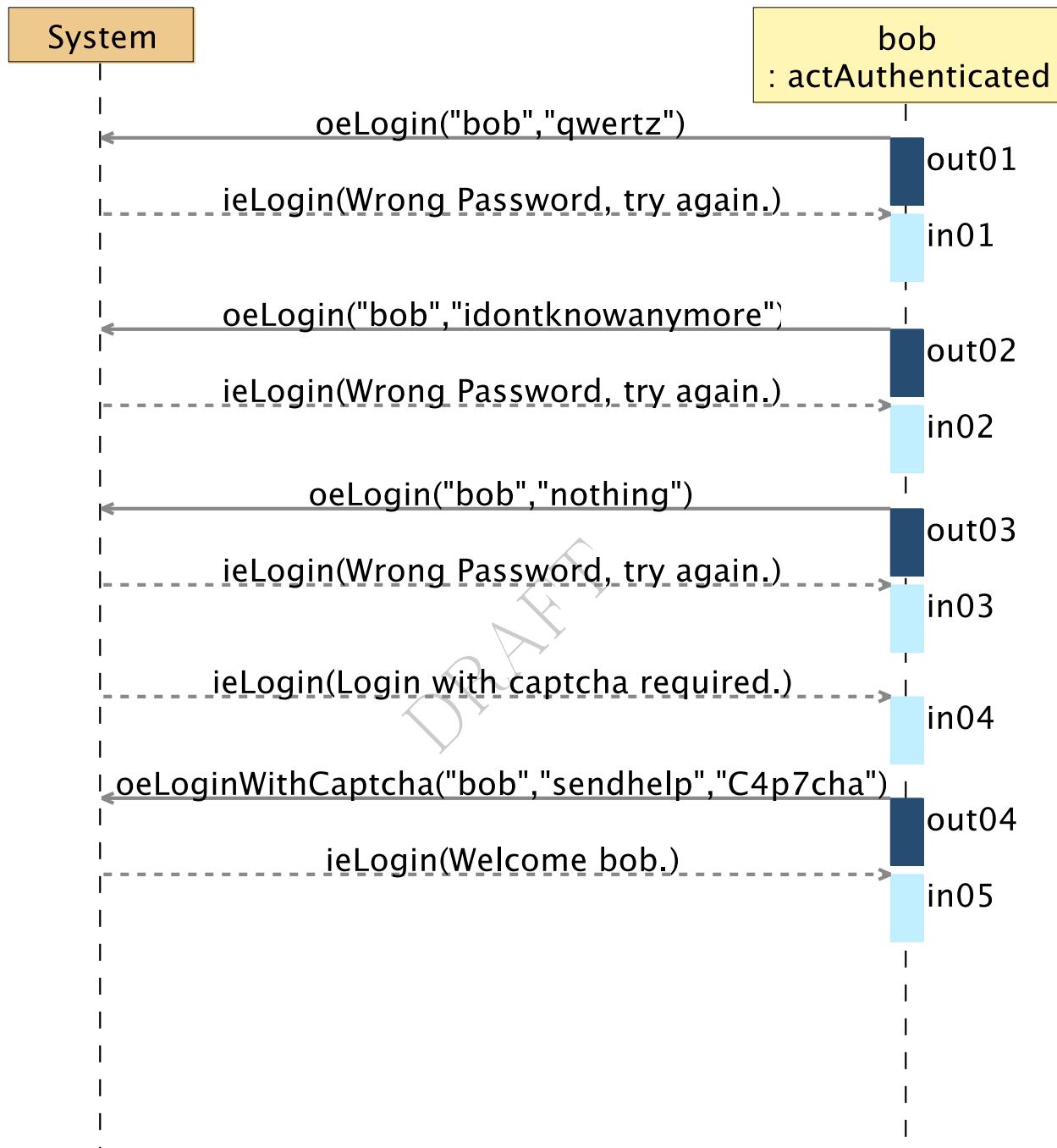


Figure 2.11:

Chapter 3

Environment Model

We provide below the view(s) defined for the **Messip** environment model (cf. [1]) of the system.

3.1 Global view 04

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Figure 3.1 presents the actors in relation to the ctState.

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 actActivator Actor

ACTOR	
<i>actActivator</i>	
represents a logical actor for time automatic message sending based on system's or environment status.	
<i>OutputInterfaces</i>	
OUT 1	oeSollicitateCrisisHandling() :ptBoolean The output event oeSollicitateCrisisHandling reminds the coordinators that there are still pending crisis.
OUT 2	oeSetClock (AcurrentTime:dtDateAndTime) :ptBoolean The output event oeSetClock updates the current time.

3.2.2 actAdministrator Actor

ACTOR	
<i>actAdministrator</i>	
PI variant: The actor Administrator is in charge of treating requested points of interests and adding, updating or deleting points of interests. The Administrator receives a request to add a new PI from a Person which the actor Coordinator checks before delivering them to the actor Administrator. Access Rights variant: The actor Administrator is in charge of managing coordinators. This includes creating and deleting them and updating their access rights.	
<i>Extends</i>	
lu.uni.lassy.excalibur.MyCrash.G02.environment.actAuthenticated	
<i>OutputInterfaces</i>	
OUT 1	oe GetAllRequestsFromCoordinator() :ptBoolean The output event oeGetAllRequestsFromCoordinator retrieves a list of requests which the actor Coordinator checked.
OUT 2	oeTreatRequest (ARequestID:dtID) :ptBoolean The output event oeTreatRequest modifies the request status to treated.
OUT 3	oeSolveRequest (ARequestID:dtID) :ptBoolean The output event oeTreatRequest modifies the request status to solved.
OUT 4	oeAddPI (APIID:dtID, APIName:dtName, APICity:dtCity, APIGPSLocation:dtGPSLocation, APIDescription:dtDescription, APICategory:etCategory) :ptBoolean The output event oeAddPI adds a new point of interest requested by the actor Person.
OUT 5	oeUpdatePI (APIID:dtID, APIName:dtName, APICity:dtCity, APIGPSLocation:dtGPSLocation, APIDescription:dtDescription, APICategory:etCategory) :ptBoolean The output event oeUpdatePI updates a point of interest.

continues in next page ...

...Actor table continuation

OUT 6	oeDeletePI (APIID:dtID) :ptBoolean
	The output event oeDeletePI deletes a point of interest.
OUT 7	oeAddCoordinator (AdtCoordinatorID:dtCoordinatorID, AdtLogin:dtLogin, AdtPassword:dtPassword, CoordinatorAccessRights:etCrisisType) :ptBoolean
	The output event oeAddCoordinator creates a new coordinator in the system.
OUT 8	oeDeleteCoordinator (AdtCoordinatorID:dtCoordinatorID) :ptBoolean
	The output event oeDeleteCoordinator deletes a coordinator in the system.
OUT 9	oeUpdateCoordinatorAccessRights (AdtCoordinatorID:dtCoordinatorID, CoordinatorAccessRights:etCrisisType) :ptBoolean
	The output event oeUpdateCoordinatorAccessRights updates a coordinator's access rights in the system.

InputInterfaces

IN 1	ieRequestList () :ptBoolean
	The input event ieRequestList returns a list of checked requests from the actor Coordinator to the actor Administrator.
IN 2	ieRequestBeingTreated () :ptBoolean
	The input event ieRequestBeingTreated specifies that the request is being treated.
IN 3	ieRequestSolved () :ptBoolean
	The input event ieRequestSolved confirms that the request was solved.
IN 4	iePIAdded () :ptBoolean
	The input event iePIAdded confirms that the requested point of interest has been added.
IN 5	iePIUpToDate () :ptBoolean
	The input event iePIUpToDate confirms that the requested point of interest has been updated.
IN 6	iePIDeleted () :ptBoolean
	The input event iePIDeleted confirms that the requested point of interest has been deleted.
IN 7	ieCoordinatorAdded () :ptBoolean
	The input event ieCoordinatorAdded confirms if a coordinator was successfully added to the system.
IN 8	ieCoordinatorDeleted () :ptBoolean
	The input event ieCoordinatorDeleted confirms if a coordinator was successfully deleted in the system.
IN 9	ieCoordinatorUpdated () :ptBoolean
	The input event ieCoordinatorUpdated confirms if a coordinator's access rights were successfully updated in the system.

3.2.3 actAuthenticated Actor

ACTOR
<i>actAuthenticated</i>
Authentication variant: The abstract actor authenticated is getting implemented by multiple other actors. It is needed to perform simple task, like login/logout. You can also request to reset your password.
<i>OutputInterfaces</i>
OUT 1 oeLogin (ALogin:dtLogin, APassword:dtPassword) :ptBoolean The output event oeLogin sends the username and password to the system, used to authenticate the user trying to login.

continues in next page ...

...Actor table continuation

OUT 2	oeLogout () :ptBoolean The output event oeLogout sends a logout request, from the currently logged in user, to the system.
OUT 3	oeLoginWithCaptcha (ALogin:dtLogin, APassword:dtPassword, ACaptcha:dtCaptcha) :ptBoolean The output event oeLoginWithCaptcha sends the username, password and captcha to the system, used to authenticate the user and to confirm that the user is not a robot.
OUT 4	oeResetPassword (ALogin:dtLogin) :ptBoolean The output event oeResetPassword requests a password request of any given user.

InputInterfaces

IN 1	ieLogin (AMessage:dtMessage) :ptBoolean The returned message from a positive or negative login. This input field is used when a user tries to login in any form. (Captcha or normal login)
IN 2	ieLoggedOut (AMessage:dtMessage) :ptBoolean The input event ieLoggedOut confirms that the logout has been completed.
IN 3	ieMessage (AMessage:dtMessage) :ptBoolean The input event ieMessage returns a message from the system that tells you useful things.
IN 4	ieResetPassword () :ptBoolean The input event ieResetPassword specifies that the request is being treated. Also tells you what you need to provide next.

3.2.4 actComCompany Actor

ACTOR	
<i>actComCompany</i>	
represents the communication company stakeholder ensuring the input/output of textual messages with humans having communication devices.	
<i>OutputInterfaces</i>	
OUT 1	oeAlert (APersonType:etPersonType, APIName:dtName, APIGPSLocation:dtGPSLocation, AdtDate:dtDate, AdtTime:dtTime, AProblemDescription:dtDescription, PhoneNumber:dtPhoneNumber) :ptBoolean The input event oeAlert redirects an alert received from a person to the coordinators.
<i>InputInterfaces</i>	
IN 1	ieSmsSend (APIName:dtName, APICategory:etCategory, ACity:dtCity, AdtPhoneNumber:dtPhoneNumber, AdtSMS:dtSMS) :ptBoolean The input event ieSmsSend returns a confirmation to the person who sent an alert.

3.2.5 actCoordinator Actor

ACTOR	
<i>actCoordinator</i>	
<i>continues in next page ...</i>	

...Actor table continuation

PI variant: The actor Coordinator is in charge of checking the requested points of interest of their existence in the system and to deliver the non-existing requested points of interest to the actor Administrator. Access Rights variant: The actor Coordinator is in charge of managing and monitoring alerts and crisis. This means he has the overview of over all alerts and crisis. He decides weather a alert should be validated or not. All the crisis managed by him, which means he is the only actor interacting and handling crisis.

Extends	
lu.uni.lassy.excalibur.MyCrash.G02.environment.actAuthenticated	
OutputInterfaces	
OUT 1 oe GetAllRequests () :ptBoolean	The output event oeGetAllRequests retrieves a list of requests sent by the actor Person.
OUT 2 oe CheckAvailability (ARequestID:dtID) :ptBoolean	The output event oeCheckAvailability confirms that a requested point of interest sent by the actor Person exists already in the system or not and sets the request ignored attribute to the corresponding value.
OUT 3 oe DeliverRequest (ARequestID:dtID) :ptBoolean	The output event oeDeliverRequest sends a checked request sent by the actor Person to the actor Administrator.
OUT 4 oe InvalidateAlert (AdtAlertID:dtAlertID) :ptBoolean	The output event oeInvalidateAlert puts the status of an alert to invalid.
OUT 5 oe ValidateAlert (AdtAlertID:dtAlertID) :ptBoolean	The output event oeValidateAlert puts the status of an alert to valid.
OUT 6 oe GetAlertSet (AetAlertStatus:etAlertStatus) :ptBoolean	The output event oeGetAlertSet requests a list with every existing alert in the system matching the given parameters.
OUT 7 oe CloseCrisis (AdtCrisisID:dtCrisisID) :ptBoolean	The output event oeCloseCrisis puts the status of a crisis to closed.
OUT 8 oe GetCrisisSet (AetCrisisStatus:etCrisisStatus) :ptBoolean	The output event oeGetCrisisSet requests a list with every existing crisis in the system matching the given parameters.
OUT 9 oe SetCrisisHandler (AdtCrisisID:dtCrisisID) :ptBoolean	The output event oeSetCrisisHandler sets a coordinator as handler of a crisis.
OUT 10 oe ReportOnCrisis (AdtCrisisID:dtCrisisID, AdtComment:dtComment) :ptBoolean	The output event oeReportOnCrisis adds a report to a crisis.
OUT 11 oe SetCrisisStatus (AdtCrisisID:dtCrisisID, AetCrisisStatus:etCrisisStatus) :ptBoolean	The output event oeSetCrisisStatus changes the status of a crisis.
OUT 12 oe SetCrisisType (AdtCrisisID:dtCrisisID, AetCrisisType:etCrisisType) :ptBoolean	The output event oeSetCrisisType changes the type of a crisis.
InputInterfaces	
IN 1 ie RequestListToCheck () :ptBoolean	The input event ieRequestListToCheck returns a list of requests which have to be checked from the actor Person to the actor Coordinator.
IN 2 ie RequestDelivered () :ptBoolean	The input event ieRequestDelivered specifies that the request has been delivered to the actor Coordinator.
IN 3 ie CrisisSet () :ptBoolean	

continues in next page ...

...Actor table continuation

	The input event ieCrisisSet returns a list with every existing crises in the system matching the given parameters.
IN 4	ieAlertSet () :ptBoolean The input event ieAlertSet returns a list with every existing alert in the system matching the given parameters.

3.2.6 actMsrCreator Actor

ACTOR	
<i>actMsrCreator</i>	
Represents the creator stakeholder in charge of state and environment initialization.	
<i>OutputInterfaces</i>	
OUT 1	oeCreateSystemAndEnvironment () :ptBoolean sent to request the initialization of the system's class instances and the environment actors instances.
<i>InputInterfaces</i>	
IN 1	ieSystemCreated () :ptBoolean confirmation message that the system was successfully created.

3.2.7 actPerson Actor

ACTOR	
<i>actPerson</i>	
PI variant: The actor Person is in charge of searching for a point of interest, get the exact GPS location and send a Sms to the communication company with a specific problem description. If the the PI is not available, the actor Person has the possibility to send a request to the system to add a new PI.	
<i>Extends</i>	
lu.uni.lassy.excalibur.MyCrash.G02.environment.actAuthenticated	
<i>OutputInterfaces</i>	
OUT 1	oeSearchPI (APIName:dtName, APICategory:etCategory, APICity:dtCity) :ptBoolean The output event oeSearchPI returns a point of interest.
OUT 2	oeSendNewRequest (APIName:dtName, APICategory:etCategory, APICity:dtCity) :ptBoolean The output event oeSendNewRequest adds a new requested PI to the system.
OUT 3	oeGetGPSLocation (APIID:dtID) :ptBoolean The output event oeGetGPSLocation retrieves the exact GPS location of a searched PI.
OUT 4	oeGetDescription (APIID:dtID) :ptBoolean The output event oeGetDescription retrieves a description of a searched PI.
<i>InputInterfaces</i>	
IN 1	iePIAdded () :ptBoolean The input event iePIAdded confirms that the requested point of interest has been added to the system.

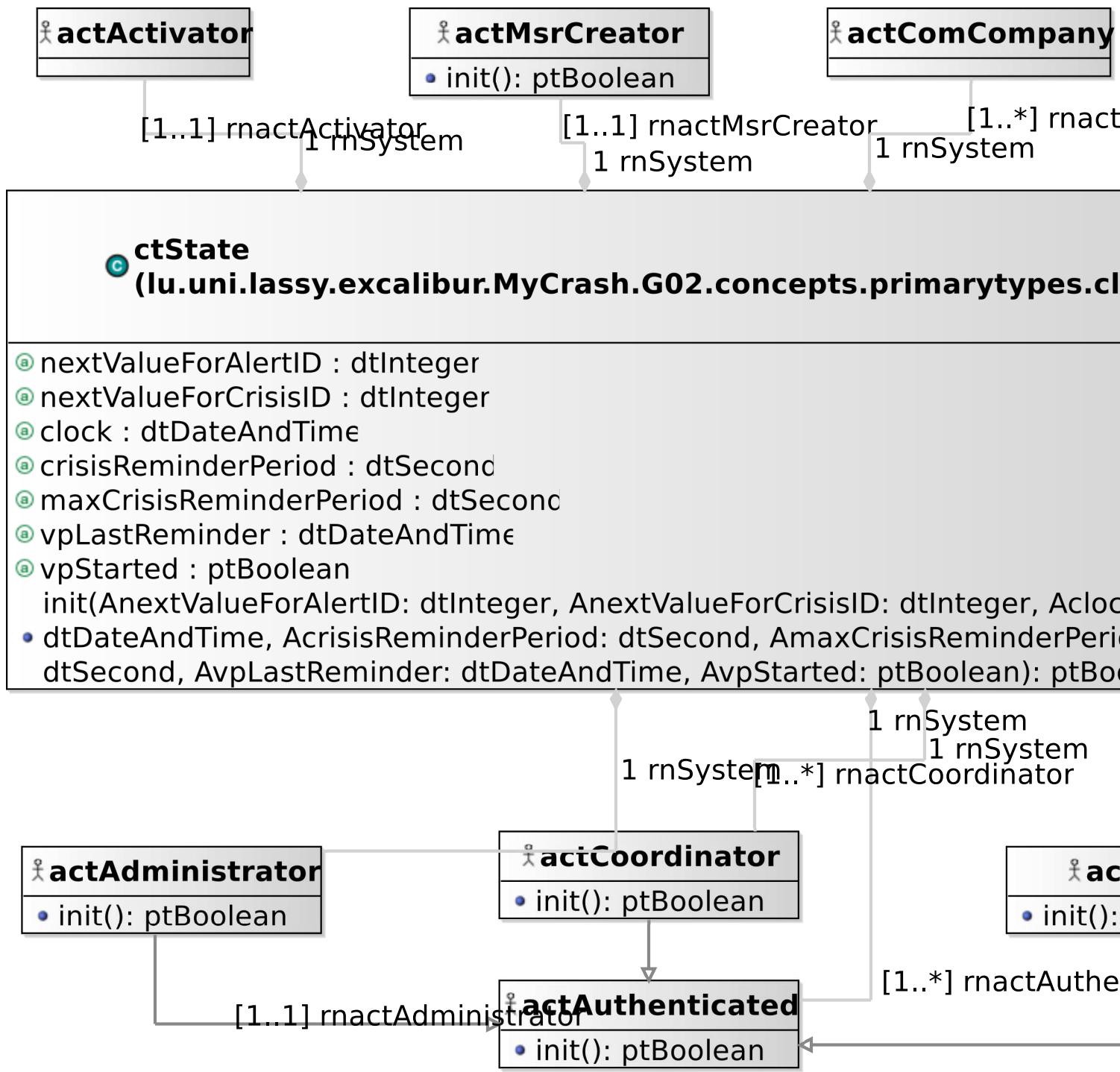


Figure 3.1: Environment Model - Global View 04. Environment global view 01.

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Chapter 4

Concept Model

4.1 PrimaryTypes-Classes

4.1.1 Local view 01

Figure 4.1 presents the relations between all the classes.

4.1.2 Global view 05

Figure 4.2 Represents class-actor relation for the PI variant

4.1.3 Global view 06

Figure 4.3 Represents class and actor relation for Access Rights variant.

4.2 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.

4.2.1 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.

CLASSES	
<i>ctAdministrator</i>	used to characterize internally the entity that is responsible of administrating the iCrash system.
extends operation	lu.uni.lassy.excalibur.MyCrash.G02.concepts.primarytypes.classes.ctAuthenticated init (Alogin:dtLogin, Apwd:dtPassword) :ptBoolean used to initialize the current object as a new instance of the ctAdministrator type.
<i>ctAlert</i>	Used to model crisis alerts sent by any human having communication capability using communication companies belonging to the system's environment

continues in next page ...

... Classes table continuation

attribute	comment: <code>dtComment</code> a textual description providing unstructured information on the alert.
attribute	id: <code>dtAlertID</code> the alert unique identification information.
attribute	instant: <code>dtDateAndTime</code> the date and time at which the alert notification has been sent.
attribute	location: <code>dtGPSLocation</code> the position of the alert provided by the space-based satellite navigation system used by the human using the communication company to inform the iCrash system of a crisis.
attribute	status: <code>etAlertStatus</code> the alert validation status
operation	init (Aid:dtAlertID, Astatus:etAlertStatus, Alocation:dtGPSLocation, Ainstant:dtDateAndTime, Acomment:dtComment) :ptBoolean used to initialize the current object as a new instance of the ctAlert type.
operation	isSentToCoordinator (AactCoordinator:ctCoordinator) :ptBoolean used to provide a given coordinator with current alert information.
<i>ctAuthenticated</i>	
used to model system's representation about actors that need to authenticate to access some specific functionalities.	
attribute	capReq: <code>ptBoolean</code> used to determine if the actor needs to solve a captcha.
attribute	lastAccess: <code>dtInteger</code> used to determine the last time the actor tried to login.
attribute	login: <code>dtLogin</code> an identifier for authentication.
attribute	pwd: <code>dtPassword</code> a key for authentication.
attribute	tries: <code>dtInteger</code> used to determine how many tries the actor tried to login.
attribute	vpIsLogged: <code>ptBoolean</code> used to determine the access status.
operation	init (Alogin:dtLogin, Apwd:dtPassword) :ptBoolean used to initialize the current object as a new instance of the ctAuthenticated type.
<i>ctCoordinator</i>	
used to model system's representation about the actors that have the responsibility to handle alerts and crisis.	
extends	lu.uni.lassy.excalibur.MyCrash.G02.concepts.primarytypes.classes.ctAuthenticated
attribute	id: <code>dtCoordinatorID</code> a unique identification information.
operation	init (Aid:dtCoordinatorID, Alogin:dtLogin, Apwd:dtPassword, Aaccessrights:etCrisisType) :ptBoolean used to initialize the current object as a new instance of the ctCoordinator type.
<i>ctCrisis</i>	
Used to model crisis that are inferred from the reception of at least one alert message. Crisis are entities that are handled by the iCrash system.	
attribute	comment: <code>dtComment</code> a textual description providing unstructured information on the crisis handling.

continues in next page ...

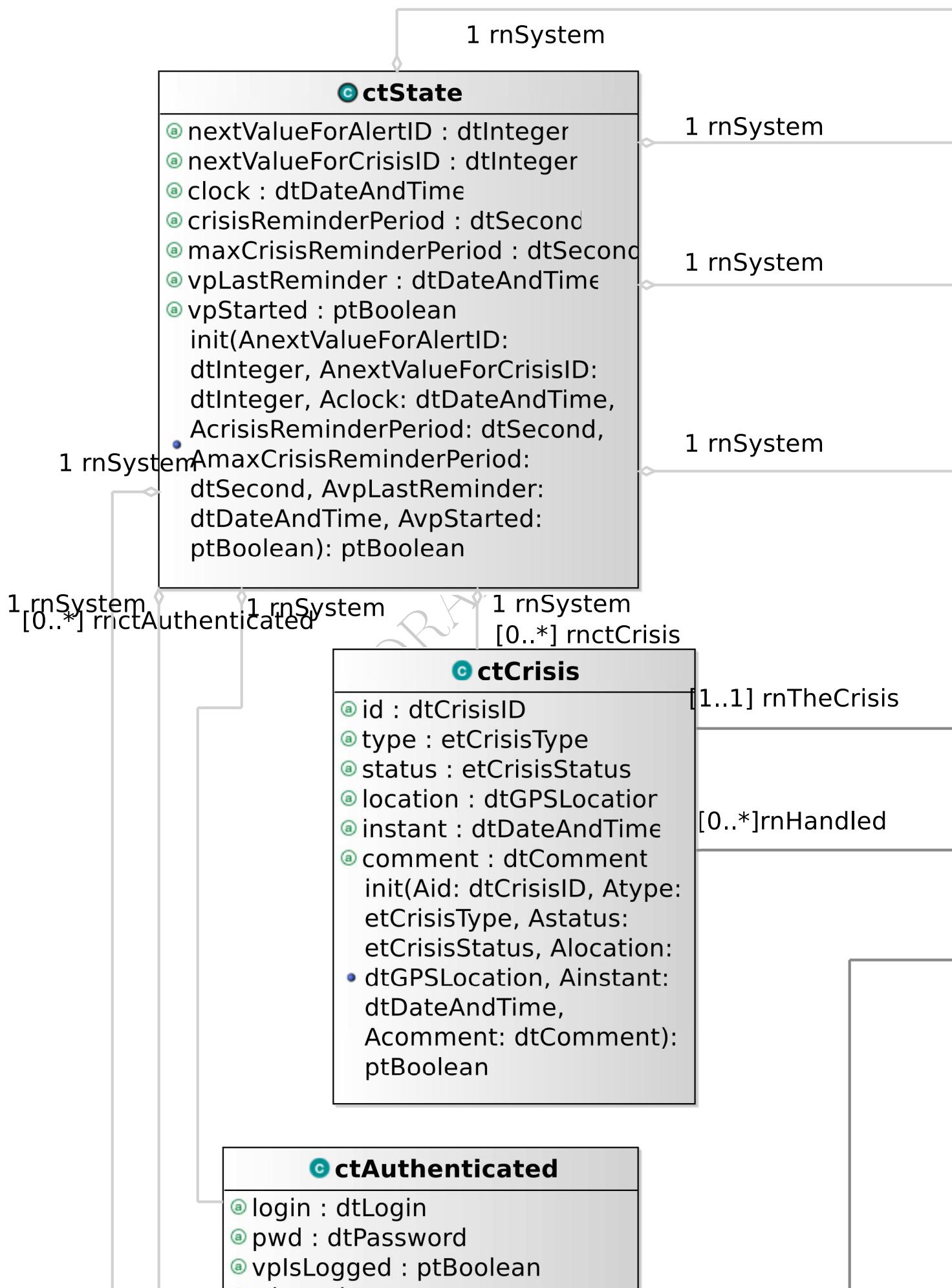
... Classes table continuation

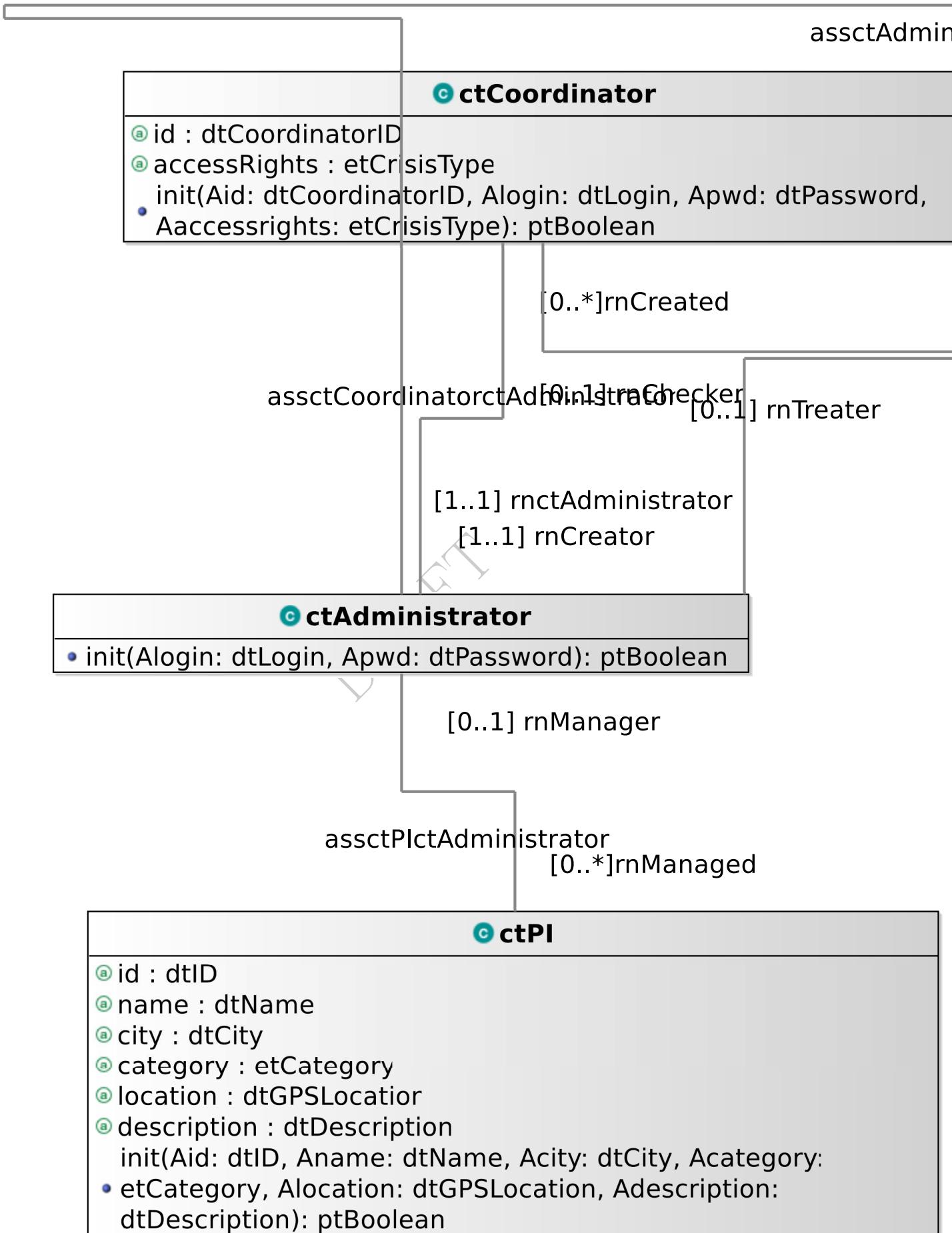
attribute	id: dtCrisisID the crisis unique identification information.
attribute	instant: dtDateAndTime the date and time at which the first related alert notification has been sent.
attribute	location: dtGPSLocation the position of the crisis equal by the one of the first alert received and associated to the crisis.
attribute	status: etCrisisStatus the crisis handling status.
attribute	type: etCrisisType an indication of the gravity of the crisis.
operation	init(Aid:dtCrisisID, Atype:etCrisisType, Astatus:etCrisisStatus, Alocation:dtGPSLocation, Ainstant:dtDateAndTime, Acomment:dtComment) :ptBoolean used to initialize the current object as a new instance of the ctAlert type.
ctPerson	
Used to model system's representation about the indirect actors that has alerted of potential crisis, but also perform requests for new potential points of interest.	
extends	lu.uni.lassy.excalibur.MyCrash.G02.concepts.primarytypes.classes.ctAuthenticated
attribute	id: dtPhoneNumber the person's unique identification information of type dtPhoneNumber.
attribute	personType: etPersonType the person type.
operation	init(Aid:dtPhoneNumber, Alogin:dtLogin, Apwd:dtPassword, ApersonType:etPersonType) :ptBoolean used to initialise the current object as a new instance of the ctPerson type.
ctPI	
Used to model points of interest that are introduced from the reception of at least one request. PIs are handled by the actor Administrator.	
attribute	category: etCategory classifies the PI in a sort of groups.
attribute	city: dtCity represents the location at the specific point of interest.
attribute	description: dtDescription a textual description providing information of the point of interest.
attribute	id: dtID the PIs unique identification information.
attribute	location: dtGPSLocation represents the location of the PI as GPS coordinates.
attribute	name: dtName represents the name of a point of interest.
operation	init(Aid:dtID, Aname:dtName, Acity:dtCity, Acategory:etCategory, Alocation:dtGPSLocation, Adescription:dtDescription) :ptBoolean used to initialise the current object as a new instance of the ctPI type.
ctRequest	
Used to model requests that are introduced from the actor Person as a new potential point of interest.	
attribute	category: etCategory

continues in next page ...

... Classes table continuation

attribute	classifies the new potential PI in a sort of groups.
	city: dtCity
attribute	represents the location at the new potential point of interest.
	id: dtID
attribute	the request's unique identification information.
	ignored: dtIgnored
attribute	represents the fact that the new to add point of interest already exists or not. Shall be ignored if yes.
	name: dtName
attribute	represents the potential name of the new point of interest.
	status: etRequestStatus
operation	the request handling status.
	init (Aid:dtID, Aname:dtName, Acity:dtCity, Acategory:etCategory, Astatus:etRequestStatus, Aignored:dtIgnored) :ptBoolean
	used to initialise the current object as a new instance of the ctRequest type.
ctState	
	used to model the system. Each system specified using Messir must include a ctState class for which there is only one instance at any state of the abstract machine after creation.
attribute	clock: dtDateAndTime
	used to represent the system local time.
attribute	crisisReminderPeriod: dtSecond
	used to define the delay between two reminders after which a reminder must be sent to the administrator and to the known coordinators to encourage them to handle the crisis.
attribute	maxCrisisReminderPeriod: dtSecond
	used to define the maximum delay after which the crisis is randomly allocated to a coordinator if any or an alert message is sent to the administrator in order to encourage him to add coordinators.
attribute	nextValueForAlertID: dtInteger
	nextValueForAlertID: dtInteger: used to associate each alert declared with a unique identification value.
attribute	nextValueForCrisisID: dtInteger
	used to associate each crisis declared with a unique identification value.
attribute	vpLastReminder: dtDateAndTime
	date and time of the last reminder.
attribute	vpStarted: ptBoolean
	used to avoid reacting to an actor message if the system is not started (i.e. oeCreateSystemAndEnvironment not executed).
operation	init (AnextValueForAlertID:dtInteger, AnextValueForCrisisID:dtInteger, Aclock:dtDateAndTime, AcrisisReminderPeriod:dtSecond, AmaxCrisisReminderPeriod:dtSecond, AvpLastReminder:dtDateAndTime, AvpStarted:ptBoolean) :ptBoolean
	used to initialize the current object as a new instance of the ctState type.





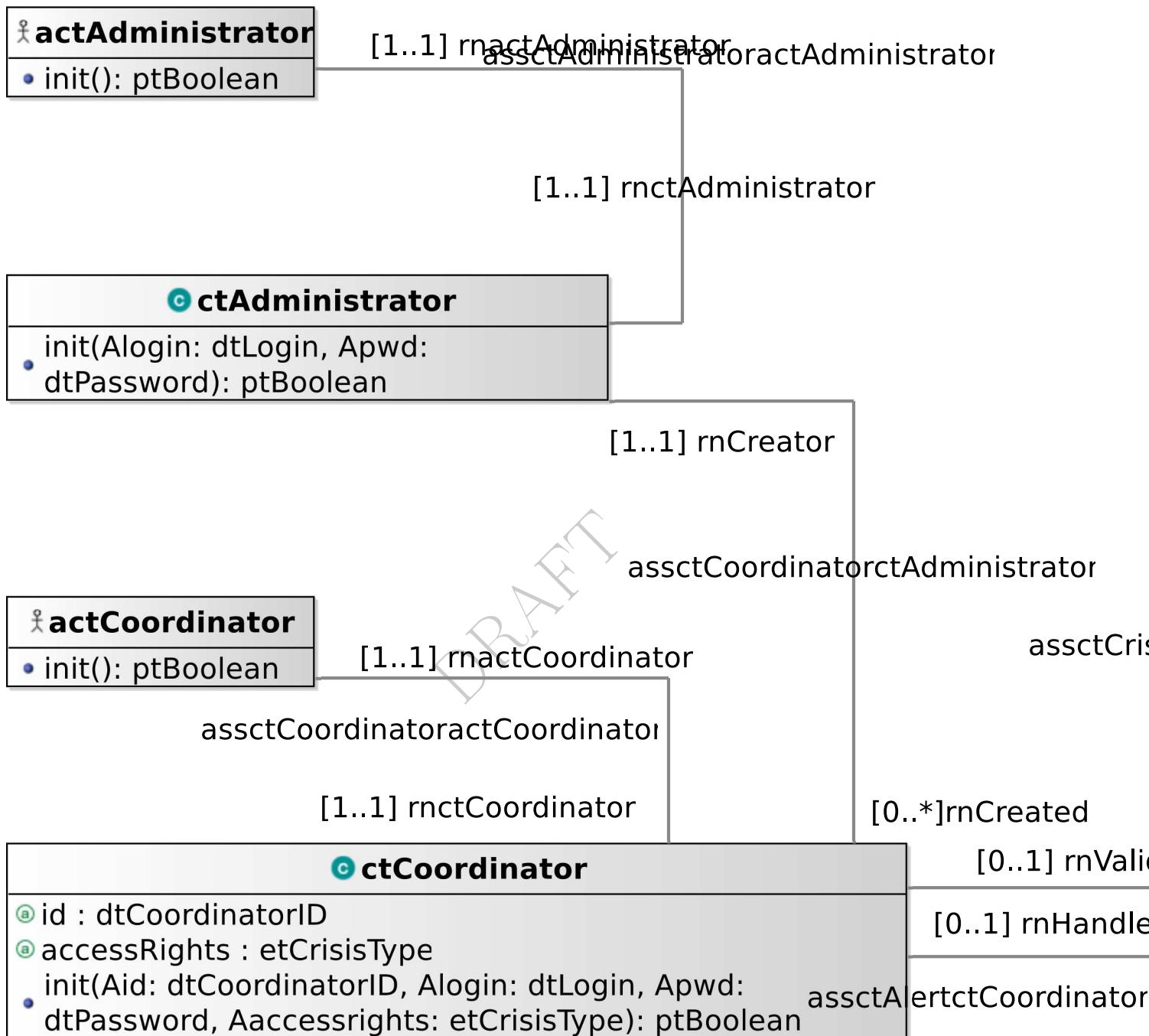


Figure 4.3: Concept Model - PrimaryTypes-Classes global view 06. ARvariant-CGV-01 concept global view 01.

4.2.2 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>dtAdministratorID</i>		
A string used to identify the administrator.		
<i>extends</i>	dtString	
<i>operation</i>	is () :ptBoolean	used to determine which strings are considered as valid administrator identifiers.
<i>dtAlertID</i>		
A string used to identify alerts.		
<i>extends</i>	dtString	
<i>operation</i>	is () :ptBoolean	used to determine which strings are considered as valid alert identifiers.
<i>dtCaptcha</i>		
A string used to store the Captcha information after the iCrash user failed to log in three times.		
<i>extends</i>	dtString	
<i>operation</i>	is () :ptBoolean	used to determine which strings are considered as valid dtCaptcha.
<i>dtCity</i>		
A string used to store the name of the city in which the point of interest is situated.		
<i>extends</i>	dtString	
<i>operation</i>	is () :ptBoolean	used to determine which strings are considered as valid dtCity.
<i>dtComment</i>		
A datatype made of a string value used to receive, store and send textual information about crisis and alerts.		
<i>extends</i>	dtString	
<i>operation</i>	is () :ptBoolean	used to determine which strings are considered as valid comments.
<i>dtCoordinatorID</i>		
A string used to identify coordinators.		
<i>extends</i>	dtString	
<i>operation</i>	is () :ptBoolean	used to determine which strings are considered as valid coordinators identifiers.
<i>dtCrisisID</i>		
A string used to identify crisis.		
<i>extends</i>	dtString	
<i>operation</i>	is () :ptBoolean	used to determine which strings are considered as valid crisis identifiers.
<i>dtDescription</i>		
A datatype made of a string value used to receive, store and send textual information about a point of interest.		
<i>extends</i>	dtString	
<i>operation</i>	is () :ptBoolean	used to determine which strings are considered as valid descriptions.
<i>dtGPSLocation</i>		

continues in next page ...

... Datatypes table continuation

Used to define coordinates of geographical positions on earth. It is defined a couple made of a latitude and a longitude.

<i>extends</i>	dtString
attribute	latitude: dtLatitude for the latitude part of the coordinate.
attribute	longitude: dtLongitude for the longitude part of the coordinate.
operation	is():ptBoolean used to determine which couples are considered as valid dtGPSLocation values.

dtID

A string used to identify points of interest and requests.

<i>extends</i>	dtString
operation	is():ptBoolean used to determine which strings are considered as valid points of interest and request identifiers.

dtIgnored

A boolean used to store the value considering if the request should be ignored or not.

operation	is():ptBoolean used to determine which boolean values are considered as valid dtIgnored.
-----------	--

dtLatitude

Used to define a latitude value of a geographical positions on earth.

<i>extends</i>	dtReal
operation	is():ptBoolean used to determine which strings are considered as valid dtLatitude.

dtLogin

A login string used to authentify an iCrash user.

<i>extends</i>	dtString
operation	is():ptBoolean used to determine which strings are considered as valid dtLogin.

dtLongitude

Used to define a longitude value of a geographical positions on earth.

<i>extends</i>	dtReal
operation	is():ptBoolean used to determine which strings are considered as valid dtLongitude.

dtMessage

A string used to store the information that will be sent as input event to the actors.

<i>extends</i>	dtString
operation	is():ptBoolean used to determine which strings are considered as valid dtMessage.

dtName

A string used to store the names of the points of interest.

<i>extends</i>	dtString
operation	is():ptBoolean used to determine which strings are considered as valid names.

dtPassword

A password string used to authentify an iCrash user.

<i>extends</i>	dtString
----------------	----------

continues in next page ...

... Datatypes table continuation

operation	is () :ptBoolean	
used to determine which strings are considered as valid dtPassword.		
dtPhoneNumber		
A string used to store the phone number from the person declaring the crisis or the alert.		
extends	dtString	
operation	is () :ptBoolean	
used to determine which strings are considered as valid dtPhoneNumber.		

ENUMERATIONS
etAlertStatus
This type is used to indicate the different validation status of an alert.
operation is () :ptBoolean
used to determine which literal belongs to the enumeration.
etCategory
This type is used to indicate the different categories of a point of interest.
operation is () :ptBoolean
used to determine which literal belongs to the enumeration.
etCrisisStatus
This type is used to indicate the different handling status of a crisis.
operation is () :ptBoolean
used to determine which literal belongs to the enumeration.
etCrisisType
This type is used to indicate the different types of a crisis.
operation is () :ptBoolean
used to determine which literal belongs to the enumeration.
etPersonType
This type is used to indicate the type of person that informs about a car crash crisis.
operation is () :ptBoolean
used to determine which literal belongs to the enumeration.
etRequestStatus
This type is used to indicate the different status of the request made for a point of interest.
operation is () :ptBoolean
used to determine which literal belongs to the enumeration.

4.2.3 Primary types - Association types descriptions

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

ASSOCIATIONS
assctAdministratoractAdministrator
frequent messages must be sent to coordinator especially in relation to coordinators they manage.
assctAlertctCoordinator
alerts need to be sent to coordinator in order to be validated or invalidated
assctAlertctCrisis
a crisis is related to one or more alerts as the alerts judged to concern all the same crisis due to their location. An alert alerts exactly one crisis.

continues in next page ...

...Associations table continuation

<i>assctAlertctPerson</i>	alerts are notified by person through the communication company. We need to keep an internal representation of those person to allow for communication of alert handling.
<i>assctAuthenticatedactAuthenticated</i>	mainly used to determine if the login request of an authenticated actor can be granted based on the given credentials and the registered ones.
<i>assctCoordinatoractCoordinator</i>	frequent messages must be sent to coordinator especially in relation to crisis they handle.
<i>assctCoordinatorctAdministrator</i>	one administrator manages more coordinators
<i>assctCrisisctCoordinator</i>	at any point in time we need to know if a coordinator is handling existing crisis or not.
<i>assctPersonactComCompany</i>	in order to communicate with person who informed about potential crisis, we need to record the communication company to use to send them messages.
<i>assctPersonactPerson</i>	messages must be sent to person
<i>assctPIctAdministrator</i>	one administrator is charge of handling various point of interest
<i>assctPIctPerson</i>	several people can request several points of interests
<i>assctRequestctAdministrator</i>	one administrator is charge of handling various point of interest requests
<i>assctRequestctCoordinator</i>	several coordinators are charge of monitoring various point of interest requests

4.2.4 Primary types - Aggregation types descriptions

There are no aggregation types for the primary types.

4.2.4.1 Primary types - Composition types descriptions

There are no composition types for the primary types.

4.2.5 Secondary types - Class types descriptions

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

4.2.6 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>dtSMS</i>	A datatype made of a string value used to send textual information to human mobile devices.
attribute	<i>value: ptString</i> the textual information.

continues in next page ...

... Datatypes table continuation

operation	is () :ptBoolean
used to determine which strings are considered as valid comments.	

4.2.7 Secondary types - Association types descriptions

There are no association types for the secondary types.

4.2.8 Secondary types - Aggregation types descriptions

There are no aggregation types for the secondary types.

4.2.9 Secondary types - Composition types descriptions

There are no composition types for the secondary types.

DRAFT

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 actAdministrator

5.1.1 Operation Model for oeAddPI

The oeAddPI operation has the following properties:

OPERATION	
<i>oeAddPI</i>	
sent to add a new point of interest in the system's post state.	
Parameters	
1	APIID: dtID used to initialise the id field
2	APIName: dtName used to initialise the name field
3	APICity: dtCity used to initialise the city field
4	APIGPSLocation: dtGPSLocation used to initialise the gps location field
5	APIDescription: dtDescription used to initialise the description field
6	APICategory: etCategory used to initialise the category field
Return type	
ptBoolean	
Pre-Condition (protocol)	
PreP 1	PreP01 the system is started.
PreP 2	PreP02 the actor logged previously and did not log out!
Pre-Condition (functional)	
PreF 1	PreF01 it is supposed that there exist one ctRequest instance with the same id attribute than the one the administrator wants to create.

continues in next page ...

... Operation table continuation

PreF 2	PreF02 it is supposed that there does NOT exist one ctPI instance with the same id attribute than the one the administrator wants to create.
Post-Condition (functional)	
PostF 1	PostF01 the new PI is added to the system.
PostF 2	PostF02 the administrator actor is informed about the satisfaction of its request.
PostF 3	PostF03 the person actor is informed about the satisfaction of its request.
Post-Condition (protocol)	
PostP 1	none

The listing 5.1 provides the **Messip** (MCL-oriented) specification of the operation.

```

1  /* Pre Protocol:*/
2  preP{let TheSystem:ctState in
3      let TheActor:actAdministrator in
4
5      self.rnActor.rnSystem = TheSystem
6      and self.rnActor = TheActor
7
8      /* PreP01 */
9      TheSystem.vpStarted = true
10
11     /* PreP02 */
12     and TheActor.rnctAuthenticated.vpIsLogged = true}
13
14 /* Pre Functional:*/
15 preF{let TheSystem:ctState in
16     let TheActor:actAdministrator in
17     let ColctPI:Set(ctPI) in
18     let ColctRequest:Set(ctRequest) in
19
20     self.rnActor.rnSystem = TheSystem
21     and self.rnActor = TheActor
22
23     /* PreF01 */
24     TheSystem.rnctPI->select(id.eq(APIID)) = ColctPI
25     and ColctPI->IsEmpty() = true
26
27     /* PreF02 */
28     and TheSystem.rnctRequest->select(id.eq(APIID) status.eq("solved")) = ColctRequest
29     and ColctRequest->IsEmpty() = false}
30
31 /* Post Functional:*/
32 postF{let TheSystem:ctState in
33     let TheActor:actAdministrator in
34     let ThectPI:ctPI in
35     let ThePerson:actPerson in
36
37     self.rnActor.rnSystem = TheSystem
38     and self.rnActor = TheActor
39
40     /* PostF01 */
41     ThectPI.init(APIID, APIName, APICity, APIGPSLocation, APIDescription, APICategory)
42
43     /* PostF02 */
44     and TheActor.rnInterfaceIN^iePIAdded()
45
46     /* PostF03 */
47     and ThePerson.rnInterfaceIN^iePIAdded()
48 }
```

```

50 /* Post Protocol:*/
51 postP{ true}

```

Listing 5.1: **Messip** (MCL-oriented) specification of the operation *oeAddPI*.

5.1.2 Operation Model for *oeUpdatePI*

The *oeUpdatePI* operation has the following properties:

OPERATION	
<i>oeUpdatePI</i>	
sent to update an existing point of interest in the system's post state.	
Parameters	
1	APIID: dtID id used for ctPI instance retrieval
2	APIName: dtName name used for ctPI instance retrieval
3	APICity: dtCity city used for ctPI instance retrieval
4	APIGPSLocation: dtGPSLocation gps location used for ctPI instance retrieval
5	APIDescription: dtDescription description used for ctPI instance retrieval
6	APICategory: etCategory category used for ctPI instance retrieval
Return type	
ptBoolean	
Pre-Condition (protocol)	
PreP 1	PreP01 the system is started.
PreP 2	PreP02 the actor logged previously and did not log out!
Pre-Condition (functional)	
PreF 1	PreF01 it is supposed that there exists one ctPI instance with the same id attribute than the one the administrator wants to delete.
Post-Condition (functional)	
PostF 1	PostF01 the PI is deleted from the system.
PostF 2	PostF02 the administrator actor is informed about the satisfaction of its request.
Post-Condition (protocol)	
PostP 1	none

The listing 5.2 provides the **Messip** (MCL-oriented) specification of the operation.

```

1
2 /* Pre Protocol:*/
3 preP{let TheSystem:ctState in
4   let TheActor:actAdministrator in
5
6   self.rnActor.rnSystem = TheSystem
7   and self.rnActor = TheActor
8

```

```

9   /* PreP01 */
10  TheSystem.vpStarted = true
11
12  /* PreP02 */
13  and TheActor.rnctAuthenticated.vpIsLogged = true}
14
15 /* Pre Functional:*/
16 preF{let TheSystem:ctState in
17   let TheActor:actAdministrator in
18   let ColctPI:Set(ctPI) in
19
20   self.rnActor.rnSystem = TheSystem
21   and self.rnActor = TheActor
22
23 /* PreF01 */
24 TheSystem.rnctPI->select(id.eq(APIID)) = ColctPI
25 and ColctPI->size().eq(1)}
26
27 /* Post Functional:*/
28 postF{let TheSystem:ctState in
29   let ThectPI:ctPI in
30   let TheActor:actAdministrator in
31
32   self.rnActor.rnSystem = TheSystem
33   and self.rnActor = TheActor
34
35 /* PostF01 */
36 ThectPI.rnctPI.name = APIName
37 and ThectPI.rnctPI.city = APIName
38 and ThectPI.rnctPI.location = AGPSLocation
39 and ThectPI.rnctPI.description = APIDescription
40 and ThectPI.rnctPI.category = APICategory
41
42 /* PostF02 */
43 and TheActor.rnInterfaceIN^iePIUpToDate()}}
44
45 /* Post Protocol:*/
46 postP{ true}

```

Listing 5.2: **Messip** (MCL-oriented) specification of the operation *oeUpdatePI*.

5.1.3 Operation Model for *oeDeletePI*

The *oeDeletePI* operation has the following properties:

OPERATION	
<i>oeDeletePI</i>	
sent to delete an existing point of interest in the system's post state.	
<i>Parameters</i>	
1	APIID: dtID used for ctPI instance retrieval
<i>Return type</i>	
ptBoolean	
<i>Pre-Condition (protocol)</i>	
PreP 1	PreP01 the system is started.
PreP 2	PreP02 the actor logged previously and did not log out!
<i>Pre-Condition (functional)</i>	
PreF 1	PreF01 it is supposed that there exists one ctPI instance with the same id attribute than the one the administrator wants to update.
<i>Post-Condition (functional)</i>	

continues in next page ...

...Operation table continuation

PostF 1	PostF01 the PI attributes are updated in the system.
PostF 2	PostF02 the administrator actor is informed about the satisfaction of its request.
Post-Condition (protocol)	
PostP 1	none

The listing 5.3 provides the **Messir** (MCL-oriented) specification of the operation.

```

1  /* Pre Protocol:*/
2  preP{let TheSystem:ctState in
3    let TheActor:actAdministrator in
4
5    self.rnActor.rnSystem = TheSystem
6    and self.rnActor = TheActor
7
8
9    /* PreP01 */
10   TheSystem.vpStarted = true
11
12   /* PreP02 */
13   and TheActor.rnctAuthenticated.vpIsLogged = true}
14
15 /* Pre Functional:*/
16 preF{let TheSystem:ctState in
17   let TheActor:actAdministrator in
18   let ColctPI:Set(ctPI) in
19
20   self.rnActor.rnSystem = TheSystem
21   and self.rnActor = TheActor
22
23   /* PreF01 */
24   TheSystem.rnctPI->select(id.eq(APIID)) = ColctPI
25   and ColctPI->size().eq(1)}
26
27 /* Post Functional:*/
28 postF{let TheSystem:ctState in
29   let TheActor:actAdministrator in
30   let ThectPI:ctPI in
31
32   self.rnActor.rnSystem = TheSystem
33   and self.rnActor = TheActor
34
35   /* PostF01 */
36   TheSystem.rnctPI->select(id.ed(APIID)) = ThectPI
37   and ThectPI.msrIsKilled
38
39   /* PostF02 */
40   and TheActor.rnInterfaceIN^iePIDeleted()}
41
42 /* Post Protocol:*/
43 postP{ true}
```

Listing 5.3: **Messir** (MCL-oriented) specification of the operation *oeDeletePI*.

5.1.4 Operation Model for *oe GetAllRequestsFromCoordinator*

The *oe GetAllRequestsFromCoordinator* operation has the following properties:

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

... Operation table continuation***oe GetAllRequestsFromCoordinator***

sent to get all the requests checked by the actor ActCoordinator in the system's post state.

Return type

ptBoolean

Pre-Condition (protocol)

PreP 1 PreP01 the system is started.

PreP 2 PreP02 the actor logged previously and did not log out!

Pre-Condition (functional)

PreF 1 none

Post-Condition (functional)

PostF 1 PostF01 the actor ActAdministrator gets a list of requests to handle if there are pending requests.

PostF 2 PostF02 the administrator actor is also informed about the non-satisfaction of its request.

Post-Condition (protocol)

PostP 1 none

The listing 5.4 provides the **Messip** (MCL-oriented) specification of the operation.

```

1  /* Pre Protocol:*/
2  preP{let TheSystem:ctState in
3    let TheActor:actAdministrator in
4
5    self.rnActor.rnSystem = TheSystem
6    and self.rnActor = TheActor
7
8    /* PreP01 */
9    TheSystem.vpStarted = true
10
11   /* PreP02 */
12   and TheActor.rnctAuthenticated.vpIsLogged = true}
13
14
15 /* Pre Functional:*/
16 preF{true}
17
18 /* Post Functional:*/
19 postF{let TheSystem:ctState in
20   let TheActor:actAdministrator in
21   let ColctRequest:Set(ctRequest) in
22
23   self.rnActor.rnSystem = TheSystem
24   and self.rnActor = TheActor
25
26   TheSystem.rnctRequest->select(status.eq("pending")) = ColctRequest
27
28   and if (ColctRequest->IsEmpty() = false)
29   then (
30     /* PostF01 */
31     and TheActor.rnInterfaceIN^ieRequestList()
32   )
33   else (
34     /* PostF02 */
35     and AMessip.eq('No requested points of interest!')
36     and TheActor.rnInterfaceIN^ieMessage(AMessip)
37   )
38 endif}
```

```

40 /* Post Protocol:*/
41 postP{ true}

```

Listing 5.4: **Messip** (MCL-oriented) specification of the operation *oe GetAllRequestsFromCoordinator*.

5.1.5 Operation Model for oeTreatRequest

The *oeTreatRequest* operation has the following properties:

OPERATION
<i>oeTreatRequest</i>
sent to treat the requested PI in the system's post state.
Parameters
1 ARequestID: dtID id used for ctRequest instance retrieval
Return type
ptBoolean
Pre-Condition (protocol)
PreP 1 PreP01 the system is started. PreP 2 PreP02 the actor logged previously and did not log out!
Pre-Condition (functional)
PreF 1 PreF01 it is supposed that there exists one ctRequest instance with the same id attribute and the status 'pending' than the one the administrator wants to treat.
Post-Condition (functional)
PostF 1 PostF01 the request's status is updated to 'treated' in the system. PostF 2 PostF02 the administrator actor is informed about the satisfaction of its request.
Post-Condition (protocol)
PostP 1 none

The listing 5.5 provides the **Messip** (MCL-oriented) specification of the operation.

```

1
2 /* Pre Protocol:*/
3 prep{let TheSystem:ctState in
4   let TheActor:actAdministrator in
5
6   self.rnActor.rnSystem = TheSystem
7   and self.rnActor = TheActor
8
9   /* PreP01 */
10  TheSystem.vpStarted = true
11
12  /* PreP02 */
13  and TheActor.rnctAuthenticated.vpIsLogged = true}
14
15 /* Pre Functional:*/
16 preF{let TheSystem:ctState in
17   let TheActor:actAdministrator in
18   let ColctRequest:Set(ctRequest) in
19
20   self.rnActor.rnSystem = TheSystem
21   and self.rnActor = TheActor

```

```

22  /* PreF01 */
23  TheSystem.rnctRequest->select(status.eq("pending")) = ColctRequest
24  and ColctRequest->IsEmpty() = false
25
26
27  /* Post Functional:*/
28  postF{let TheSystem:ctState in
29    let TheActor:actAdministrator in
30    let ThectRequest:ctRequest in
31
32    self.rnActor.rnSystem = TheSystem
33    and self.rnActor = TheActor
34
35    /* PostF01 */
36    ThectRequest.rnctRequest.status = "treated"
37
38    /* PostF02 */
39    and TheActor.rnInterfaceIN^ieRequestBeingTreated()
40
41  /* Post Protocol:*/
42  postP{ true}

```

Listing 5.5: **Messip** (MCL-oriented) specification of the operation *oeTreatRequest*.

5.1.6 Operation Model for *oeSolveRequest*

The *oeSolveRequest* operation has the following properties:

OPERATION	
<i>oeSolveRequest</i>	
sent to solve the requested PI in the system's post state.	
Parameters	
1	ARequestID: dtID id used for ctRequest instance retrieval
Return type	
ptBoolean	
Pre-Condition (protocol)	
PreP 1	PreP01 the system is started.
PreP 2	PreP02 the actor logged previously and did not log out!
Pre-Condition (functional)	
PreF 1	PreF01 it is supposed that there exists one ctRequest instance with the same id attribute and the status 'treated' than the one the administrator wants to solve.
Post-Condition (functional)	
PostF 1	PostF01 the request's status is updated to 'solved' in the system.
PostF 2	PostF02 the administrator actor is informed about the satisfaction of its request.
Post-Condition (protocol)	
PostP 1	none

The listing 5.6 provides the **Messip** (MCL-oriented) specification of the operation.

```

1
2  /* Pre Protocol:*/
3  preP{let TheSystem:ctState in

```

```

4   let TheActor:actAdministrator in
5
6     self.rnActor.rnSystem = TheSystem
7     and self.rnActor = TheActor
8
9     /* PreP01 */
10    TheSystem.vpStarted = true
11
12    /* PreP02 */
13    and TheActor.rnctAuthenticated.vpIsLogged = true}
14
15  /* Pre Functional:*/
16  preF{let TheSystem:ctState in
17    let TheActor:actAdministrator in
18    let ColctRequest:Set(ctRequest) in
19
20    self.rnActor.rnSystem = TheSystem
21    and self.rnActor = TheActor
22
23    /* PreF01 */
24    TheSystem.rnctRequest->select(status.eq("treated")) = ColctRequest
25    and ColctRequest->IsEmpty() = false}
26
27  /* Post Functional:*/
28  postF{let TheSystem:ctState in
29    let TheActor:actAdministrator in
30    let ThectRequest:ctRequest in
31
32    self.rnActor.rnSystem = TheSystem
33    and self.rnActor = TheActor
34
35    /* PostF01 */
36    ThectRequest.rnctRequest.status = "solved"
37
38    /* PostF02 */
39    and TheActor.rnInterfaceIN^ieRequestSolved()}
40
41  /* Post Protocol:*/
42  postP{ true}

```

Listing 5.6: **Messir** (MCL-oriented) specification of the operation *oeSolveRequest*.

5.1.7 Operation Model for oeAddCoordinator

The *oeAddCoordinator* operation has the following properties:

OPERATION	
<i>oeAddCoordinator</i>	
sent to add a new coordinator in the system's post state and environment's post state.	
Parameters	
1	AdtCoordinatorID: dtCoordinatorID used to initialize the id field
2	AdtLogin: dtLogin used to initialize the login field
3	AdtPassword: dtPassword used to initialize the password field
4	CoordinatorAccessRights: etCrisisType used to initialize the access right field
Return type	
ptBoolean	

continues in next page ...

... Operation table continuation

<i>Pre-Condition (protocol)</i>	
PreP 1 PreP 1 the system is started PreP 2 the actor logged previously and did not log out ! (i.e. the associated ctAdministrator instance is considered logged)	
<i>Pre-Condition (functional)</i>	
Pref 1 Pref 1 it is supposed that there cannot exist a ctCoordinator instance with the same id attribute as the one the administrator wants to delete.	
<i>Post-Condition (functional)</i>	
PostF 1 PostF 1 the environment has a new instance of coordinator actor allowing for input/output message communication with the system. PostF 2 the system's state has a new instance of ctCoordinator initialized with the given values. PostF 3 the new actor instance and ctCoordinator instance are related. PostF 4 the new actor instance and ctCoordinator instance are related according to the authenticated association. PostF 5 the administrator actor is informed about the satisfaction of its request.	
<i>Post-Condition (protocol)</i>	
PostP 1 PostP 1 none	

The listing 5.7 provides the **Messip** (MCL-oriented) specification of the operation.

```

1  /* Pre Protocol*/
2  preP{let TheSystem:ctState in
3    let TheActor:actAdministrator in
4
5    self.rnActor.rnSystem = TheSystem
6    and self.rnActor = The Actor
7
8    /* Pre P01 */
9    TheSystem.vpStarted = true
10
11   /* Pre P02 */
12   TheActor.rnctAuthenticated.vpIsLogged = true}
13
14
15 /* Pre Functional*/
16 pref{let TheSystem: ctState in
17   let TheActor:actAdministrator in
18   let ColctCoordinators:Bag(ctCoordinator) in
19
20   self.rnActor.rnSystem = TheSystem
21   and self.rnActor = TheActor
22
23   /* PreF01 */
24   and TheSystem.rnctCoordinator->select(id.eq(AdtCoordinatorID)) = ColctCoordinators
25   and ColctCoordinators->isEmpty() = true}
26
27 /* Post Functional*/
28 postF{let TheSystem: ctState in
29   let TheactCoordinator:actCoordinator in
30   let ThectCoordinator:ctCoordinator in
31
32   self.rnActor.rnSystem = TheSystem
33   and self.rnActor = TheActor
34
35   /* PostF01 */
36   TheactCoordinator.init()
37
38   /* PostF02 */
39   and ThectCoordinator.init(AdtCoordinatorID,AdtLogin,AdtPassword, CoordinatorAccessRights)

```

```

40  /* PostF03 */
41  and TheactCoordinator@post.rnctCoordinator = ThectCoordinator
42
43  /* PostF04 */
44  and ThectCoordinator@post.rnactAuthenticated = TheactCoordinator
45
46  /* PostF05 */
47  and TheActor.rnInterfaceIN^ieCoordinatorAdded()
48
49
50 /* Post Protocol:*/
51 postP{ true}

```

Listing 5.7: **Messip** (MCL-oriented) specification of the operation *oeAddCoordinator*.

5.1.8 Operation Model for *oeDeleteCoordinator*

The *oeDeleteCoordinator* operation has the following properties:

OPERATION	
<i>oeDeleteCoordinator</i>	
sent to delete an existing coordinator in the system's post state and environment's post state.	
Parameters	
1	AdtCoordinatorID: dtCoordinatorID used for ctCoordinator instance retrieval
Return type	
ptBoolean	
Pre-Condition (protocol)	
PreP 1	PreP 1 the system is started PreP 2 the actor logged previously and did not log out ! (i.e. the associated ctAdministrator instance is considered logged)
Pre-Condition (functional)	
PreF 1	PreF 1 it is supposed that there exist one ctCoordinator instance with the same id attribute than the one the administrator wants to delete.
Post-Condition (functional)	
PostF 1	PostF 1 the ctCoordinator class instance having the required id do not belong anymore to the post state as well as its related actCoordinator actor instance. PostF 2 the administrator actor is informed about the satisfaction of its request.
Post-Condition (protocol)	
PostP 1	PostP 1 none

The listing 5.8 provides the **Messip** (MCL-oriented) specification of the operation.

```

1  /* Pre Protocol:*/
2  preP{let TheSystem:ctState in
3    let TheActor:actAdministrator in
4
5    self.rnActor.rnSystem = TheSystem
6    and self.rnActor = The Actor
7
8
9  /* Pre P01 */
10 TheSystem.vpStarted = true
11

```

```

12     /* Pre P02 */
13     TheActor.rnctAuthenticated.vpIsLogged = true
14
15     /* Pre Functional:*/
16     preF{let TheSystem: ctState in
17         let TheActor:actAdministrator in
18         let ColctCoordinators:Bag(ctCoordinator) in
19
20         self.rnActor.rnSystem = TheSystem
21         and self.rnActor = TheActor
22
23         /* PreF01 */
24         TheSystem.rnctCoordinator->select(id.eq(AdtCoordinatorID)) = ColctCoordinators
25         and ColctCoordinators->size() .eq(1)
26
27     /* Post Functional:*/
28     postF{let TheSystem: ctState in
29         let TheActor:actAdministrator in
30         let ThectCoordinator:ctCoordinator in
31
32         self.rnActor.rnSystem = TheSystem
33         and self.rnActor = TheActor
34
35         /* PostF01 */
36         TheSystem.rnctCoordinator->select(id.eq(AdtCoordinatorID)) = ThectCoordinator
37         and ThectCoordinator.rnactCoordinator->forall(msrIsKilled)
38         and ThectCoordinator.msrIsKilled
39
40         /* PostF02 */
41         and TheActor.rnInterfaceIN^ieCoordinatorDeleted()
42
43         /* Post Protocol:*/
44         /* /* PostP01 */
45         and true}
46
47     /* Post Protocol:*/
48     postP{ true}

```

Listing 5.8: **Messip** (MCL-oriented) specification of the operation *oeDeleteCoordinator*.

5.1.9 Operation Model for *oeUpdateCoordinatorAccessRights*

The *oeUpdateCoordinatorAccessRights* operation has the following properties:

OPERATION	
<i>oeUpdateCoordinatorAccessRights</i>	
sent to update an existing coordinator's access rights in the system's post state and environment's post state.	
Parameters	
1	AdtCoordinatorID: dtCoordinatorID used for ctCoordinator instance retrieval
2	CoordinatorAccessRights: etCrisisType used to update access rights field
<i>Return type</i>	
ptBoolean	
<i>Pre-Condition (protocol)</i>	
PreP 1 PreP 1 the system is started PreP 2 the actor logged previously and did not log out ! (i.e. the associated ctAdministrator instance is considered logged)	
<i>Pre-Condition (functional)</i>	

continues in next page ...

...Operation table continuation

PreF 1	it is supposed that there exist one ctCoordinator instance with the same id attribute than the one the administrator wants to update.
Post-Condition (functional)	
PostF 1	PostF 1 the ctCoordinator class instance having the required id has its access rights updated in the post state as well as its related actCoordinator actor instance. PostF 2 the administrator actor is informed about the satisfaction of its request.
Post-Condition (protocol)	
PostP 1	PostP 1 none

The listing 5.9 provides the **Messip** (MCL-oriented) specification of the operation.

```

1  /* Pre Protocol:*/
2  preP{let TheSystem:ctState in
3    let TheActor:actAdministrator in
4
5    self.rnActor.rnSystem = TheSystem
6    and self.rnActor = The Actor
7
8    /* Pre P01 */
9    TheSystem.vpStarted = true
10
11   /* Pre P02 */
12   TheActor.rnctAuthenticated.vpIsLogged = true)
13
14
15 /* Pre Functional:*/
16 preF{let TheSystem: ctState in
17   let TheActor:actAdministrator in
18   let ColctCoordinators:Bag(ctCoordinator) in
19
20   self.rnActor.rnSystem = TheSystem
21   and self.rnActor = TheActor
22
23   /* PreF01 */
24   TheSystem.rnctCoordinator->select(id.eq(AdtCoordinatorID)) = ColctCoordinators
25   and ColctCoordinators->size().eq(1))
26
27 /* Post Functional:*/
28 postF{let TheSystem: ctState in
29   let TheActor:actAdministrator in
30   let ThectCoordinator:ctCoordinator in
31
32   self.rnActor.rnSystem = TheSystem
33   and self.rnActor = TheActor
34
35   /* PostF01 */
36   TheSystem.rnctCoordinator->select(id.eq(AdtCoordinatorID)) = ThectCoordinator
37   and ThectCoordinator.accessRights.eq(AaccessRights)
38
39   /* PostF02 */
40   and TheActor.rnInterfaceIN^ieCoordinatorAccessRightsUpdated())
41
42 /* Post Protocol:*/
43 postP{ true}

```

Listing 5.9: **Messip** (MCL-oriented) specification of the operation *oeUpdateCoordinatorAccessRights*.

5.2 Environment - Out Interface Operation Scheme for actAuthenticated

5.2.1 Operation Model for oeLogin

The oeLogin operation has the following properties:

OPERATION	
<i>oeLogin</i>	
sent to request authorization to request access secured system operations.	
Parameters	
1	ALogin: dtLogin first information used to determine accessibility rights for the actual actor.
2	APassword: dtPassword second information used to determine accessibility rights for the actual actor.
Return type	
ptBoolean	
Pre-Condition (protocol)	
PreP 1	PreP 1 the system is started PreP 2 the actor is not already logged in ! (i.e. the associated ctAuthenticated instance is not considered logged)
Pre-Condition (functional)	
PreF 1	PreF 1 none
Post-Condition (functional)	
PostF 1	PostF 1 if the login and password provided by the actor correspond to the ones that belong to the ctAuthenticated instance he is related to then a welcome message is sent to the actor (n.b. the logged status is changed as a post-protocol condition); else the actor is notified that he gave incorrect data and all the administrator actors existing in the environment are notified of an intrusion attempt.
Post-Condition (protocol)	
PostP 1	PostP 1 if the authentication information is correct then the actor is known to be logged in ! (i.e. the associated ctAuthenticated instance with given login and password is considered logged)

The listing 5.10 provides the **Messip** (MCL-oriented) specification of the operation.

```

1
2 /* Pre Protocol*/
3 prep{let TheSystem: ctState in
4   let TheActor:actAuthenticated in
5   self.rnActor.rnSystem = TheSystem
6   and self.rnActor = TheActor
7
8   /* Prep01 */
9   and TheSystem.vpStarted = true
10  /* Prep02 */
11  and TheActor.rnctAuthenticated.vpIsLogged = false
12  /* Prep03 */
13  and TheActor.rnctAuthenticated.capReq = false}
14
15 /* Pre Functional*/
16 preF{/* PreF01 */}
```

```

17    true}
18
19 /* Post Functional:*/
20 postF{let TheSystem: ctState in
21   let TheactAuthenticated:actAuthenticated in
22
23   let AptStringMessageForTheactAuthenticated: ptString in
24   let AptStringMessageForTheactAdministrator:ptString in
25
26   self.rnActor.rnSystem = TheSystem
27   and self.rnActor = TheactAuthenticated
28
29 and /* PostF01 */
30   if (TheactAuthenticated.rnctAuthenticated.pwd = AdtPassword
31     and TheactAuthenticated.rnctAuthenticated.login = AdtLogin )
32   then (AptStringMessageForTheactAuthenticated.eq('You are logged ! Welcome ...')
33     and TheactAuthenticated.rnInterfaceIN^ieMessage(AptStringMessageForTheactAuthenticated)
34   )
35 else (AptStringMessageForTheactAuthenticated
36   .eq('Wrong identification information ! Please try again ...')
37   and TheactAuthenticated.rnInterfaceIN^ieMessage(AptStringMessageForTheactAuthenticated)
38   and AptStringMessageForTheactAdministrator.eq('Intrusion tentative !')
39   and TheSystem.rnactAdministrator
40   .rnInterfaceIN^ieMessage(AptStringMessageForTheactAdministrator)
41   )
42 endif}
43
44 /* Post Protocol:*/
45 postP{ let TheSystem: ctState in
46   let TheactAuthenticated:actAuthenticated in
47
48   self.rnActor.rnSystem = TheSystem
49   and self.rnActor = TheactAuthenticated
50 /* PostP01 */
51   if (TheactAuthenticated.rnctAuthenticated.pwd = AdtPassword and
52 TheactAuthenticated.rnctAuthenticated.login = AdtLogin) then(
53   TheactAuthenticated.rnctAuthenticated@post.vpIsLogged = true and
54   TheactAuthenticated.rnctAuthenticated@post.tries = 0 and
55   TheactAuthenticated.rnctAuthenticated@post.lastAccess = -181
56 )else(
57   TheactAuthenticated.rnctAuthenticated@post.lastAccess = ((int)System.currentTimeMillis()/1000)
58   - TheactAuthenticated.rnctAuthenticated.lastAccess
59   if(TheactAuthenticated.rnctAuthenticated@post.lastAccess <= 180)then(
60     TheactAuthenticated.rnctAuthenticated@post.tries = TheactAuthenticated.rnctAuthenticated@post.
61     tries + 1
62   if (TheactAuthenticated.rnctAuthenticated@post.tries > 2) then(
63     TheactAuthenticated.rnctAuthenticated@post.capReq = true
64   )else
65     true
66   endif
67 )else(
68   TheactAuthenticated.rnctAuthenticated@post.tries = 1
69 )endif
70 )endif}
71

```

Listing 5.10: **Messip** (MCL-oriented) specification of the operation *oeLogin*.

5.2.2 Operation Model for *oeLogout*

The *oeLogout* operation has the following properties:

OPERATION
<i>oeLogout</i>
sent to end the secured access to specific system operations.
<i>Return type</i>

continues in next page ...

... Operation table continuation

ptBoolean
Pre-Condition (protocol)
PreP 1 PreP 1 the system is started PreP 2 the actor is currently logged in ! (i.e. the associated ctAuthenticated instance is considered logged)
Pre-Condition (functional)
PreF 1 PreF 1 none
Post-Condition (functional)
PostF 1 PostF 1 a logout confirmation message is sent to the actor (n.b. the logged status is changed as a post-protocol condition)
Post-Condition (protocol)
PostP 1 PostP 1 the actor is known to be logged out ! (i.e. the associated ctAuthenticated instance with given login and password is considered logged out)

The listing 5.11 provides the **Messip** (MCL-oriented) specification of the operation.

```

1  /* Pre Protocol:*/
2  preP{let TheSystem: ctState in
3    let TheActor:actAdministrator in
4    self.rnActor.rnSystem = TheSystem
5    and self.rnActor = TheActor
6
7
8  /* PreP01 */
9  and TheSystem.vpStarted = true
10 /* PreP02 */
11 and TheActor.rnctAuthenticated.vpIsLogged = true}
12
13 /* Pre Functional:*/
14 preF{/* PreF01 */
15   true}
16
17 /* Post Functional:*/
18 postF{let TheSystem: ctState in
19   let TheactAuthenticated:actAuthenticated in
20   let AptStringMessageForTheactAuthenticated: ptString in
21
22   self.rnActor.rnSystem = TheSystem
23   and self.rnActor = TheactAuthenticated
24
25  /* PostF01 */
26  AptStringMessageForTheactAuthenticated.eq('You are logged out ! Good Bye ...')
27  and TheactAuthenticated.rnInterfaceIN^ieMessage(AptStringMessageForTheactAuthenticated)}
28
29 /* Post Protocol:*/
30 postP{ let TheSystem: ctState in
31   let TheactAuthenticated:actAuthenticated in
32
33   self.rnActor.rnSystem = TheSystem
34   and self.rnActor = TheactAuthenticated.asSet
35  /* PostP01 */
36  TheactAuthenticated.rnctAuthenticated@post.vpIsLogged = false}
```

Listing 5.11: **Messip** (MCL-oriented) specification of the operation *oeLogout*.

5.2.3 Operation Model for oeLoginWithCaptcha

The *oeLoginWithCaptcha* operation has the following properties:

OPERATION	
<i>oeLoginWithCaptcha</i>	
This operation can and must only be done when capReq boolean value is true. Used to authenticate the user and to also authenticate the the user is not a robot.	
Parameters	
1	ALogin: dtLogin The username of the actor.
2	APassword: dtPassword The key to login of the actor.
3	ACaptcha: dtCaptcha The captcha the actor sent to the system to compare to the captcha to solve.
Return type	
ptBoolean	
Pre-Condition (protocol)	
PreP 1	
Pre-Condition (functional)	
PreF 1	
Post-Condition (functional)	
PostF 1	
Post-Condition (protocol)	
PostP 1	

The listing 5.12 provides the **Messip** (MCL-oriented) specification of the operation.

```

1  /* Pre Protocol:*/
2  preP{let TheSystem: ctState in
3    let TheActor:actAuthenticated in
4      self.rnActor.rnSystem = TheSystem
5      and self.rnActor = TheActor
6
7
8  /* PreP01 */
9  and TheSystem.vpStarted = true
10 /* PreP02 */
11 and TheActor.rnctAuthenticated.vpIsLogged = false
12 /* PreP03 */
13 and TheActor.rnctAuthenticated.capReq = true)
14
15 /* Pre Functional:*/
16 preF{/ * PreF01 */
17   true)
18
19 /* Post Functional:*/
20 postF{let TheSystem: ctState in
21   let TheactAuthenticated:actAuthenticated in
22
23   let AptStringMessageForTheactAuthenticated:ptString in
24   let AptStringMessageForTheactAdministrator:ptString in
25
26   self.rnActor.rnSystem = TheSystem
27   and self.rnActor = TheactAuthenticated
28
29   and /* PostF01 */
30   if(ACaptcha = TheactAuthenticated.rnctAuthenticated.cap2Solve) then
31     if (TheactAuthenticated.rnctAuthenticated.pwd = AdtPassword
32       and TheactAuthenticated.rnctAuthenticated.login = AdtLogin

```

```

33      )
34      then (AptStringMessageForTheactAuthenticated.eq('You are logged ! Welcome ...')
35      and TheactAuthenticated.rnInterfaceIN^ieMessage(AptStringMessageForTheactAuthenticated)
36      )
37      else (AptStringMessageForTheactAuthenticated
38      .eq('Wrong identification information ! Please try again ...')
39      and TheactAuthenticated.rnInterfaceIN^ieMessage(AptStringMessageForTheactAuthenticated)
40      and AptStringMessageForTheactAdministrator.eq('Intrusion tentative !')
41      and TheSystem.rnactAdministrator
42      .rnInterfaceIN^ieMessage(AptStringMessageForTheactAdministrator)
43      )
44      endif
45      else
46      (TheactAuthenticated.rnctAuthenticated@post.cap2Solve = random() and
47      AptStringMessageForTheactAuthenticated.eq('Wrong Captcha information ! Captcha: ' +
48      TheactAuthenticated.rnctAuthenticated@post.cap2Solve) and
49      TheactAuthenticated.rnInterfaceIN^ieMessage(AptStringMessageForTheactAuthenticated)
50      )
51      endif
52
53 /* Post Protocol:*/
54 postP{ let TheSystem: ctState in
55   let TheactAuthenticated:actAuthenticated in
56
57   self.rnActor.rnSystem = TheSystem
58   and self.rnActor = TheactAuthenticated
59   /* PostP01 */
60   if(ACaptcha = TheactAuthenticated.rnctAuthenticated.cap2Solve) then
61     (if(TheactAuthenticated.rnctAuthenticated.pwd = AdtPassword and
62     TheactAuthenticated.rnctAuthenticated.login = AdtLogin) then(
63       TheactAuthenticated.rnctAuthenticated@post.tries = 0 and
64       TheactAuthenticated.rnctAuthenticated@post.lastAccess = -181 and
65       TheactAuthenticated.rnctAuthenticated@post.capReq = false and
66       TheactAuthenticated.rnctAuthenticated@post.vpIsLogged = true
67     )else(
68       TheactAuthenticated.rnctAuthenticated@post.lastAccess = ((int)System.currentTimeMillis()/1000)
69       - TheactAuthenticated.rnctAuthenticated.lastAccess
70     (if(TheactAuthenticated.rnctAuthenticated@post.lastAccess <= 180)then
71       TheactAuthenticated.rnctAuthenticated@post.tries = TheactAuthenticated.rnctAuthenticated.
72       tries + 1
73     )else
74       TheactAuthenticated.rnctAuthenticated@post.tries = 1
75     )endif
76   )endif
77   else
78   (false)
79 }

```

Listing 5.12: **Messip** (MCL-oriented) specification of the operation *oeLoginWithCaptcha*.

5.2.4 Operation Model for *oeResetPassword*

The *oeResetPassword* operation has the following properties:

OPERATION	
<i>oeResetPassword</i>	
Operation used to reset a users password, does not reset the password of an admin tho.	
Parameters	
1	ALogin: dtLogin The username of the actor to reset the password.
Return type	
ptBoolean	
Pre-Condition (protocol)	

continues in next page ...

...Operation table continuation

PreP 1
<i>Pre-Condition (functional)</i>
PreF 1
<i>Post-Condition (functional)</i>
PostF 1
<i>Post-Condition (protocol)</i>
PostP 1

The listing 5.13 provides the **Messip** (MCL-oriented) specification of the operation.

```

1  /* Pre Protocol:*/
2  preP{let TheSystem: ctState in
3    let TheActor:actAuthenticated in
4      self.rnActor.rnSystem = TheSystem
5      and self.rnActor = TheActor
6
7
8  /* PreP01 */
9  and TheSystem.vpStarted = true
10 /* PreP02 */
11 and TheActor.rnctAuthenticated.vpIsLogged = false}
12
13 /* Pre Functional:*/
14 preF{/* PreF01 */
15   true}
16
17 /* Post Functional:*/
18 postF{let TheSystem: ctState in
19   let TheactAuthenticated:actAuthenticated in
20
21   let AptStringMessageForTheactAuthenticated: ptString in
22   let AptStringMessageForTheactAdministrator:ptString in
23
24   self.rnActor.rnSystem = TheSystem
25   and self.rnActor = TheactAuthenticated
26
27   and /* PostF01 */
28   if (TheactAuthenticated.rnctAuthenticated.login = AdtLogin
29     )
30   then (TheactAuthenticated.rnctAuthenticated@post.pwd = new dtPassword( random() )
31   and AptStringMessageForTheactAuthenticated.eq('User found, resetting password ... New password
32     = ' + TheactAuthenticated.rnctAuthenticated@post.pwd)
33   and TheactAuthenticated.rnInterfaceIN^ieMessage(AptStringMessageForTheactAuthenticated)
34   )
35   else (AptStringMessageForTheactAuthenticated
36     .eq('Wrong username information ! Please try again ...')
37     and TheactAuthenticated.rnInterfaceIN^ieMessage(AptStringMessageForTheactAuthenticated)
38   )
39   endif}
40 /* Post Protocol:*/
41 postP{ }

```

Listing 5.13: **Messip** (MCL-oriented) specification of the operation *oeResetPassword*.

5.3 Environment - Out Interface Operation Scheme for actCoordinator

5.3.1 Operation Model for oe GetAllRequests

The oe GetAllRequests operation has the following properties:

OPERATION
<i>oe GetAllRequests</i>
sent to get a list of requested PIs.
<i>Return type</i>
ptBoolean
<i>Pre-Condition (protocol)</i>
PreP 1 PreP01 the system is started. PreP 2 PreP02 the actor logged previously and did not log out!
<i>Pre-Condition (functional)</i>
PreF 1 none
<i>Post-Condition (functional)</i>
PostF 1 PostF01 the actor ActCoordinator gets a list of requests to handle if there are unhandled requests (no status). PostF 2 PostF02 the coordinator actor is also informed about the non-satisfaction of its request.
<i>Post-Condition (protocol)</i>
PostP 1 non

The listing 5.14 provides the **Messip** (MCL-oriented) specification of the operation.

```

1  /* Pre Protocol:*/
2  prep{let TheSystem:ctState in
3    let TheActor:actAdministrator in
4
5    self.rnActor.rnSystem = TheSystem
6    and self.rnActor = TheActor
7
8    /* PreP01 */
9    TheSystem.vpStarted = true
10   /* PreP02 */
11   and TheActor.rnctAuthenticated.vpIsLogged = true}
12
13
14
15 /* Pre Functional:*/
16 preF{true}
17
18 /* Post Functional:*/
19 postF{let TheSystem:ctState in
20   let TheActor:actCoordinator in
21   let ColctRequest:Set(ctRequest) in
22
23   self.rnActor.rnSystem = TheSystem
24   and self.rnActor = TheActor
25
26   TheSystem.rnctRequest->select(status.eq("")) = ColctRequest
27
28   and if (ColctRequest->IsEmpty() = false)
29   then (

```

```

30  /* PostF01 */
31  and TheActor.rnInterfaceIN^ieRequestListToCheck()
32  )
33  else (
34  /* PostF02 */
35  and AMessage.eq('No requests to check!')
36  and TheActor.rnInterfaceIN^ieMessage(AMessage)
37  )
38  endif}
39
40 /* Post Protocol:*/
41 postP{ true}

```

Listing 5.14: **Messip** (MCL-oriented) specification of the operation *oe GetAllRequests*.

5.3.2 Operation Model for *oeCheckAvailability*

The *oeCheckAvailability* operation has the following properties:

OPERATION	
<i>oeCheckAvailability</i>	
sent to check if the requested PI is in the system.	
Parameters	
1	ARequestID: dtID id used for ctRequest instance retrieval
Return type	
ptBoolean	
Pre-Condition (protocol)	
PreP 1	PreP01 the system is started.
PreP 2	PreP02 the actor logged previously and did not log out!
Pre-Condition (functional)	
PreF 1	PreF01 it is supposed that there exists one ctRequest instance with the same name, city and category attributes than the one the coordinator wants to compare to.
Post-Condition (functional)	
PostF 1	PostF01 the request's ignored is updated to 'false' in the system if the requested PI is NOT in the system.
PostF 2	PostF02 the request's ignored is updated to 'true' in the system if the requested PI is in the system.
PostF 3	PostF03 the coordinator actor is informed about the satisfaction or non-satisfaction of its request.
Post-Condition (protocol)	
PostP 1	none

The listing 5.15 provides the **Messip** (MCL-oriented) specification of the operation.

```

1  /* Pre Protocol:*/
2  prep{let TheSystem:ctState in
3    let TheActor:actAdministrator in
4
5    self.rnActor.rnSystem = TheSystem
6    and self.rnActor = TheActor
7

```

```

8      /* PreP01 */
9      TheSystem.vpStarted = true
10
11     /* PreP02 */
12     and TheActor.rnctAuthenticated.vpIsLogged = true}
13
14
15    /* Pre Functional:*/
16  preF{let TheSystem:ctState in
17    let TheActor:actCoordinator in
18    let ColctPI:Set(ctPI) in
19    let ColctRequest:Set(ctRequest) in
20
21    self.rnActor.rnSystem = TheSystem
22    and self.rnActor = TheActor
23
24    /* PreF01 */
25    TheSystem.rnctRequest->select(name.eq(ARequestID)) = ColctRequest
26    and ColctRequest->size().eq(1)}
27
28    /* Post Functional:*/
29  postF{let TheSystem:ctState in
30    let TheActor:actCoordinator in
31    let ThectRequest:ctRequest in
32
33    self.rnActor.rnSystem = TheSystem
34    and self.rnActor = TheActor
35
36    TheSystem.rnctPI->select(name.eq(ARequestID)) = ColctPI
37
38    and if (ColctPI.IsEmpty() = false)
39    then (
40      /* PostF01 */
41      and ThectRequest.rnctRequest.ignored = true
42      and AMessage.eq('The PI is already in the system.')
43      and TheActor.rnInterfaceIN^ieMessage(AMessage)
44    )
45    else (
46      /* PostF02 */
47      and ThectRequest.rnctRequest.ignored = false
48      and AMessage.eq('The PI is NOT in the system. How to proceed?')
49      and TheActor.rnInterfaceIN^ieMessage(AMessage)
50    )
51  endif}
52
53  /* Post Protocol:*/
54  postP{ true}

```

Listing 5.15: **Messip** (MCL-oriented) specification of the operation *oeCheckAvailability*.

5.3.3 Operation Model for oeDeliverRequest

The *oeDeliverRequest* operation has the following properties:

OPERATION	
<i>oeDeliverRequest</i>	
sent to change the status of a requested PI in the system's post state.	
Parameters	
1	ARequestID: dtID id used for ctRequest instance retrieval
Return type	
ptBoolean	
Pre-Condition (protocol)	

continues in next page ...

...Operation table continuation

PreP 1	PreP01 the system is started.
PreP 2	PreP02 the actor logged previously and did not log out!
Pre-Condition (functional)	
PreF 1	PreF01 it is supposed that there exists one ctRequest instance with the same id attribute than the one the coordinator wants to change the status.
Post-Condition (functional)	
PostF 1	PostF01 the request's status is updated to 'pending' in the system's post state.
PostF 2	PostF02 the coordinator actor is informed about the satisfaction of its request.
Post-Condition (protocol)	
PostP 1	none

The listing 5.16 provides the **Messip** (MCL-oriented) specification of the operation.

```

1  /* Pre Protocol:*/
2  preP{let TheSystem:ctState in
3    let TheActor:actCoordinator in
4
5    self.rnActor.rnSystem = TheSystem
6    and self.rnActor = TheActor
7
8    /* PreP01 */
9    TheSystem.vpStarted = true
10
11   /* PreP02 */
12   and TheActor.rnctAuthenticated.vpIsLogged = true}
13
14
15 /* Pre Functional:*/
16 preF{let TheSystem:ctState in
17   let TheActor:actCoordinator in
18   let ColctRequest:Set(ctRequest) in
19
20   self.rnActor.rnSystem = TheSystem
21   and self.rnActor = TheActor
22
23   /* PreF01 */
24   TheSystem.rnctRequest->select(ignored.eq(false)) = ColctRequest
25   and ColctRequest->IsEmpty() = false}
26
27 /* Post Functional:*/
28 postF{let TheSystem:ctState in
29   let TheActor:actCoordinator in
30   let ThectRequest:ctRequest in
31
32   self.rnActor.rnSystem = TheSystem
33   and self.rnActor = TheActor
34
35   /* PostF01 */
36   ThectRequest.rnctRequest.status = "pending"
37
38   /* PostF02 */
39   and TheActor.rnInterfaceIN^ieRequestDelivered()}
40
41 /* Post Protocol:*/
42 postP{ true}
```

Listing 5.16: **Messip** (MCL-oriented) specification of the operation *oeDeliverRequest*.

5.3.4 Operation Model for oeValidateAlert

The oeValidateAlert operation has the following properties:

OPERATION	
oeValidateAlert	
sent to indicate that a specific alert is not a fake.	
Parameters	
1	AdtAlertID: dtAlertID the identification information used to determine the alert instance
Return type	
ptBoolean	
Pre-Condition (protocol)	
PreP 1	PreP 1 the system is started PreP 2 the actor logged previously and did not log out ! (i.e. the associated ctCoordinator instance is considered logged)
Pre-Condition (functional)	
PreF 1	PreF 1 it is supposed that there exist one ctAlert instance with the same id attribute value as the one provided by the coordinator actor who wants to validate.
Post-Condition (functional)	
PostF 1	PostF 1 the ctAlert class instance having the provided id is considered as valid in the post state and the coordinator actor is informed about the satisfaction of its request.
Post-Condition (protocol)	
PostP 1	PostP 1 none

The listing 5.17 provides the **Messip** (MCL-oriented) specification of the operation.

```

1  /* Pre Protocol*/
2  preP{let TheSystem:ctState in
3    let TheActor:actCoordinator in
4
5    self.rnActor.rnSystem = TheSystem
6    and self.rnActor = The Actor
7
8    /* Pre P01 */
9    TheSystem.vpStarted = true
10   /* Pre P02 */
11   TheActor.rnctAuthenticated.vpIsLogged = true}
12
13
14
15 /* Pre Functional*/
16 preF{let TheSystem:ctState in
17   let ColctAlert:Bag(ctAlert) in
18
19   self.rnActor.rnSystem = TheSystem
20
21   /* Pre F01 */
22   TheSystem.rnctAlert->select(id.eq(AdtAlertID)) = ColctAlert
23   and ColctAlert->size.eq(1)}
24
25 /* Post Functional*/
26 postF{let TheSystem:ctState in
27   let ThectAlert:ctAlert in
28
29   self.rnActor.rnSystem = TheSystem

```

```

30  /* Post F01 */
31  TheSystem.rnctAlert->select(id.eq(AdtAlerID)) = ThectAlert
32  and ThectAlert.status.eq("valid")
33  and TheActor.rnInterfaceIN^ieMessage("Alert validated!"))
34
35
36 /* Post Protocol:*/
37 postP{ true}

```

Listing 5.17: **Messip** (MCL-oriented) specification of the operation *oeValidateAlert*.

5.3.5 Operation Model for *oeInvalidateAlert*

The *oeInvalidateAlert* operation has the following properties:

OPERATION	
<i>oeInvalidateAlert</i>	
sent to indicate that an alert should be considered as closed.	
Parameters	
1	AdtAlertID: dtAlertID the identification information used to determine the alert to close
Return type	
ptBoolean	
Pre-Condition (protocol)	
PreP 1	PreP 1 the system is started PreP 2 the actor logged previously and did not log out ! (i.e. the associated ctCoordinator instance is considered logged)
Pre-Condition (functional)	
PreF 1	PreF 1 it is supposed that there exist one ctAlert instance with the same id attribute value as the one provided by the coordinator actor who wants to close.
Post-Condition (functional)	
PostF 1	PostF 1 the ctAlert class instance having the provided id is considered closed in the post state. PostF 2 the coordinator actor is informed about the satisfaction of its request.
Post-Condition (protocol)	
PostP 1	PostP 1 none

The listing 5.18 provides the **Messip** (MCL-oriented) specification of the operation.

```

1
2 /* Pre Protocol:*/
3 preP{let TheSystem:ctState in
4   let TheActor:actCoordinator in
5
6   self.rnActor.rnSystem = TheSystem
7   and self.rnActor = The Actor
8
9   /* Pre P01 */
10  TheSystem.vpStarted = true
11
12  /* Pre P02 */
13  TheActor.rnctAuthenticated.vpIsLogged = true}
14
15 /* Pre Functional:*/
16 preF{let TheSystem:ctState in

```

```

17   let ColctAlert:Bag(ctAlert) in
18
19     self.rnActor.rnSystem = TheSystem
20
21   /* Pre F01 */
22   TheSystem.rnctAlert->select(id.eq(AdtAlertID)) = ColctAlert
23   and ColctAlert->size.eq(1)
24
25  /* Post Functional:*/
26 postF{let TheSystem:ctState in
27   let ThectAlert:ctAlert in
28
29   self.rnActor.rnSystem = TheSystem
30
31  /* Post F01 */
32  TheSystem.rnctAlert->select(id.eq(AdtAlerID)) = ThectAlert
33  and ThectAlert.status.eq("closed")
34  and TheActor.rnInterfaceIN^ieMessage("Alert invalidated!")
35
36  /* Post Protocol:*/
37 postP{ true}

```

Listing 5.18: **Messip** (MCL-oriented) specification of the operation *oeInvalidateAlert*.

5.3.6 Operation Model for oeGetAlertSet

The *oeGetAlertSet* operation has the following properties:

OPERATION	
<i>oeGetAlertSet</i>	
sent to request all the ctAlert instances having a specific status.	
Parameters	
1	AetAlertStatus: etAlertStatus the criteria used to select the alerts to send back to the actor
Return type	
ptBoolean	
Pre-Condition (protocol)	
PreP 1	PreP 1 the system is started PreP 2 the actor logged previously and did not log out ! (i.e. the associated ctCoordinator instance is considered logged)
Pre-Condition (functional)	
PreF 1	PreF 1 none
Post-Condition (functional)	
PostF 1	PostF 1 the post state is the one obtained by satisfying the isSentToCoordinator predicate for each alert having the provided status and for the actor sending the message. (cf. specification of isSentToCoordinator predicate given for the ctAlert type).
Post-Condition (protocol)	
PostP 1	PostP 1 none

The listing 5.19 provides the **Messip** (MCL-oriented) specification of the operation.

```

1
2  /* Pre Protocol:*/
3 preP{let TheSystem:ctState in

```

```

4   let TheActor:actCoordinator in
5
6     self.rnActor.rnSystem = TheSystem
7     and self.rnActor = The Actor
8
9     /* Pre P01 */
10    TheSystem.vpStarted = true
11
12    /* Pre P02 */
13    TheActor.rnctAuthenticated.vpIsLogged = true}
14
15  /* Pre Functional:*/
16  preF{true}
17
18  /* Post Functional:*/
19  postF{let TheSystem: ctState in
20    let ThectAlert:ctAlert in
21
22    self.rnActor.rnSystem = TheSystem
23
24    /* Post F01 */
25    TheSystem.rnctAlert->select(status.eq(AetAlertStatus)) = ThectAlert
26    and ThectAlert.rnctAlert->forAll(isSentToCoordinator)
27    and ThectAlert.msrIsSentToCoordinator}
28
29  /* Post Protocol:*/
30  postP{ true}

```

Listing 5.19: **Messip** (MCL-oriented) specification of the operation *oeGetAlertSet*.

5.3.7 Operation Model for *oeGetCrisisSet*

The *oeGetCrisisSet* operation has the following properties:

OPERATION
<i>oeGetCrisisSet</i> sent to request all the ctCrisis instances having a specific status.
<i>Parameters</i>
1 AetCrisisStatus: etCrisisStatus the status information used to determine the crisis to send back to the actor
<i>Return type</i>
ptBoolean
<i>Pre-Condition (protocol)</i>
PreP 1 PreP 1 the system is started PreP 2 the actor logged previously and did not log out ! (i.e. the associated ctCoordinator instance is considered logged)
<i>Pre-Condition (functional)</i>
PreF 1 PreF 1 none
<i>Post-Condition (functional)</i>
PostF 1 PostF 1 the post state is the one obtained by satisfying the isSentToCoordinator predicate for each crisis having the provided status and for the actor sending the message ieSendACrisis. (cf. specification of isSentToCoordinator predicate given for the ctCrisis type.)
<i>Post-Condition (protocol)</i>
PostP 1 PostP 1 none

The listing 5.20 provides the **Messip** (MCL-oriented) specification of the operation.

```

1  /* Pre Protocol:*/
2  preP{let TheSystem:ctState in
3    let TheActor:actCoordinator in
4
5    self.rnActor.rnSystem = TheSystem
6    and self.rnActor = The Actor
7
8
9    /* Pre P01 */
10   TheSystem.vpStarted = true
11
12   /* Pre P02 */
13   TheActor.rnctAuthenticated.vpIsLogged = true}
14
15  /* Pre Functional:*/
16  preF{true}
17
18  /* Post Functional:*/
19  postF{let TheSystem: ctState in
20    let TheCrisis:ctCrisis in
21
22    self.rnActor.rnSystem = TheSystem
23
24    /* Post F01 */
25    TheSystem.rnctCrisis->select(status.eq(AetCrisisStatus)) = TheCrisis
26    and TheCrisis.rnctCrisis->forall(isSentToCoordinator)
27    and TheCrisis.msrIsSentToCoordinator}
28
29  /* Post Protocol:*/
30  postP{ true}

```

Listing 5.20: **Messip** (MCL-oriented) specification of the operation *oeGetCrisisSet*.

5.3.8 Operation Model for oeSetCrisisType

The *oeSetCrisisType* operation has the following properties:

OPERATION	
<i>oeSetCrisisType</i>	
sent to define the gravity type of a specific crisis.	
<i>Parameters</i>	
1	AdtCrisisID: dtCrisisID the identification information used to determine the crisis
2	AetCrisisType: etCrisisType the new type value
<i>Return type</i>	
ptBoolean	
<i>Pre-Condition (protocol)</i>	
PreP 1	PreP 1 the system is started PreP 2 the actor logged previously and did not log out ! (i.e. the associated ctCoordinator instance is considered logged)
<i>Pre-Condition (functional)</i>	
PreF 1	PreF 1 it is supposed that there exist one crisis in the pre state having the given id.
<i>Post-Condition (functional)</i>	
PostF 1	PostF 1 the crisis type attribute of the crisis instance having the given id is replaced by the given one and the requesting actor is notified of this update.
<i>Post-Condition (protocol)</i>	
PostP 1	PostP 1 none

The listing 5.21 provides the **Messip** (MCL-oriented) specification of the operation.

```

1  /* Pre Protocol*/
2  preP{let TheSystem:ctState in
3    let TheActor:actCoordinator in
4
5    self.rnActor.rnSystem = TheSystem
6    and self.rnActor = The Actor
7
8
9    /* Pre P01 */
10   TheSystem.vpStarted = true
11
12  /* Pre P02 */
13  TheActor.rnctAuthenticated.vpIsLogged = true}
14
15 /* Pre Functional*/
16 preF{let TheSystem:ctState in
17   let ColctCrisis:Bag(ctCrisis) in
18
19   self.rnActor.rnSystem = TheSystem
20
21  /* Pre F01 */
22  TheSystem.rnctCrisis->select(id.eq(AdtCrisisID)) = ColctCrisis
23  and ColctCrisis->size.eq(1)}
24
25 /* Post Functional*/
26 postF{let TheSystem:ctState in
27   let TheCrisis:ctCrisis in
28
29   self.rnActor.rnSystem = TheSystem
30
31  /* Post F01 */
32  TheSystem.rnctCrisis->select(id.eq(AdtCrisisID)) = TheCrisis
33  and TheCrisis.AetCrisisType.eq(AdtCrisisType)
34  and TheActor.rnInterfaceIN^ieMessage("Crisis type set to " + AdtCrisisType)}
35
36 /* Post Protocol*/
37 postP{ true}

```

Listing 5.21: **Messip** (MCL-oriented) specification of the operation *oeSetCrisisType*.

5.3.9 Operation Model for *oeSetCrisisStatus*

The *oeSetCrisisStatus* operation has the following properties:

OPERATION	
<i>oeSetCrisisStatus</i>	
sent to define the handling status of a specific crisis.	
Parameters	
1	AdtCrisisID: dtCrisisID the identification information used to determine the crisis
2	AetCrisisStatus: etCrisisStatus the new status value
Return type	
ptBoolean	
Pre-Condition (protocol)	
PreP 1	PreP 1 the system is started PreP 2 the actor logged previously and did not log out ! (i.e. the associated ctCoordinator instance is considered logged)

continues in next page ...

... Operation table continuation

Pre-Condition (functional)	
PreF 1 PreF 1 it is supposed that there exist one crisis in the pre state having the given id.	
Post-Condition (functional)	
PostF 1 PostF 1 the crisis status attribute of the crisis instance having the given id is replaced by the given one and the requesting actor is notified of this update.	
Post-Condition (protocol)	
PostP 1 PostP 1 none	

The listing 5.22 provides the **Messip** (MCL-oriented) specification of the operation.

```

1  /* Pre Protocol:*/
2  preP{let TheSystem:ctState in
3    let TheActor:actCoordinator in
4
5    self.rnActor.rnSystem = TheSystem
6    and self.rnActor = The Actor
7
8
9    /* Pre P01 */
10   TheSystem.vpStarted = true
11
12   /* Pre P02 */
13   TheActor.rnctAuthenticated.vpIsLogged = true
14
15  /* Pre Functional:*/
16  preF{let TheSystem:ctState in
17    let ColctCrisis:Bag(ctCrisis) in
18
19    self.rnActor.rnSystem = TheSystem
20
21    /* Pre F01 */
22    TheSystem.rnctCrisis->select(id.eq(AdtCrisisID)) = ColctCrisis
23    and ColctCrisis->size.eq(1)
24
25  /* Post Functional:*/
26  postF{let TheSystem:ctState in
27    let ThectCrisis:ctCrisis in
28
29    self.rnActor.rnSystem = TheSystem
30
31    /* Post F01 */
32    TheSystem.rnctCrisis->select(id.eq(AdtCrisisID)) = ThectCrisis
33    and ThectCrisis.AetCrisisStatus.eq(AdtCrisisStatus)
34    and TheActor.rnInterfaceIN^ieMessage("Crisis status set to " + AdtCrisisStatus)
35
36  /* Post Protocol:*/
37  postP{ true}

```

Listing 5.22: **Messip** (MCL-oriented) specification of the operation *oeSetCrisisStatus*.

5.3.10 Operation Model for oeSetCrisisHandler

The *oeSetCrisisHandler* operation has the following properties:

OPERATION

continues in next page ...

...Operation table continuation

<i>oeSetCrisisHandler</i>	sent to declare himself as been the handler of a crisis having the specified id.
<i>Parameters</i>	
1 AdtCrisisID: dtCrisisID	the identification information used to determine the crisis
<i>Return type</i>	
ptBoolean	
<i>Pre-Condition (protocol)</i>	
PreP 1	PreP 1 the system is started PreP 2 the actor logged previously and did not log out ! (i.e. the associated ctCoordinator instance is considered logged)
<i>Pre-Condition (functional)</i>	
PreF 1	PreF 1 there exist one crisis having the given id in the pre-state.
<i>Post-Condition (functional)</i>	
PostF 1	PostF 1 the ctCrisis instance having the provided id is in handled status at poststate and is associated to the actor that sends the message (which himself is notified with a textual message as confirmation). PostF 2 All the alerts related to this crisis are sent to the actor such that he can decide how to handle them. PostF 3 if the crisis was already handled at pre-state then the associated handler actor is notified about the change of handler for one of his crisis (n.b. it might be the same even if not relevant). PostF 4 a message is sent to the communication company for any human related to an alert associated to the crisis. A human will receive as many messages as alerts he sent despite the fact that they might relate to the same crisis (i.e. one alert, one acknowledgement).
<i>Post-Condition (protocol)</i>	
PostP 1	PostP 1 none

The listing 5.23 provides the **Messip** (MCL-oriented) specification of the operation.

```

1
2 /* Pre Protocol:*/
3 preP{let TheSystem:ctState in
4   let TheActor:actCoordinator in
5
6   self.rnActor.rnSystem = TheSystem
7   and self.rnActor = The Actor
8
9   /* Pre P01 */
10  TheSystem.vpStarted = true
11
12  /* Pre P02 */
13  TheActor.rnctAuthenticated.vpIsLogged = true}
14
15 /* Pre Functional:*/
16 preF{let TheSystem:ctState in
17   let ColctCrisis:Bag(ctCrisis) in
18
19   self.rnActor.rnSystem = TheSystem
20
21  /* Pre F01 */
22  TheSystem.rnctCrisis->select(id.eq(AdtCrisisID)) = ColctCrisis
23  and ColctCrisis->size.eq(1)}
24
25 /* Post Functional:*/
26 postF{let TheSystem:ctState in

```

```

27   let ThectCrisis:ctCrisis in
28
29     self.rnActor.rnSystem = TheSystem
30
31   /* Post F01 */
32   TheSystem.rnctCrisis->select(id.eq(AdtCrisisID)) = ThectCrisis
33   and ThectCrisis.AetCrisisStatus.eq("handled")
34   and TheActor.rnInterfaceIN^ieMessage("Handler of the crisis " + AdtCrisisID + " is being
      handled by coordinator with id " + self.id)}
35
36  /* Post Protocol:*/
37 postP{ true}

```

Listing 5.23: **Messip** (MCL-oriented) specification of the operation *oeSetCrisisHandler*.

5.3.11 Operation Model for oeReportOnCrisis

The *oeReportOnCrisis* operation has the following properties:

OPERATION	
<i>oeReportOnCrisis</i>	
sent to update the textual information available for a specific handled crisis.	
Parameters	
1	AdtCrisisID: dtCrisisID the identification information used to determine the crisis to report on
2	AdtComment: dtComment the textual information commenting the crisis
Return type	
ptBoolean	
Pre-Condition (protocol)	
PreP 1	PreP 1 the system is started PreP 2 the actor logged previously and did not log out ! (i.e. the associated ctCoordinator instance is considered logged)
Pre-Condition (functional)	
PreF 1	PreF 1 it is supposed that there exist one crisis in the pre state having the given id.
Post-Condition (functional)	
PostF 1	PostF 1 the comment attribute of the crisis instance having the given id is replaced by the given one and the requesting actor is notified of this update.
Post-Condition (protocol)	
PostP 1	PostP 1 none

The listing 5.24 provides the **Messip** (MCL-oriented) specification of the operation.

```

1
2  /* Pre Protocol:*/
3 prep{let TheSystem:ctState in
4   let TheActor:actCoordinator in
5
6   self.rnActor.rnSystem = TheSystem
7   and self.rnActor = The Actor
8
9  /* Pre P01 */
10 TheSystem.vpStarted = true
11

```

```

12  /* Pre P02 */
13  TheActor.rnctAuthenticated.vpIsLogged = true}
14
15 /* Pre Functional:*/
16 preF{let TheSystem:ctState in
17   let ColctCrisis:Bag(ctCrisis) in
18
19   self.rnActor.rnSystem = TheSystem
20
21 /* Pre F01 */
22 TheSystem.rnctCrisis->select(id.eq(AdtCrisisID)) = ColctCrisis
23 and ColctCrisis->size.eq(1)}
24
25 /* Post Functional:*/
26 postF{let TheSystem:ctState in
27   let ThectCrisis:ctCrisis in
28
29   self.rnActor.rnSystem = TheSystem
30
31 /* Post F01 */
32 TheSystem.rnctCrisis->select(id.eq(AdtCrisisID)) = ThectCrisis
33 and ThectCrisis.AdtComment.eq(AdtComment)
34 and TheActor.rnInterfaceIN^ieMessage("Added comment to the crisis")}
35
36 /* Post Protocol:*/
37 postP{ true}

```

Listing 5.24: **Messip** (MCL-oriented) specification of the operation *oeReportOnCrisis*.

5.3.12 Operation Model for oeCloseCrisis

The *oeCloseCrisis* operation has the following properties:

OPERATION	
<i>oeCloseCrisis</i>	
sent to indicate that a crisis should be considered as closed.	
Parameters	
1 AdtCrisisID: dtCrisisID	the identification information used to determine the crisis to close
<i>Return type</i>	
ptBoolean	
<i>Pre-Condition (protocol)</i>	
PreP 1	PreP 1 the system is started PreP 2 the actor logged previously and did not log out ! (i.e. the associated ctCoordinator instance is considered logged)
<i>Pre-Condition (functional)</i>	
PreF 1	PreF 1 it is supposed that there exist one ctCrisis instance with the same id attribute value as the one provided by the coordinator actor who wants to close.
<i>Post-Condition (functional)</i>	
PostF 1	PostF 1 the ctCrisis class instance having the provided id is considered closed in the post state. PostF 2 There is no handler declared in the system as associated to the crisis. PostF 3 all the alert instances associated to this crisis do not belong any more to the system's post state. PostF 4 the coordinator actor is informed about the satisfaction of its request.
<i>Post-Condition (protocol)</i>	
PostP 1	PostP 1 none

The listing 5.25 provides the **Messip** (MCL-oriented) specification of the operation.

```

1  /* Pre Protocol:*/
2  preP{let TheSystem:ctState in
3    let TheActor:actCoordinator in
4
5    self.rnActor.rnSystem = TheSystem
6    and self.rnActor = The Actor
7
8
9    /* Pre P01 */
10   TheSystem.vpStarted = true
11
12  /* Pre P02 */
13  TheActor.rnctAuthenticated.vpIsLogged = true}
14
15 /* Pre Functional:*/
16 preF{let TheSystem:ctState in
17   let ColctCrisis:Bag(ctCrisis) in
18
19   self.rnActor.rnSystem = TheSystem
20
21  /* Pre F01 */
22  TheSystem.rnctCrisis->select(id.eq(AdtCrisisID)) = ColctCrisis
23  and ColctCrisis->size.eq(1)}
24
25 /* Post Functional:*/
26 postF{let TheSystem:ctState in
27   let ThectCrisis:ctCrisis in
28
29   self.rnActor.rnSystem = TheSystem
30
31  /* Post F01 */
32  TheSystem.rnctCrisis->select(id.eq(AdtCrisisID)) = ThectCrisis
33  and ThectCrisis.AetCrisisStatus.eq("closed")
34  and TheActor.rnInterfaceIN^ieMessage("Crisis closed")}
35
36 /* Post Protocol:*/
37 postP{ true}
```

Listing 5.25: **Messip** (MCL-oriented) specification of the operation *oeCloseCrisis*.

5.4 Environment - Out Interface Operation Scheme for actPerson

5.4.1 Operation Model for *oeSearchPI*

The *oeSearchPI* operation has the following properties:

OPERATION	
<i>oeSearchPI</i>	
sent to search for a specific PI in the system.	
<i>Parameters</i>	
1	APIName: dtName name used for ctPI instance retrieval
2	APICategory: etCategory category used for ctPI instance retrieval
3	APICity: dtCity city used for ctPI instance retrieval
<i>Return type</i>	

continues in next page ...

...Operation table continuation

ptBoolean
<i>Pre-Condition (protocol)</i>
PreP 1 PreP01 the system is started.
PreP 2 PreP02 the actor logged previously and did not log out!
<i>Pre-Condition (functional)</i>
PreF 1 none
<i>Post-Condition (functional)</i>
PostF 1 PostF01 the actor ActPerson gets a response from the system if the PI has been found or not.
PostF 2 PostF02 following the response, the person actor is informed about the appropriated response of its request.
<i>Post-Condition (protocol)</i>
PostP 1 none

The listing 5.26 provides the **Messip** (MCL-oriented) specification of the operation.

```

1  /* Pre Protocol:*/
2  preP{let TheSystem:ctState in
3    let TheActor:actPerson in
4
5    self.rnActor.rnSystem = TheSystem
6    and self.rnActor = TheActor
7
8    /* PreP01 */
9    TheSystem.vpStarted = true
10   and TheActor.rnctAuthenticated.vpIsLogged = true}
11
12  /* PreP02 */
13  and TheActor.rnctAuthenticated.vpIsLogged = true}
14
15 /* Pre Functional:*/
16 preF{true}
17
18 /* Post Functional:*/
19 postF{let TheSystem:ctState in
20   let TheActor:actPerson in
21   let ColctPI:Set(ctPI) in
22
23   self.rnActor.rnSystem = TheSystem
24   and self.rnActor = TheActor
25
26   /* PostF01 */
27   TheSystem.rnctPI->select(name.eq(APIName) category.eq(APICategory) city.eq(APICity)) = ColctPI
28   and if (ColctPI->size().eq(1))
29   then (
30     and AMessage.eq('PI found. How to proceed?')
31     and TheActor.rnInterfaceIN^ieMessage(AMessage)
32   )
33   else (
34     and AMessage.eq('PI NOT found. How to proceed?')
35     and TheActor.rnInterfaceIN^ieMessage(AMessage)
36   )
37   endif}
38
39 /* Post Protocol:*/
40 postP{ true}

```

Listing 5.26: **Messip** (MCL-oriented) specification of the operation *oeSearchPI*.

5.4.2 Operation Model for oeSendNewRequest

The `oeSendNewRequest` operation has the following properties:

OPERATION	
<i>oeSendNewRequest</i>	
sent to add a new request to the system's post state.	
<i>Parameters</i>	
1	APIName: <code>dtName</code> used to initialise the name field
2	APICategory: <code>etCategory</code> used to initialise the category field
3	APICity: <code>dtCity</code> used to initialise the city field
<i>Return type</i>	
<code>ptBoolean</code>	
<i>Pre-Condition (protocol)</i>	
PreP 1	PreP01 the system is started.
PreP 2	PreP02 the actor logged previously and did not log out!
<i>Pre-Condition (functional)</i>	
PreF 1	PreF01 it is supposed that there does NOT exists one <code>ctRequest</code> instance with the same name, category and city attributes than the one the person wants to add a new request.
PreF 2	PreF02 it is supposed that there does NOT exists one <code>ctPI</code> instance with the same name, category and city attributes than the one the person wants to add a new request.
<i>Post-Condition (functional)</i>	
PostF 1	PostF01 the new requested PI is added in the system's post state.
PostF 2	PostF02 the person actor is informed about the satisfaction of its request.
<i>Post-Condition (protocol)</i>	
PostP 1	none

The listing 5.27 provides the **Messip** (MCL-oriented) specification of the operation.

```

1  /* Pre Protocol*/
2  preP{let TheSystem:ctState in
3    let TheActor:actPerson in
4
5    self.rnActor.rnSystem = TheSystem
6    and self.rnActor = TheActor
7
8    /* PreP01 */
9    TheSystem.vpStarted = true
10
11   /* PreP02 */
12   and TheActor.rnctAuthenticated.vpIsLogged = true}
13
14
15 /* Pre Functional*/
16 preF{let TheSystem:ctState in
17   let TheActor:actPerson in
18   let ColctPI:Set(ctPI) in
19
20   self.rnActor.rnSystem = TheSystem
21   and self.rnActor = TheActor

```

```

22  /* PreF01 */
23  TheSystem.rnctPI->select(name.eq(APIName) category.eq(APICategory) city.eq(APICity)) = ColctPI
24  and ColctPI->IsEmpty() = true
25
26  /* PreF02 */
27  and TheSystem.rnctRequest->select(name.eq(APIName) category.eq(APICategory) city.eq(APICity)) =
28      ColctRequest
29  and ColctRequest->IsEmpty() = true
30
31 /* Post Functional:*/
32 postF{let TheSystem:ctState in
33     let TheActor:actPerson in
34     let ThectRequest:ctRequest in
35
36     self.rnActor.rnSystem = TheSystem
37     and self.rnActor = TheActor
38
39     /* PostF01 */
40     ThectRequest.init(APIName, APICategory, APICity)
41
42     /* PostF02 */
43     and AMessage.eq('Request sent!')
44     and TheActor.rnInterfaceIN^ieMessage(AMessage) }
45
46 /* Post Protocol:*/
47 postP{ true}

```

Listing 5.27: **Messip** (MCL-oriented) specification of the operation *oeSendNewRequest*.

5.4.3 Operation Model for *oeGetGPSLocation*

The *oeGetGPSLocation* operation has the following properties:

OPERATION
<i>oeGetGPSLocation</i>
sent to get the GPS location of a PI in the system's post state.
<i>Parameters</i>
1 APIID: dtID id used for ctPI instance retrieval
<i>Return type</i>
ptBoolean
<i>Pre-Condition (protocol)</i>
PreP 1 PreP01 the system is started. PreP 2 PreP02 the actor logged previously and did not log out!
<i>Pre-Condition (functional)</i>
PreF 1 PreF01 it is supposed that there exists one ctRequest instance with the same id attribute than the one the person wants to get the gps location.
<i>Post-Condition (functional)</i>
PostF 1 PostF01 the actor ActPerson gets an appropriate response with the gps location of the PI.
<i>Post-Condition (protocol)</i>
PostP 1 none

The listing 5.28 provides the **Messip** (MCL-oriented) specification of the operation.

```

1  /* Pre Protocol:*/
2  preP{let TheSystem:ctState in
3    let TheActor:actPerson in
4
5    self.rnActor.rnSystem = TheSystem
6    and self.rnActor = TheActor
7
8
9    /* PreP01 */
10   TheSystem.vpStarted = true
11
12   /* PreP02 */
13   and TheActor.rnctAuthenticated.vpIsLogged = true}
14
15 /* Pre Functional:*/
16 preF{let TheSystem:ctState in
17   let TheActor:actPerson in
18   let ColctPI:Set(ctPI) in
19
20   self.rnActor.rnSystem = TheSystem
21   and self.rnActor = TheActor
22
23   /* PreF01 */
24   TheSystem.rnctPI->select(id.eq(APIID)) = ColctPI
25   and ColctPI->IsEmpty() = false}
26
27 /* Post Functional:*/
28 postF{let TheSystem:ctState in
29   let TheActor:actPerson in
30
31   self.rnActor.rnSystem = TheSystem
32   and self.rnActor = TheActor
33
34   /* PostF01 */
35   AMessag.eq('Here, the GPS Location: 55.9797/56.9898')
36   and TheActor.rnInterfaceIN^ieMessage(AMessage)}
37
38 /* Post Protocol:*/
39 postP{ true}
```

Listing 5.28: **Messip** (MCL-oriented) specification of the operation *oeGetGPSLocation*.

5.4.4 Operation Model for *oeGetDescription*

The *oeGetDescription* operation has the following properties:

OPERATION	
<i>oeGetDescription</i>	
sent to get the description of a PI in the system's post state.	
Parameters	
1 APIID: dtID	id used for ctPI instance retrieval
<i>Return type</i>	
ptBoolean	
<i>Pre-Condition (protocol)</i>	
PreP 1	PreP01 the system is started.
PreP 2	PreP02 the actor logged previously and did not log out!
<i>Pre-Condition (functional)</i>	
PreF 1	PreF01 it is supposed that there exists one ctRequest instance with the same id attribute than the one the person wants to get the description.

continues in next page ...

...Operation table continuation

Post-Condition (functional)	
PostF 1	PostF01 the actor ActPerson gets an appropriate response with the description of the PI.
Post-Condition (protocol)	
PostP 1	none

The listing 5.29 provides the **Messip** (MCL-oriented) specification of the operation.

```

1  /* Pre Protocol:*/
2  preP{let TheSystem:ctState in
3    let TheActor:actPerson in
4
5    self.rnActor.rnSystem = TheSystem
6    and self.rnActor = TheActor
7
8    /* PreP01 */
9    TheSystem.vpStarted = true
10
11   /* PreP02 */
12   and TheActor.rnctAuthenticated.vpIsLogged = true}
13
14 /* Pre Functional:*/
15 preF{let TheSystem:ctState in
16   let TheActor:actPerson in
17   let ColctPI:Set(ctPI) in
18
19   self.rnActor.rnSystem = TheSystem
20   and self.rnActor = TheActor
21
22   /* PreF01 */
23   TheSystem.rnctPI->select(id.eq(APIID)) = ColctPI
24   and ColctPI->IsEmpty() = false}
25
26
27 /* Post Functional:*/
28 postF{let TheSystem:ctState in
29   let TheActor:actPerson in
30
31   self.rnActor.rnSystem = TheSystem
32   and self.rnActor = TheActor
33
34   /* PostF01 */
35   AMessage.eq('Cactus Bascharage is a huge supermarket situated in the south of Luxembourg.')
36   and TheActor.rnInterfaceIN^ieMessage(AMessage)}
37
38 /* Post Protocol:*/
39 postP{ true}
```

Listing 5.29: **Messip** (MCL-oriented) specification of the operation *oeGetDescription*.

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 ctAdministrator

5.6.1 Operation Model for init

The *init* operation has the following properties:

OPERATION	
<i>init</i>	
used to initialise the current object as a new instance of the ctAdministrator type.	
Parameters	
1	Alogin: dtLogin the login initialised for a new administrator.
2	Apwd: dtPassword the password initialised for a new administrator.
Return type	
ptBoolean	
Post-Condition (functional)	
PostF 1	true iff the system poststate includes the current object as a new ctAdministrator instance having its attributes equal to the ones provided as parameters.

The listing 5.30 provides the **Messip** (MCL-oriented) specification of the operation.

```

1  /* Post Functional:*/
2  postF{if (
3      let Self:ctAdministrator in
4
5
6      /* Post F01 */
7      Self.login(Alogin)
8      and Self.pwd = Apwd
9      and Self.vpIsLogged = false
10
11     /* Post F02 */
12     and (Self.oclIsNew and self = Self)
13 )
14 then (result = true)
15 else (result = false)
16 endif}
```

Listing 5.30: **Messip** (MCL-oriented) specification of the operation *init*.

5.7 Primary Types - Operation Schemes for Class ctCoordinator

5.7.1 Operation Model for init

The *init* operation has the following properties:

OPERATION	
<i>init</i>	
used to initialise the current object as a new instance of the ctCoordinator type.	
Parameters	
1	Aid: dtCoordinatorID the id initialised for a new coordinator.
2	Alogin: dtLogin the login initialised for a new coordinator.
3	Apwd: dtPassword

continues in next page ...

...Operation table continuation

the password initialised for a new coordinator.
4 Aaccessrights: etCrisisType
the access rights initialised for a new coordinator.
Return type
ptBoolean
Post-Condition (functional)
PostF 1 true iff the system poststate includes the current object as a new ctCoordinator instance having its attributes equal to the ones provided as parameters.

The listing 5.31 provides the **Messip** (MCL-oriented) specification of the operation.

```

1  /* Post Functional:*/
2  postF{if (
3    let Self:ctCoordinator in
4
5      /* Post F01 */
6      Self.id = Aid
7      and Self.login = Alogin
8      and Self.pwd = Apwd
9      and Self.vpIsLogged = false
10     and Self.accessRights = AaccessRights
11
12     /* Post F02 */
13     and (Self.oclIsNew and self = Self)
14   )
15   then (result = true)
16   else (result = false)
17 endif}

```

Listing 5.31: **Messip** (MCL-oriented) specification of the operation *init*.

5.8 Primary Types - Operation Schemes for Class ctPerson

5.8.1 Operation Model for init

The *init* operation has the following properties:

OPERATION
<i>init</i>
used to initialise the current object as a new instance of the ctPerson type.
Parameters
1 Aid: dtPhoneNumber the id initialised for a new person.
2 Alogin: dtLogin the login initialised for a new PI.
3 Apwd: dtPassword the password initialised for a new PI.
4 ApersonType: etPersonType the person type initialised for a new PI.

continues in next page ...

... Operation table continuation

Return type
ptBoolean
Post-Condition (functional)
PostF 1 true iff the system poststate includes the current object as a new ctPerson instance having its attributes equal to the ones provided as parameters.

The listing 5.32 provides the **Messir** (MCL-oriented) specification of the operation.

```

1  /* Post Functional:*/
2  postF{if (
3      let Self:ctPerson in
4
5      /* Post F01 */
6
7      Self.id = Aid
8      and Self.login = Alogin
9      and Self.pwd = Apwd
10     and Self.type = Atype
11     and Self.phoneNumber = AphoneNumber
12
13     /* Post F02 */
14     and (Self.oclIsNew and self = Self)
15   )
16   then (result = true)
17   else (result = false)
18   endif}

```

Listing 5.32: **Messir** (MCL-oriented) specification of the operation *init*.

5.9 Primary Types - Operation Schemes for Datatypes

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

5.10 Primary Types - Operation Schemes for Enumerations

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

5.11 Secondary Types - Operation Schemes for Classes

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

5.12 Secondary Types - Operation Schemes for Datatypes

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

5.13 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.

DRAFT

DRAFT

Chapter 7

Additional Constraints

DRAFT

DRAFT

Appendix A

Messir Specification Files Listing

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

```
1 //  
2 //DON'T TOUCH THIS FILE !!!  
3 //  
4 package uuid5703615e7218493bb67cdc3f6b2e26dc {  
5   Concept Model {}  
6 }
```

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

A.2 File ./src-gen/messir-spec/operations/environment/actAdministrator.msr

```
1 /*  
2 * @author mikel  
3 * @date Fri Mar 16 11:46:38 CET 2018  
4 */  
5  
6 package lu.uni.lassy.excalibur.MyCrash.G02.operations.environment.actAdministrator {  
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 import lu.uni.lassy.excalibur.MyCrash.G02.environment  
14 import lu.uni.lassy.excalibur.MyCrash.G02.concepts.primarytypes.datatypes  
15 import lu.uni.lassy.excalibur.MyCrash.G02.concepts.primarytypes.classes  
16  
17 Operation Model {  
18  
19   operation: actAdministrator.outactAdministrator.oeAddPI(APIID:dtID, APIName:dtName, APICity:dtCity  
    , APIGPSLocation:dtGPSLocation, APIDescription:dtDescription, APICategory:etCategory):  
    ptBoolean {  
20  
21     /* Pre Protocol: */  
22     preP {  
23       let TheSystem:ctState in  
24       let TheActor:actAdministrator in  
25  
26       self.rnActor.rnSystem = TheSystem  
27       and self.rnActor = TheActor  
28  
29       /* PreP01 */  
30       TheSystem.vpStarted = true  
31  
32       /* PreP02 */  
33       and TheActor.rnctAuthenticated.vpIsLogged = true  
34     }  
35   }  
36 }
```

```

35  /* Pre Functional: */
36  preF {
37    let TheSystem:ctState in
38    let TheActor:actAdministrator in
39    let ColctPI:Set(ctPI) in
40    let ColctRequest:Set(ctRequest) in
41
42    self.rnActor.rnSystem = TheSystem
43    and self.rnActor = TheActor
44
45
46  /* Pref01 */
47  TheSystem.rnctPI->select(id.eq(APIID)) = ColctPI
48  and ColctPI->IsEmpty() = true
49
50  /* Pref02 */
51  and TheSystem.rnctRequest->select(id.eq(APIID) status.eq("solved")) = ColctRequest
52  and ColctRequest->IsEmpty() = false
53 }
54
55 /* Post Functional: */
56 postF {
57  let TheSystem:ctState in
58  let TheActor:actAdministrator in
59  let ThectPI:ctPI in
60  let ThePerson:actPerson in
61
62  self.rnActor.rnSystem = TheSystem
63  and self.rnActor = TheActor
64
65  /* PostF01 */
66  ThectPI.init(APIID, APIName, APICity, APIGPSLocation, APIDescription, APICategory)
67
68  /* PostF02 */
69  and TheActor.rnInterfaceIN^iePIAdded()
70
71  /* PostF03 */
72  and ThePerson.rnInterfaceIN^iePIAdded()
73 }
74
75 /* Post Protocol:*/
76 postP {
77  true
78 }
79
80
81 operation: actAdministrator.outactAdministrator.oeUpdatePI(APIID:dtID, APIName:dtName, APICity:
82   dtCity, APIGPSLocation:dtGPSLocation, APIDescription:dtDescription, APICategory:etCategory):
83   ptBoolean {
84
85  /* Pre Protocol: */
86  preP {
87    let TheSystem:ctState in
88    let TheActor:actAdministrator in
89
90    self.rnActor.rnSystem = TheSystem
91    and self.rnActor = TheActor
92
93  /* Prep01 */
94  TheSystem.vpStarted = true
95
96  /* Prep02 */
97  and TheActor.rnctAuthenticated.vpIsLogged = true
98
99  /* Pre Functional: */
100 preF {
101  let TheSystem:ctState in
102  let TheActor:actAdministrator in
103  let ColctPI:Set(ctPI) in

```

```

103
104     self.rnActor.rnSystem = TheSystem
105     and self.rnActor = TheActor
106
107     /* PreF01 */
108     TheSystem.rnctPI->select(id.eq(APIID)) = ColctPI
109     and ColctPI->size() .eq(1)
110 }
111
112     /* Post Functional: */
113     postF {
114         let TheSystem:ctState in
115         let ThectPI:ctPI in
116         let TheActor:actAdministrator in
117
118         self.rnActor.rnSystem = TheSystem
119         and self.rnActor = TheActor
120
121         /* PostF01 */
122         ThectPI.rnctPI.name = APIName
123         and ThectPI.rnctPI.city = APIName
124         and ThectPI.rnctPI.location = AGPSLocation
125         and ThectPI.rnctPI.description = APIDescription
126         and ThectPI.rnctPI.category = APICategory
127
128         /* PostF02 */
129         and TheActor.rnInterfaceIN^iePIUpToDate()
130     }
131
132     /* Post Protocol:*/
133     postP {
134         true
135     }
136 }
137
138 operation: actAdministrator.outactAdministrator.oeDeletePI(APIID:dtID):ptBoolean {
139
140     /* Pre Protocol: */
141     preP {
142         let TheSystem:ctState in
143         let TheActor:actAdministrator in
144
145         self.rnActor.rnSystem = TheSystem
146         and self.rnActor = TheActor
147
148         /* PreP01 */
149         TheSystem.vpStarted = true
150
151         /* PreP02 */
152         and TheActor.rnctAuthenticated.vpIsLogged = true
153     }
154
155     /* Pre Functional: */
156     preF {
157         let TheSystem:ctState in
158         let TheActor:actAdministrator in
159         let ColctPI:Set(ctPI) in
160
161         self.rnActor.rnSystem = TheSystem
162         and self.rnActor = TheActor
163
164         /* PreF01 */
165         TheSystem.rnctPI->select(id.eq(APIID)) = ColctPI
166         and ColctPI->size() .eq(1)
167     }
168
169     /* Post Functional */
170     postF {
171         let TheSystem:ctState in
172         let TheActor:actAdministrator in

```

```

173 let ThectPI:ctPI in
174
175 self.rnActor.rnSystem = TheSystem
176 and self.rnActor = TheActor
177
178 /* PostF01 */
179 TheSystem.rnctPI->select(id.ed(APIID)) = ThectPI
180 and ThectPI.msrsIsKilled
181
182 /* PostF02 */
183 and TheActor.rnInterfaceIN^iePIDeleted()
184 }
185
186 /* Post Protocol:*/
187 postP {
188   true
189 }
190 }
191
192 operation: actAdministrator.outactAdministrator.oe GetAllRequestsFromCoordinator():ptBoolean {
193
194 /* Pre Protocol: */
195 preP {
196   let TheSystem:ctState in
197   let TheActor:actAdministrator in
198
199   self.rnActor.rnSystem = TheSystem
200   and self.rnActor = TheActor
201
202 /* PreP01 */
203 TheSystem.vpStarted = true
204
205 /* PreP02 */
206 and TheActor.rnctAuthenticated.vpIsLogged = true
207 }
208
209 /* Pre Functional: */
210 preF {
211   true
212 }
213
214 /* Post Functional */
215 postF {
216   let TheSystem:ctState in
217   let TheActor:actAdministrator in
218   let ColctRequest:Set(ctRequest) in
219
220   self.rnActor.rnSystem = TheSystem
221   and self.rnActor = TheActor
222
223 TheSystem.rnctRequest->select(status.eq("pending")) = ColctRequest
224
225 and if (ColctRequest->IsEmpty() = false)
226 then (
227   /* PostF01 */
228   and TheActor.rnInterfaceIN^ieRequestList()
229 )
230 else (
231   /* PostF02 */
232   and AMassage.eq('No requested points of interest!')
233   and TheActor.rnInterfaceIN^ieMessage(AMassage)
234 )
235 endif
236 }
237
238 /* Post Protocol:*/
239 postP {
240   true
241 }
242 }
```

```

243
244 operation: actAdministrator.outactAdministrator.oeTreatRequest (ARequestID:dtID) :ptBoolean {
245
246 /* Pre Protocol: */
247 preP {
248   let TheSystem:ctState in
249   let TheActor:actAdministrator in
250
251   self.rnActor.rnSystem = TheSystem
252   and self.rnActor = TheActor
253
254 /* PreP01 */
255 TheSystem.vpStarted = true
256
257 /* PreP02 */
258 and TheActor.rnctAuthenticated.vpIsLogged = true
259 }
260
261 /* Pre Functional: */
262 preF {
263   let TheSystem:ctState in
264   let TheActor:actAdministrator in
265   let ColctRequest:Set(ctRequest) in
266
267   self.rnActor.rnSystem = TheSystem
268   and self.rnActor = TheActor
269
270 /* PreF01 */
271 TheSystem.rnctRequest->select(status.eq("pending")) = ColctRequest
272 and ColctRequest->IsEmpty() = false
273 }
274
275 /* Post Functional */
276 postF {
277   let TheSystem:ctState in
278   let TheActor:actAdministrator in
279   let ThectRequest:ctRequest in
280
281   self.rnActor.rnSystem = TheSystem
282   and self.rnActor = TheActor
283
284 /* PostF01 */
285 ThectRequest.rnctRequest.status = "treated"
286
287 /* PostF02 */
288 and TheActor.rnInterfaceIN^ieRequestBeingTreated()
289 }
290
291 /* Post Protocol:*/
292 postP {
293   true
294 }
295 }
296
297 operation: actAdministrator.outactAdministrator.oeSolveRequest (ARequestID:dtID) :ptBoolean {
298
299 /* Pre Protocol: */
300 preP {
301   let TheSystem:ctState in
302   let TheActor:actAdministrator in
303
304   self.rnActor.rnSystem = TheSystem
305   and self.rnActor = TheActor
306
307 /* PreP01 */
308 TheSystem.vpStarted = true
309
310 /* PreP02 */
311 and TheActor.rnctAuthenticated.vpIsLogged = true
312 }

```

```

313
314 /* Pre Functional: */
315 preF {
316   let TheSystem:ctState in
317   let TheActor:actAdministrator in
318   let ColctRequest:Set(ctRequest) in
319
320   self.rnActor.rnSystem = TheSystem
321   and self.rnActor = TheActor
322
323 /* PreF01 */
324 TheSystem.rnctRequest->select(status.eq("treated")) = ColctRequest
325   and ColctRequest->IsEmpty() = false
326 }
327
328 /* Post Functional */
329 postF {
330   let TheSystem:ctState in
331   let TheActor:actAdministrator in
332   let ThectRequest:ctRequest in
333
334   self.rnActor.rnSystem = TheSystem
335   and self.rnActor = TheActor
336
337 /* PostF01 */
338 ThectRequest.rnctRequest.status = "solved"
339
340 /* PostF02 */
341   and TheActor.rnInterfaceIN^ieRequestSolved()
342 }
343
344 /* Post Protocol:*/
345 postP {
346   true
347 }
348 }
349
350 operation: actAdministrator.outactAdministrator.oeAddCoordinator(AdtCoordinatorID: dtCoordinatorID
351   , AdtLogin: dtLogin, AdtPassword: dtPassword, CoordinatorAccessRights: etCrisisType):ptBoolean
352   {
353 /* Pre protocol */
354 preP {
355   let TheSystem:ctState in
356   let TheActor:actAdministrator in
357
358   self.rnActor.rnSystem = TheSystem
359   and self.rnActor = The Actor
360
361 /* Pre P01 */
362 TheSystem.vpStarted = true
363
364 /* Pre P02 */
365 TheActor.rnctAuthenticated.vpIsLogged = true
366 }
367
368 /* Pre Functional */
369 preF {
370   let TheSystem: ctState in
371   let TheActor:actAdministrator in
372   let ColctCoordinators:Bag(ctCoordinator) in
373
374   self.rnActor.rnSystem = TheSystem
375   and self.rnActor = TheActor
376
377 /* PreF01 */
378 and TheSystem.rnctCoordinator->select(id.eq(AdtCoordinatorID)) = ColctCoordinators
379   and ColctCoordinators->isEmpty() = true
380 }
381
382 /* Post Functional */

```

```

381 postF {
382   let TheSystem: ctState in
383   let TheactCoordinator:actCoordinator in
384   let ThectCoordinator:ctCoordinator in
385
386   self.rnActor.rnSystem = TheSystem
387   and self.rnActor = TheActor
388
389   /* PostF01 */
390   TheactCoordinator.init()
391
392   /* PostF02 */
393   and ThectCoordinator.init(AdtCoordinatorID,AdtLogin,AdtPassword, CoordinatorAccessRights)
394
395   /* PostF03 */
396   and TheactCoordinator@post.rnctCoordinator = ThectCoordinator
397
398   /* PostF04 */
399   and ThectCoordinator@post.rnactAuthenticated = TheactCoordinator
400
401   /* PostF05 */
402   and TheActor.rnInterfaceIN^ieCoordinatorAdded()
403 }
404
405 /* Post Protocol */
406 postP {
407   true
408 }
409 }
410
411 operation: actAdministrator.outactAdministrator.oeDeleteCoordinator(AdtCoordinatorID:
412   dtCoordinatorID):ptBoolean {
413   /* Pre protocol */
414   preP {
415     let TheSystem:ctState in
416     let TheActor:actAdministrator in
417
418     self.rnActor.rnSystem = TheSystem
419     and self.rnActor = The Actor
420
421     /* Pre P01 */
422     TheSystem.vpStarted = true
423
424     /* Pre P02 */
425     TheActor.rnctAuthenticated.vpIsLogged = true
426   }
427
428   /* Pre Functional:*/
429   preF{
430     let TheSystem: ctState in
431     let TheActor:actAdministrator in
432     let ColctCoordinators:Bag(ctCoordinator) in
433
434     self.rnActor.rnSystem = TheSystem
435     and self.rnActor = TheActor
436
437     /* PreF01 */
438     TheSystem.rnctCoordinator->select(id.eq(AdtCoordinatorID)) = ColctCoordinators
439     and ColctCoordinators->size() .eq(1)
440   }
441
442   /* Post Functional:*/
443   postF{
444     let TheSystem: ctState in
445     let TheActor:actAdministrator in
446     let ThectCoordinator:ctCoordinator in
447
448     self.rnActor.rnSystem = TheSystem
449     and self.rnActor = TheActor

```

```

450  /* PostF01 */
451  TheSystem.rnctCoordinator->select(id.eq(AdtCoordinatorID)) = ThectCoordinator
452  and ThectCoordinator.rnactCoordinator->forAll(msrIsKilled)
453  and ThectCoordinator.msrIsKilled
454
455  /* PostF02 */
456  and TheActor.rnInterfaceIN^ieCoordinatorDeleted()
457
458  /* Post Protocol:*/
459  * /* PostP01 */
460  and true
461 }
462
463 /* Post Protocol:*/
464 postP{
465   true
466 }
467 }
468
469 operation: actAdministrator.outactAdministrator.oeUpdateCoordinatorAccessRights(AdtCoordinatorID:
470   dtCoordinatorID, CoordinatorAccessRights: etCrisisType):ptBoolean {
471  /* Pre protocol */
472  preP {
473    let TheSystem:ctState in
474    let TheActor:actAdministrator in
475
476      self.rnActor.rnSystem = TheSystem
477      and self.rnActor = The Actor
478
479    /* Pre P01 */
480    TheSystem.vpStarted = true
481
482    /* Pre P02 */
483    TheActor.rnctAuthenticated.vpIsLogged = true
484  }
485
486  /* Pre Functional */
487  preF{
488    let TheSystem: ctState in
489    let TheActor:actAdministrator in
490    let ColctCoordinators:Bag(ctCoordinator) in
491
492      self.rnActor.rnSystem = TheSystem
493      and self.rnActor = TheActor
494
495    /* Pref01 */
496    TheSystem.rnctCoordinator->select(id.eq(AdtCoordinatorID)) = ColctCoordinators
497    and ColctCoordinators->size() .eq(1)
498  }
499
500  /* Post Functional */
501  postF {
502    let TheSystem: ctState in
503    let TheActor:actAdministrator in
504    let ThectCoordinator:ctCoordinator in
505
506      self.rnActor.rnSystem = TheSystem
507      and self.rnActor = TheActor
508
509    /* PostF01 */
510    TheSystem.rnctCoordinator->select(id.eq(AdtCoordinatorID)) = ThectCoordinators
511    and ThectCoordinator.accessRights.eq(AaccessRights)
512
513    /* PostF02 */
514    and TheActor.rnInterfaceIN^ieCoordinatorAccessRightsUpdated()
515
516  /* Post Protocol:*/
517  postP{
518    true

```

```

519     }
520   }
521 }
522 }
```

Listing A.2: Messir Spec. file actAdministrator.msr.

A.3 File ./src-gen/messir-spec/operations/environment/actAuthenticated.msr

```

1 /*
2 * @author mikel
3 * @date Fri Mar 16 11:46:38 CET 2018
4 */
5
6 package lu.uni.lassy.excalibur.MyCrash.G02.operations.environment.actAuthenticated {
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 import lu.uni.lassy.excalibur.MyCrash.G02.environment
14 import lu.uni.lassy.excalibur.MyCrash.G02.concepts.primarytypes.datatypes
15 import lu.uni.lassy.excalibur.MyCrash.G02.concepts.primarytypes.classes
16
17 Operation Model {
18
19   operation: actAuthenticated.outactAuthenticated.oeLogin(ALogin:dtLogin, APassword:dtPassword) :
20     ptBoolean{
21       /* Pre Protocol*/
22       preP{let TheSystem: ctState in
23         let TheActor:actAuthenticated in
24           self.rnActor.rnSystem = TheSystem
25           and self.rnActor = TheActor
26
27           /* PreP01 */
28           and TheSystem.vpStarted = true
29           /* PreP02 */
30           and TheActor.rnctAuthenticated.vpIsLogged = false
31           /* PreP03 */
32           and TheActor.rnctAuthenticated.capReq = false}
33
34         /* Pre Functional:*/
35         preF{/* PreF01 */
36           true}
37
38         /* Post Functional:*/
39         postF{let TheSystem: ctState in
40           let TheactAuthenticated:actAuthenticated in
41             let AptStringMessageForTheactAuthenticated: ptString in
42               AptStringMessageForTheactAdministrator:ptString in
43
44             self.rnActor.rnSystem = TheSystem
45             and self.rnActor = TheactAuthenticated
46
47             and /* PostF01 */
48               if (TheactAuthenticated.rnctAuthenticated.pwd = AdtPassword
49                 and TheactAuthenticated.rnctAuthenticated.login = AdtLogin )
50                 then (AptStringMessageForTheactAuthenticated.eq('You are logged ! Welcome ...')
51                   and TheactAuthenticated.rnInterfaceIN^ieMessage(AptStringMessageForTheactAuthenticated)
52                 )
53               else (AptStringMessageForTheactAuthenticated
54                 .eq('Wrong identification information ! Please try again ...')
55                 and TheactAuthenticated.rnInterfaceIN^ieMessage(AptStringMessageForTheactAuthenticated)
56                 and AptStringMessageForTheactAdministrator.eq('Intrusion tentative !')
57                 and TheSystem.rnactAdministrator
58                   .rnInterfaceIN^ieMessage(AptStringMessageForTheactAdministrator)
59                 )}
```

```

60    endif}
61
62 /* Post Protocol:*/
63 postP{ let TheSystem: ctState in
64   let TheactAuthenticated:actAuthenticated in
65
66   self.rnActor.rnSystem = TheSystem
67   and self.rnActor = TheactAuthenticated
68 /* PostP01 */
69   if (TheactAuthenticated.rnctAuthenticated.pwd = AdtPassword and
70 TheactAuthenticated.rnctAuthenticated.login = AdtLogin) then(
71     TheactAuthenticated.rnctAuthenticated@post.vpIsLogged = true and
72     TheactAuthenticated.rnctAuthenticated@post.tries = 0 and
73     TheactAuthenticated.rnctAuthenticated@post.lastAccess = -181
74 )else(
75   TheactAuthenticated.rnctAuthenticated@post.lastAccess = ((int)System.currentTimeMillis() /1000) -
76     TheactAuthenticated.rnctAuthenticated.lastAccess
77   if(TheactAuthenticated.rnctAuthenticated@post.lastAccess <= 180)then(
78     TheactAuthenticated.rnctAuthenticated@post.tries = TheactAuthenticated.rnctAuthenticated@post.
79       tries + 1
80   if (TheactAuthenticated.rnctAuthenticated@post.tries > 2) then(
81     TheactAuthenticated.rnctAuthenticated@post.capReq = true
82   )else
83     true
84   endif
85 )endif
86 )endif}
87 }
88
89 operation: actAuthenticated.outactAuthenticated.oeLogout():ptBoolean{
90 // include below the specification information (pre, post or ocl or prolog)
91 /* Pre Protocol:*/
92 preP{let TheSystem: ctState in
93   let TheActor:actAdministrator in
94   self.rnActor.rnSystem = TheSystem
95   and self.rnActor = TheActor
96
97 /* PreP01 */
98   and TheSystem.vpStarted = true
99   /* Prep02 */
100  and TheActor.rnctAuthenticated.vpIsLogged = true}
101
102 /* Pre Functional:*/
103 pref{/* PreF01 */
104 true}
105
106 /* Post Functional:*/
107 postF{let TheSystem: ctState in
108   let TheactAuthenticated:actAuthenticated in
109   let AptStringMessageForTheactAuthenticated: ptString in
110
111   self.rnActor.rnSystem = TheSystem
112   and self.rnActor = TheactAuthenticated
113
114 /* PostF01 */
115 AptStringMessageForTheactAuthenticated.eq('You are logged out ! Good Bye ...')
116 and TheactAuthenticated.bnInterfaceIN^ieMessage(AptStringMessageForTheactAuthenticated) }
117
118 /* Post Protocol:*/
119 postP{ let TheSystem: ctState in
120   let TheactAuthenticated:actAuthenticated in
121
122   self.rnActor.rnSystem = TheSystem
123   and self.rnActor = TheactAuthenticated.asSet
124 /* PostP01 */
125   TheactAuthenticated.rnctAuthenticated@post.vpIsLogged = false}
126 }
127 operation: actAuthenticated.outactAuthenticated.oeLoginWithCaptcha(ALogin:dtLogin, APassword:
```

```

        dtPassword, ACaptcha:dtCaptcha) :ptBoolean{
128  /* Pre Protocol:*/
129  preP{let TheSystem: ctState in
130  let TheActor:actAuthenticated in
131  self.rnActor.rnSystem = TheSystem
132  and self.rnActor = TheActor
133
134  /* PreP01 */
135  and TheSystem.vpStarted = true
136  /* PreP02 */
137  and TheActor.rnctAuthenticated.vpIsLogged = false
138  /* PreP03 */
139  and TheActor.rnctAuthenticated.capReq = true)
140
141  /* Pre Functional:*/
142  preF{/* PreF01 */
143  true}
144
145  /* Post Functional:*/
146  postF{let TheSystem: ctState in
147  let TheactAuthenticated:actAuthenticated in
148
149  let AptStringMessageForTheactAuthenticated:ptString in
150  let AptStringMessageForTheactAdministrator:ptString in
151
152  self.rnActor.rnSystem = TheSystem
153  and self.rnActor = TheactAuthenticated
154
155  and /* PostF01 */
156  if(ACaptcha = TheactAuthenticated.rnctAuthenticated.cap2Solve) then
157    if (TheactAuthenticated.rnctAuthenticated.pwd = AdtPassword
158      and TheactAuthenticated.rnctAuthenticated.login = AdtLogin
159      )
160    then (AptStringMessageForTheactAuthenticated.eq('You are logged ! Welcome ...')
161      and TheactAuthenticated.rnInterfaceIN^ieMessage(AptStringMessageForTheactAuthenticated)
162      )
163    else (AptStringMessageForTheactAuthenticated
164      .eq('Wrong identification information ! Please try again ...')
165      and TheactAuthenticated.rnInterfaceIN^ieMessage(AptStringMessageForTheactAuthenticated)
166      and AptStringMessageForTheactAdministrator.eq('Intrusion tentative !')
167      and TheSystem.rnactAdministrator
168      .rnInterfaceIN^ieMessage(AptStringMessageForTheactAdministrator)
169      )
170  endif
171  else
172    (TheactAuthenticated.rnctAuthenticated@post.cap2Solve = random() and
173     AptStringMessageForTheactAuthenticated.eq('Wrong Captcha information ! Captcha: ' +
174     TheactAuthenticated.rnctAuthenticated@post.cap2Solve) and
175     TheactAuthenticated.rnInterfaceIN^ieMessage(AptStringMessageForTheactAuthenticated)
176     )
177  endif}
178
179  /* Post Protocol:*/
180  postP{ let TheSystem: ctState in
181  let TheactAuthenticated:actAuthenticated in
182
183  self.rnActor.rnSystem = TheSystem
184  and self.rnActor = TheactAuthenticated
185  /* PostP01 */
186  if(ACaptcha = TheactAuthenticated.rnctAuthenticated.cap2Solve) then
187    (if(TheactAuthenticated.rnctAuthenticated.pwd = AdtPassword and
188     TheactAuthenticated.rnctAuthenticated.login = AdtLogin) then(
189     TheactAuthenticated.rnctAuthenticated@post.tries = 0 and
190     TheactAuthenticated.rnctAuthenticated@post.lastAccess = -181 and
191     TheactAuthenticated.rnctAuthenticated@post.capReq = false and
192     TheactAuthenticated.rnctAuthenticated@post.vpIsLogged = true
193   )else(
194     TheactAuthenticated.rnctAuthenticated@post.lastAccess = ((int)System.currentTimeMillis()/1000)
195     - TheactAuthenticated.rnctAuthenticated.lastAccess
196   (if(TheactAuthenticated.rnctAuthenticated@post.lastAccess <= 180)then(

```

```

196     TheactAuthenticated.rnctAuthenticated@post.tries = TheactAuthenticated.rnctAuthenticated.tries
197     + 1
198     )else(
199     TheactAuthenticated.rnctAuthenticated@post.tries = 1
200     )endif)
201     )endif)
202     else
203     (false)
204     endif}
205     }
206     operation: actAuthenticated.outactAuthenticated.oeResetPassword(ALogin:dtLogin):ptBoolean{
207     /* Pre Protocol:*/
208     preP{let TheSystem: ctState in
209     let TheActor:actAuthenticated in
210     self.rnActor.rnSystem = TheSystem
211     and self.rnActor = TheActor
212
213     /* PreP01 */
214     and TheSystem.vpStarted = true
215     /* PreP02 */
216     and TheActor.rnctAuthenticated.vpIsLogged = false}
217
218     /* Pre Functional:*/
219     preF{//* PreF01 */
220     true}
221
222     /* Post Functional:*/
223     postF{let TheSystem: ctState in
224     let TheactAuthenticated:actAuthenticated in
225
226     let AptStringMessageForTheactAuthenticated: ptString in
227     let AptStringMessageForTheactAdministrator:ptString in
228
229     self.rnActor.rnSystem = TheSystem
230     and self.rnActor = TheactAuthenticated
231
232     and /* PostF01 */
233     if (TheactAuthenticated.rnctAuthenticated.login = AdtLogin
234         )
235     then (TheactAuthenticated.rnctAuthenticated@post.pwd = new dtPassword( random() )
236         and AptStringMessageForTheactAuthenticated.eq('User found, resetting password ... New password
237             = ' + TheactAuthenticated.rnctAuthenticated@post.pwd)
238         and TheactAuthenticated.rnInterfaceIN^ieMessage(AptStringMessageForTheactAuthenticated)
239     )
240     else (AptStringMessageForTheactAuthenticated
241         .eq('Wrong username information ! Please try again ...')
242         and TheactAuthenticated.rnInterfaceIN^ieMessage(AptStringMessageForTheactAuthenticated)
243     )
244     endif}
245
246     /* Post Protocol:*/
247     postP{
248     }
249   }

```

Listing A.3: Messir Spec. file actAuthenticated.msr.

A.4 File ./src-gen/messir-spec/operations/environment/actComCompany.m

```

1  /*
2 * @author mikel
3 * @date Fri Mar 16 11:46:38 CET 2018
4 */
5
6 package lu.uni.lassy.excalibur.MyCrash.G02.operations.environment.actComCompany {
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 Operation Model {
14
15 }
16 }
```

Listing A.4: Messir Spec. file actComCompany.msr.

A.5 File ./src-gen/messir-spec/operations/environment/actCoordinator.msr

```

1 /*
2 * @author mikel
3 * @date Fri Mar 16 11:46:38 CET 2018
4 */
5
6 package lu.uni.lassy.excalibur.MyCrash.G02.operations.environment.actCoordinator {
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 import lu.uni.lassy.excalibur.MyCrash.G02.environment
14 import lu.uni.lassy.excalibur.MyCrash.G02.concepts.primarytypes.classes
15 import lu.uni.lassy.excalibur.MyCrash.G02.concepts.primarytypes.datatypes
16
17 Operation Model {
18
19 operation: actCoordinator.outactCoordinator.oe GetAllRequests():ptBoolean {
20
21 /* Pre Protocol: */
22 preP {
23 let TheSystem:ctState in
24 let TheActor:actAdministrator in
25
26 self.rnActor.rnSystem = TheSystem
27 and self.rnActor = TheActor
28
29 /* PreP01 */
30 TheSystem.vpStarted = true
31
32 /* PreP02 */
33 and TheActor.rnctAuthenticated.vpIsLogged = true
34 }
35
36 /* Pre Functional: */
37 preF {
38 true
39 }
40
41 /* Post Functional */
42 postF {
43 let TheSystem:ctState in
44 let TheActor:actCoordinator in
45 let ColctRequest:Set(ctRequest) in
46
47 self.rnActor.rnSystem = TheSystem
48 and self.rnActor = TheActor
49
50 TheSystem.rnctRequest->select(status.eq("")) = ColctRequest
51
52 and if (ColctRequest->IsEmpty() = false)
53 then (
54 /* PostF01 */
55 and TheActor.rnInterfaceIN^ieRequestListToCheck()
56 )}
```

```

57     else (
58       /* PostF02 */
59       and AMessage.eq('No requests to check!')
60       and TheActor.rnInterfaceIN^ieMessage(AMessage)
61     )
62   endif
63 }
64
65 /* Post Protocol:*/
66 postP {
67   true
68 }
69 }
70
71 operation: actCoordinator.outactCoordinator.oeCheckAvailability(ARequestID:dtID):ptBoolean {
72
73 /* Pre Protocol: */
74 preP {
75   let TheSystem:ctState in
76   let TheActor:actAdministrator in
77
78   self.rnActor.rnSystem = TheSystem
79   and self.rnActor = TheActor
80
81 /* PreP01 */
82 TheSystem.vpStarted = true
83
84 /* PreP02 */
85   and TheActor.rnctAuthenticated.vpIsLogged = true
86 }
87
88 /* Pre Functional: */
89 preF {
90   let TheSystem:ctState in
91   let TheActor:actCoordinator in
92   let ColctPI:Set(ctPI) in
93   let ColctRequest:Set(ctRequest) in
94
95   self.rnActor.rnSystem = TheSystem
96   and self.rnActor = TheActor
97
98 /* Pref01 */
99 TheSystem.rnctRequest->select(name.eq(ARequestID)) = ColctRequest
100   and ColctRequest->size() .eq(1)
101 }
102
103 /* Post Functional */
104 postF {
105   let TheSystem:ctState in
106   let TheActor:actCoordinator in
107   let ThectRequest:ctRequest in
108
109   self.rnActor.rnSystem = TheSystem
110   and self.rnActor = TheActor
111
112 TheSystem.rnctPI->select(name.eq(ARequestID)) = ColctPI
113
114   and if (ColctPI.IsEmpty() = false)
115   then (
116     /* PostF01 */
117     and ThectRequest.rnctRequest.ignored = true
118     and AMessage.eq('The PI is already in the system.')
119     and TheActor.rnInterfaceIN^ieMessage(AMessage)
120   )
121   else (
122     /* PostF02 */
123     and ThectRequest.rnctRequest.ignored = false
124     and AMessage.eq('The PI is NOT in the system. How to proceed?')
125     and TheActor.rnInterfaceIN^ieMessage(AMessage)
126   )

```

```

127     endif
128 }
129
130 /* Post Protocol:*/
131 postP {
132   true
133 }
134 }
135
136 operation: actCoordinator.outactCoordinator.oeDeliverRequest(AResquestID:dtID):ptBoolean {
137
138 /* Pre Protocol: */
139 preP {
140   let TheSystem:ctState in
141   let TheActor:actCoordinator in
142
143   self.rnActor.rnSystem = TheSystem
144   and self.rnActor = TheActor
145
146 /* PreP01 */
147 TheSystem.vpStarted = true
148
149 /* PreP02 */
150 and TheActor.rnctAuthenticated.vpIsLogged = true
151 }
152
153 /* Pre Functional: */
154 preF {
155   let TheSystem:ctState in
156   let TheActor:actCoordinator in
157   let ColctRequest:Set(ctRequest) in
158
159   self.rnActor.rnSystem = TheSystem
160   and self.rnActor = TheActor
161
162 /* PreF01 */
163 TheSystem.rnctRequest->select(ignored.eq(false)) = ColctRequest
164 and ColctRequest->IsEmpty() = false
165 }
166
167 /* Post Functional */
168 postF {
169   let TheSystem:ctState in
170   let TheActor:actCoordinator in
171   let ThectRequest:ctRequest in
172
173   self.rnActor.rnSystem = TheSystem
174   and self.rnActor = TheActor
175
176 /* PostF01 */
177 ThectRequest.rnctRequest.status = "pending"
178
179 /* PostF02 */
180 and TheActor.rnInterfaceIN^ieRequestDelivered()
181 }
182
183 /* Post Protocol:*/
184 postP {
185   true
186 }
187 }
188
189 operation: actCoordinator.outactCoordinator.oeValidateAlert(AdtAlertID: dtAlertID):ptBoolean {
190 /* Pre protocol */
191 preP {
192   let TheSystem:ctState in
193   let TheActor:actCoordinator in
194
195   self.rnActor.rnSystem = TheSystem
196   and self.rnActor = The Actor

```

```

197  /* Pre P01 */
198  TheSystem.vpStarted = true
199
200  /* Pre P02 */
201  TheActor.rnctAuthenticated.vpIsLogged = true
202 }
203
204  /* Pre Functional */
205  preF {
206    let TheSystem:ctState in
207    let ColctAlert:Bag(ctAlert) in
208
209    self.rnActor.rnSystem = TheSystem
210
211  /* Pre F01 */
212  TheSystem.rnctAlert->select(id.eq(AdtAlertID)) = ColctAlert
213  and ColctAlert->size.eq(1)
214 }
215
216
217  /* Post Functional */
218  postF {
219    let TheSystem:ctState in
220    let ThectAlert:ctAlert in
221
222    self.rnActor.rnSystem = TheSystem
223
224  /* Post F01 */
225  TheSystem.rnctAlert->select(id.eq(AdtAlerID)) = ThectAlert
226  and ThectAlert.status.eq("valid")
227  and TheActor.rnInterfaceIN^ieMessage("Alert validated!")
228 }
229
230  /* Post Protocol */
231  postP {
232    true
233  }
234 }
235
236 operation: actCoordinator.outactCoordinator.oeInvalidateAlert(AdtAlertID: dtAlertID):ptBoolean {
237  /* Pre protocol */
238  preP {
239    let TheSystem:ctState in
240    let TheActor:actCoordinator in
241
242    self.rnActor.rnSystem = TheSystem
243    and self.rnActor = The Actor
244
245  /* Pre P01 */
246  TheSystem.vpStarted = true
247
248  /* Pre P02 */
249  TheActor.rnctAuthenticated.vpIsLogged = true
250 }
251
252  /* Pre Functional */
253  preF {
254    let TheSystem:ctState in
255    let ColctAlert:Bag(ctAlert) in
256
257    self.rnActor.rnSystem = TheSystem
258
259  /* Pre F01 */
260  TheSystem.rnctAlert->select(id.eq(AdtAlertID)) = ColctAlert
261  and ColctAlert->size.eq(1)
262 }
263
264  /* Post Functional */
265  postF {
266    let TheSystem:ctState in

```

```

267 let ThectAlert:ctAlert in
268
269 self.rnActor.rnSystem = TheSystem
270
271 /* Post F01 */
272 TheSystem.rnctAlert->select(id.eq(AdtAlerID)) = ThectAlert
273 and ThectAlert.status.eq("closed")
274 and TheActor.rnInterfaceIN^ieMessage("Alert invalidated!")
275 }
276
277 /* Post Protocol */
278 postP {
279   true
280 }
281 }
282
283 operation: actCoordinator.outactCoordinator.oeGetAlertSet(AetAlertStatus: etAlertStatus) :ptBoolean
284   {
285     /* Pre protocol */
286     preP {
287       let TheSystem:ctState in
288       let TheActor:actCoordinator in
289
290       self.rnActor.rnSystem = TheSystem
291       and self.rnActor = The Actor
292
293       /* Pre P01 */
294       TheSystem.vpStarted = true
295
296       /* Pre P02 */
297       TheActor.rnctAuthenticated.vpIsLogged = true
298     }
299
300     /* Pre Functional */
301     preF {
302       true
303     }
304
305     /* Post Functional */
306     postF{
307       let TheSystem: ctState in
308       let ThectAlert:ctAlert in
309
310       self.rnActor.rnSystem = TheSystem
311
312       /* Post F01 */
313       TheSystem.rnctAlert->select(status.eq(AetAlertStatus)) = ThectAlert
314       and ThectAlert.rnctAlert->forAll(isSentToCoordinator)
315       and ThectAlert.msrIsSentToCoordinator
316     }
317
318     /* Post Protocol */
319     postP {
320       true
321     }
322   }
323
324 operation: actCoordinator.outactCoordinator.oeGetCrisisSet(AetCrisisStatus: etCrisisStatus):
325   ptBoolean {
326     /* Pre protocol */
327     preP {
328       let TheSystem:ctState in
329       let TheActor:actCoordinator in
330
331       self.rnActor.rnSystem = TheSystem
332       and self.rnActor = The Actor
333
334       /* Pre P01 */
335       TheSystem.vpStarted = true

```

```

335  /* Pre P02 */
336  TheActor.rnctAuthenticated.vpIsLogged = true
337
338  /* Pre P03 */
339  /* Coordinators access rights are equal to or lower than the crisis type.*/
340 }
341
342  /* Pre Functional */
343 preF {
344  true
345 }
346
347  /* Post Functional */
348 postF{
349  let TheSystem: ctState in
350  let ThectCrisis:ctCrisis in
351
352  self.rnActor.rnSystem = TheSystem
353
354  /* Post F01 */
355  TheSystem.rnctCrisis->select(status.eq(AetCrisisStatus)) = ThectCrisis
356  and ThectCrisis.rnctCrisis->forAll(isSentToCoordinator)
357  and ThectCrisis.msrIsSentToCoordinator
358 }
359
360  /* Post Protocol */
361 postP {
362  true
363 }
364 }
365
366 operation: actCoordinator.outactCoordinator.oeSetCrisisType(AdtCrisisID: dtCrisisID, AetCrisisType
367  : etCrisisType):ptBoolean {
368  /* Pre protocol */
369  preP {
370  let TheSystem:ctState in
371  let TheActor:actCoordinator in
372
373  self.rnActor.rnSystem = TheSystem
374  and self.rnActor = The Actor
375
376  /* Pre P01 */
377  TheSystem.vpStarted = true
378
379  /* Pre P02 */
380  TheActor.rnctAuthenticated.vpIsLogged = true
381
382  /* Pre P03 */
383  /* Coordinators access rights are equal to or lower than the crisis type.*/
384 }
385
386  /* PreFunctional */
387  preF {
388  let TheSystem:ctState in
389  let ColctCrisis:Bag(ctCrisis) in
390
391  self.rnActor.rnSystem = TheSystem
392
393  /* Pre F01 */
394  TheSystem.rnctCrisis->select(id.eq(AdtCrisisID)) = ColctCrisis
395  and ColctCrisis->size.eq(1)
396 }
397
398  /* Post Functional */
399  postF {
400  let TheSystem:ctState in
401  let ThectCrisis:ctCrisis in
402
403  self.rnActor.rnSystem = TheSystem
404 }
```

```

404  /* Post F01 */
405  TheSystem.rnctCrisis->select(id.eq(AdtCrisisID)) = ThectCrisis
406  and ThectCrisis.AetCrisisType.eq(AdtCrisisType)
407  and TheActor.rnInterfaceIN^ieMessage("Crisis type set to " + AdtCrisisType)
408 }
409
410 /* Post Protocol */
411 postP {
412   true
413 }
414 }
415
416 operation: actCoordinator.outactCoordinator.oeSetCrisisStatus(AdtCrisisID: dtCrisisID,
417   AetCrisisStatus: etCrisisStatus):ptBoolean {
418 /* Pre protocol */
419 preP {
420   let TheSystem:ctState in
421   let TheActor:actCoordinator in
422
423   self.rnActor.rnSystem = TheSystem
424   and self.rnActor = The Actor
425
426   /* Pre P01 */
427   TheSystem.vpStarted = true
428
429   /* Pre P02 */
430   TheActor.rnctAuthenticated.vpIsLogged = true
431
432   /* Pre P03 */
433   /* Coordinators access rights are equal to or lower than the crisis type.*/
434 }
435
436 /* PreFunctional */
437 pref {
438   let TheSystem:ctState in
439   let ColctCrisis:Bag(ctCrisis) in
440
441   self.rnActor.rnSystem = TheSystem
442
443   /* Pre F01 */
444   TheSystem.rnctCrisis->select(id.eq(AdtCrisisID)) = ColctCrisis
445   and ColctCrisis->size.eq(1)
446 }
447
448 /* Post Functional */
449 postF {
450   let TheSystem:ctState in
451   let ThectCrisis:ctCrisis in
452
453   self.rnActor.rnSystem = TheSystem
454
455   /* Post F01 */
456   TheSystem.rnctCrisis->select(id.eq(AdtCrisisID)) = ThectCrisis
457   and ThectCrisis.AetCrisisStatus.eq(AdtCrisisStatus)
458   and TheActor.rnInterfaceIN^ieMessage("Crisis status set to " + AdtCrisisStatus)
459 }
460
461 /* Post Protocol */
462 postP {
463   true
464 }
465
466 operation: actCoordinator.outactCoordinator.oeSetCrisisHandler(AdtCrisisID: dtCrisisID):ptBoolean
467   {
468 /* Pre protocol */
469 preP {
470   let TheSystem:ctState in
471   let TheActor:actCoordinator in

```

```

472  self.rnActor.rnSystem = TheSystem
473  and self.rnActor = The Actor
474
475  /* Pre P01 */
476  TheSystem.vpStarted = true
477
478  /* Pre P02 */
479  TheActor.rnctAuthenticated.vpIsLogged = true
480
481  /* Pre P03 */
482  /* Coordinators access rights are equal to or lower than the crisis type.*/
483 }
484
485 /* PreFunctional */
486 preF {
487  let TheSystem:ctState in
488  let ColctCrisis:Bag(ctCrisis) in
489
490  self.rnActor.rnSystem = TheSystem
491
492  /* Pre F01 */
493  TheSystem.rnctCrisis->select(id.eq(AdtCrisisID)) = ColctCrisis
494  and ColctCrisis->size.eq(1)
495 }
496
497 /* Post Functional */
498 postF {
499  let TheSystem:ctState in
500  let ThectCrisis:ctCrisis in
501
502  self.rnActor.rnSystem = TheSystem
503
504  /* Post F01 */
505  TheSystem.rnctCrisis->select(id.eq(AdtCrisisID)) = ThectCrisis
506  and ThectCrisis.AetCrisisStatus.eq("handled")
507  and TheActor.rnInterfaceIN^ieMessage("Handler of the crisis " + AdtCrisisID + " is being handled
      by coordinator with id " + self.id)
508
509  /* Post F02 */
510  /*All the alerts related to this crisis are sent to the actor such that he can
      decide how to handle them.*/
511
512  /* Post F03 */
513  /*if the crisis was already handled at pre-state then the associated handler actor is
      notified about the change of handler for one of his crisis
      (n.b. it might be the same even if not relevant).*/
514
515  /* Post F04 */
516  /*a message is sent to the communication company for any human related to an alert
      associated to the crisis. A human will receive as many messages as alerts he sent despite
      the fact that they might relate to the same crisis (i.e. one alert, one acknowledgement).*/
517
518 }
519
520  /* Post Protocol */
521 postP {
522  true
523 }
524 }
525 }
526 }
527
528 operation: actCoordinator.outactCoordinator.oeReportOnCrisis(AdtCrisisID: dtCrisisID, AdtComment:
      dtComment):ptBoolean {
529  /* Pre protocol */
530  preP {
531  let TheSystem:ctState in
532  let TheActor:actCoordinator in
533
534  self.rnActor.rnSystem = TheSystem
535  and self.rnActor = The Actor
536
537  /* Pre P01 */
538  TheSystem.vpStarted = true
539

```

```

540  /* Pre P02 */
541  TheActor.rnctAuthenticated.vpIsLogged = true
542
543  /* Pre P03 */
544  /* Coordinators access rights are equal to or lower than the crisis type.*/
545 }
546
547 /* PreFunctional */
548 preF {
549   let TheSystem:ctState in
550   let ColctCrisis:Bag(ctCrisis) in
551
552   self.rnActor.rnSystem = TheSystem
553
554  /* Pre F01 */
555  TheSystem.rnctCrisis->select(id.eq(AdtCrisisID)) = ColctCrisis
556  and ColctCrisis->size.eq(1)
557 }
558
559 /* Post Functional */
560 postF {
561   let TheSystem:ctState in
562   let ThectCrisis:ctCrisis in
563
564   self.rnActor.rnSystem = TheSystem
565
566  /* Post F01 */
567  TheSystem.rnctCrisis->select(id.eq(AdtCrisisID)) = ThectCrisis
568  and ThectCrisis.AdtComment.eq(AdtComment)
569  and TheActor.rnInterfaceIN^ieMessage("Added comment to the crisis")
570 }
571
572 /* Post Protocol */
573 postP {
574   true
575 }
576 }
577
578 operation: actCoordinator.outactCoordinator.oeCloseCrisis(AdtCrisisID: dtCrisisID):ptBoolean {
579  /* Pre protocol */
580  preP {
581    let TheSystem:ctState in
582    let TheActor:actCoordinator in
583
584    self.rnActor.rnSystem = TheSystem
585    and self.rnActor = The Actor
586
587  /* Pre P01 */
588  TheSystem.vpStarted = true
589
590  /* Pre P02 */
591  TheActor.rnctAuthenticated.vpIsLogged = true
592
593  /* Pre P03 */
594  /* Coordinators access rights are equal to or lower than the crisis type.*/
595 }
596
597 /* Pre Functional */
598 preF {
599   let TheSystem:ctState in
600   let ColctCrisis:Bag(ctCrisis) in
601
602   self.rnActor.rnSystem = TheSystem
603
604  /* Pre F01 */
605  TheSystem.rnctCrisis->select(id.eq(AdtCrisisID)) = ColctCrisis
606  and ColctCrisis->size.eq(1)
607 }
608
609 /* Post Functional */

```

```

610  postF {
611    let TheSystem:ctState in
612    let TheCrisis:ctCrisis in
613
614    self.rnActor.rnSystem = TheSystem
615
616    /* Post F01 */
617    TheSystem.rnctCrisis->select(id.eq(AdtCrisisID)) = TheCrisis
618    and TheCrisis.AetCrisisStatus.eq("closed")
619    and TheActor.rnInterfaceIN^ieMessage("Crisis closed")
620  }
621
622  /* Post Protocol */
623  postP {
624    true
625  }
626 }
627 }
628 }
```

Listing A.5: Messir Spec. file actCoordinator.msr.

A.6 File ./src-gen/messir-spec/operations/environment/actMsrCreator.msr

```

1 /*
2 * @author mikel
3 * @date Fri Mar 16 11:46:38 CET 2018
4 */
5
6 package lu.uni.lassy.excalibur.MyCrash.G02.operations.environment.actMsrCreator {
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 Operation Model {
14
15 }
16 }
```

Listing A.6: Messir Spec. file actMsrCreator.msr.

A.7 File ./src-gen/messir-spec/operations/environment/actPerson.msr

```

1 /*
2 * @author mikel
3 * @date Fri Mar 16 11:46:38 CET 2018
4 */
5
6 package lu.uni.lassy.excalibur.MyCrash.G02.operations.environment.actPerson {
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 import lu.uni.lassy.excalibur.MyCrash.G02.environment
14 import lu.uni.lassy.excalibur.MyCrash.G02.concepts.primarytypes.datatypes
15 import lu.uni.lassy.excalibur.MyCrash.G02.concepts.primarytypes.classes
16
17 Operation Model {
18
19   operation: actPerson.outactPerson.oeSearchPI(APIName:dtName, APICategory:etCategory, APICity:
20           dtCity):ptBoolean {
21
22     /* Pre Protocol: */
23     preP {
```

```

23  let TheSystem:ctState in
24  let TheActor:actPerson in
25
26  self.rnActor.rnSystem = TheSystem
27  and self.rnActor = TheActor
28
29  /* PreP01 */
30  TheSystem.vpStarted = true
31
32  /* PreP02 */
33  and TheActor.rnctAuthenticated.vpIsLogged = true
34 }
35
36 /* Pre Functional: */
37 preF {
38   true
39 }
40
41 /* Post Functional: */
42 postF {
43   let TheSystem:ctState in
44   let TheActor:actPerson in
45   let ColctPI:Set(ctPI) in
46
47   self.rnActor.rnSystem = TheSystem
48   and self.rnActor = TheActor
49
50  /* PostF01 */
51  TheSystem.rnctPI->select(name.eq(APIName) category.eq(APICategory) city.eq(APICity)) = ColctPI
52  and if (ColctPI->size().eq(1))
53  then (
54    and AMessage.eq('PI found. How to proceed?')
55    and TheActor.rnInterfaceIN^ieMessage(AMessage)
56  )
57  else (
58    and AMessage.eq('PI NOT found. How to proceed?')
59    and TheActor.rnInterfaceIN^ieMessage(AMessage)
60  )
61 endif
62 }
63
64 /* Post Protocol:*/
65 postP {
66   true
67 }
68 }
69
70 operation: actPerson.outactPerson.oeSendNewRequest(APIName:dtName, APICategory:etCategory, APICity
       :dtCity):ptBoolean {
71
72  /* Pre Protocol: */
73  preP {
74   let TheSystem:ctState in
75   let TheActor:actPerson in
76
77   self.rnActor.rnSystem = TheSystem
78   and self.rnActor = TheActor
79
80  /* PreP01 */
81  TheSystem.vpStarted = true
82
83  /* PreP02 */
84  and TheActor.rnctAuthenticated.vpIsLogged = true
85 }
86
87 /* Pre Functional: */
88 preF {
89   let TheSystem:ctState in
90   let TheActor:actPerson in
91   let ColctPI:Set(ctPI) in

```

```

92
93     self.rnActor.rnSystem = TheSystem
94     and self.rnActor = TheActor
95
96     /* PreF01 */
97     TheSystem.rnctPI->select(name.eq(APIName) category.eq(APICategory) city.eq(APICity)) = ColctPI
98     and ColctPI->IsEmpty() = true
99
100    /* PreF02 */
101    and TheSystem.rnctRequest->select(name.eq(APIName) category.eq(APICategory) city.eq(APICity)) =
102        ColctRequest
103        and ColctRequest->IsEmpty() = true
104    }
105
106    /* Post Functional: */
107    postF {
108        let TheSystem:ctState in
109        let TheActor:actPerson in
110        let ThectRequest:ctRequest in
111
112        self.rnActor.rnSystem = TheSystem
113        and self.rnActor = TheActor
114
115        /* PostF01 */
116        ThectRequest.init(APIName, APICategory, APICity)
117
118        /* PostF02 */
119        and AMessage.eq('Request sent!')
120        and TheActor.rnInterfaceIN^ieMessage(AMessage)
121    }
122
123    /* Post Protocol:*/
124    postP {
125        true
126    }
127
128 operation: actPerson.outactPerson.oeGetGPSLocation(APIID:dtID):ptBoolean {
129
130     /* Pre Protocol: */
131     preP {
132         let TheSystem:ctState in
133         let TheActor:actPerson in
134
135         self.rnActor.rnSystem = TheSystem
136         and self.rnActor = TheActor
137
138         /* PreP01 */
139         TheSystem.vpStarted = true
140
141         /* PreP02 */
142         and TheActor.rnctAuthenticated.vpIsLogged = true
143     }
144
145     /* Pre Functional: */
146     preF {
147         let TheSystem:ctState in
148         let TheActor:actPerson in
149         let ColctPI:Set(ctPI) in
150
151         self.rnActor.rnSystem = TheSystem
152         and self.rnActor = TheActor
153
154         /* PreF01 */
155         TheSystem.rnctPI->select(id.eq(APIID)) = ColctPI
156         and ColctPI->IsEmpty() = false
157     }
158
159     /* Post Functional: */
160     postF {

```

```

161 let TheSystem:ctState in
162 let TheActor:actPerson in
163
164 self.rnActor.rnSystem = TheSystem
165 and self.rnActor = TheActor
166
167 /* PostF01 */
168 AMessage.eq('Here, the GPS Location: 55.9797/56.9898')
169 and TheActor.rnInterfaceIN^ieMessage(AMessage)
170 }
171
172 /* Post Protocol:*/
173 postP {
174   true
175 }
176 }
177
178 operation: actPerson.outactPerson.oeGetDescription(APIID:dtID):ptBoolean {
179
180 /* Pre Protocol: */
181 preP {
182   let TheSystem:ctState in
183   let TheActor:actPerson in
184
185 self.rnActor.rnSystem = TheSystem
186 and self.rnActor = TheActor
187
188 /* PreP01 */
189 TheSystem.vpStarted = true
190
191 /* PreP02 */
192 and TheActor.rnctAuthenticated.vpIsLogged = true
193 }
194
195 /* Pre Functional: */
196 preF {
197   let TheSystem:ctState in
198   let TheActor:actPerson in
199   let ColctPI:Set(ctPI) in
200
201 self.rnActor.rnSystem = TheSystem
202 and self.rnActor = TheActor
203
204 /* PreF01 */
205 TheSystem.rnctPI->select(id.eq(APIID)) = ColctPI
206 and ColctPI->IsEmpty() = false
207 }
208
209 /* Post Functional: */
210 postF {
211   let TheSystem:ctState in
212   let TheActor:actPerson in
213
214 self.rnActor.rnSystem = TheSystem
215 and self.rnActor = TheActor
216
217 /* PostF01 */
218 AMessage.eq('Cactus Bascharage is a huge supermarket situated in the south of Luxembourg.')
219 and TheActor.rnInterfaceIN^ieMessage(AMessage)
220 }
221
222 /* Post Protocol:*/
223 postP {
224   true
225 }
226 }
227 }
228 }

```

Listing A.7: Messir Spec. file actPerson.msr.

A.8 File ./src-gen/messir-spec/operations/concepts/primarytypes-classes/ctAdministrator.msr

```

1 /*
2 * @author mikel
3 * @date Fri Mar 16 11:46:38 CET 2018
4 */
5
6 package lu.uni.lassy.excalibur.MyCrash.G02.operations.concepts.primarytypes.classes.ctAdministrator
{
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 import lu.uni.lassy.excalibur.MyCrash.G02.environment
14 import lu.uni.lassy.excalibur.MyCrash.G02.concepts.primarytypes.datatypes
15 import lu.uni.lassy.excalibur.MyCrash.G02.concepts.primarytypes.classes
16
17 Operation Model {
18
19   operation: ctAdministrator.init(Alogin:dtLogin, Apwd:dtPassword):ptBoolean {
20
21     /* Post Functional: */
22     postF {
23       if (
24         let Self:ctAdministrator in
25
26           /* Post F01 */
27           Self.login(Alogin)
28           and Self.pwd = Apwd
29           and Self.vpIsLogged = false
30
31           /* Post F02 */
32           and (Self.oclIsNew and self = Self)
33         )
34         then (result = true)
35         else (result = false)
36         endif
37     }
38   }
39 }
40 }
```

Listing A.8: Messir Spec. file ctAdministrator.msr.

A.9 File ./src-gen/messir-spec/operations/concepts/primarytypes-classes/ctCoordinator.msr

```

1 /*
2 * @author mikel
3 * @date Fri Mar 16 11:46:38 CET 2018
4 */
5
6 package lu.uni.lassy.excalibur.MyCrash.G02.operations.environment.primarytypes.classes.ctCoordinator
{
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 import lu.uni.lassy.excalibur.MyCrash.G02.environment
14 import lu.uni.lassy.excalibur.MyCrash.G02.concepts.primarytypes.datatypes
15 import lu.uni.lassy.excalibur.MyCrash.G02.concepts.primarytypes.classes
```

```

16
17 Operation Model {
18
19   operation: ctCoordinator.init(Aid:dtCoordinatorID, Alogin:dtLogin, Apwd:dtPassword, AaccessRights:
20     etCrisisType):ptBoolean {
21
22     /* Post Functional: */
23     postF {
24       if (
25         let Self:ctCoordinator in
26
27         /* Post F01 */
28         Self.id = Aid
29         and Self.login = Alogin
30         and Self.pwd = Apwd
31         and Self.vpIsLogged = false
32         and Self.accessRights = AaccessRights
33
34         /* Post F02 */
35         and (Self.oclisNew and self = Self)
36       )
37       then (result = true)
38       else (result = false)
39     endif
40   }
41 }
42 }
```

Listing A.9: Messir Spec. file ctCoordinator.msr.

A.10 File ./src-gen/messir-spec/operations/concepts/primarytypes-classes/ctPerson.msr

```

1 /*
2 * @author mikel
3 * @date Fri Mar 16 11:46:38 CET 2018
4 */
5
6 package lu.uni.lassy.excalibur.MyCrash.G02.operations.concepts.primarytypes.classes.ctPerson {
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 import lu.uni.lassy.excalibur.MyCrash.G02.environment
14 import lu.uni.lassy.excalibur.MyCrash.G02.concepts.primarytypes.datatypes
15 import lu.uni.lassy.excalibur.MyCrash.G02.concepts.primarytypes.classes
16
17 Operation Model {
18
19   operation: ctPerson.init(Aid:dtPhoneNumber, Alogin:dtLogin, Apwd:dtPassword, Atype:etPersonType):
20     ptBoolean {
21
22     postF {
23       if (
24         let Self:ctPerson in
25
26         /* Post F01 */
27
28         Self.id = Aid
29         and Self.login = Alogin
30         and Self.pwd = Apwd
31         and Self.type = Atype
32         and Self.phoneNumber = AphoneNumber
33
34         /* Post F02 */
35
36       )
37     endif
38   }
39 }
```

```

34     and (Self.oclisNew and self = Self)
35   )
36   then (result = true)
37   else (result = false)
38   endif
39 }
40 }
41 }
42 }
```

Listing A.10: Messir Spec. file ctPerson.msr.

A.11 File ./src-gen/messir-spec/environment/environment.msr

```

1 /*
2 * @author mikel
3 * @date Fri Mar 16 11:46:38 CET 2018
4 */
5
6 package lu.uni.lassy.excalibur.MyCrash.G02.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
13 import lu.uni.lassy.excalibur.MyCrash.G02.concepts.primarytypes.datatypes
14 import lu.uni.lassy.excalibur.MyCrash.G02.concepts.secondarytypes.datatypes
15
16 Environment Model {
17
18 actor actMsrCreator role rnactMsrCreator cardinality[1.. 1] {
19
20   operation init():ptBoolean
21
22   input interface inactMsrCreator {
23
24     operation ieSystemCreated():ptBoolean
25   }
26
27   output interface outactMsrCreator {
28
29     operation oeCreateSystemAndEnvironment():ptBoolean
30   }
31 }
32
33 actor actAuthenticated role rnactAuthenticated cardinality[1 .. *] {
34
35   operation init():ptBoolean
36
37   input interface inactAuthenticated {
38
39     operation ieLogin(AMessage:dtMessage):ptBoolean
40     operation ieLoggedOut(AMessage:dtMessage):ptBoolean
41     operation ieMessage(AMessage:dtMessage):ptBoolean
42     operation ieResetPassword():ptBoolean
43   }
44
45   output interface outactAuthenticated {
46
47     operation oeLogin(ALogin:dtLogin, APassword:dtPassword):ptBoolean
48     operation oeLogout():ptBoolean
49     operation oeLoginWithCaptcha(ALogin:dtLogin, APassword:dtPassword, ACaptcha:dtCaptcha):ptBoolean
50     operation oeResetPassword(ALogin:dtLogin):ptBoolean
51   }
52 }
53
54 actor actAdministrator role rnactAdministrator cardinality[1 .. 1] extends actAuthenticated {
55 }
```

```

56 operation init():ptBoolean
57
58 input interface inactAdministrator {
59
60   //PI variant
61   operation ieRequestList():ptBoolean
62   operation ieRequestBeingTreated():ptBoolean
63   operation ieRequestSolved():ptBoolean
64
65   operation iePIAdded():ptBoolean
66   operation iePIUpToDate():ptBoolean
67   operation iePIDeleted():ptBoolean
68
69   //Access rights variant
70   operation ieCoordinatorAdded():ptBoolean
71   operation ieCoordinatorDeleted():ptBoolean
72   operation ieCoordinatorUpdated():ptBoolean
73 }
74
75 output interface outactAdministrator {
76
77   // PI variant
78   operation oe GetAllRequestsFromCoordinator():ptBoolean
79   operation oeTreatRequest(ARequestID:dtID):ptBoolean
80   operation oeSolveRequest(ARequestID:dtID):ptBoolean
81
82   operation oeAddPI(APIID:dtID, APIName:dtName, APICity:dtCity, APIGPSLocation:dtGPSLocation,
83     APIDescription:dtDescription, APICategory:etCategory):ptBoolean
83   operation oeUpdatePI(APIID:dtID, APIName:dtName, APICity:dtCity, APIGPSLocation:dtGPSLocation,
84     APIDescription:dtDescription, APICategory:etCategory):ptBoolean
84   operation oeDeletePI(APIID:dtID):ptBoolean
85
86   //Access rights
87   operation oeAddCoordinator(AdtCoordinatorID:dtCoordinatorID, AdtLogin:dtLogin, AdtPassword:
88     dtPassword, CoordinatorAccessRights:etCrisisType):ptBoolean
88   operation oeDeleteCoordinator(AdtCoordinatorID:dtCoordinatorID):ptBoolean
89   operation oeUpdateCoordinatorAccessRights(AdtCoordinatorID:dtCoordinatorID,
89     CoordinatorAccessRights:etCrisisType):ptBoolean
90
91 }
92 }
93
94 actor actCoordinator role rnactCoordinator cardinality[1 .. *] extends actAuthenticated {
95
96   operation init():ptBoolean
97
98   input interface inactCoordinator {
99
100    //PI variant
101    operation ieRequestListToCheck():ptBoolean
102    operation ieRequestDelivered():ptBoolean
103
104    //Access rights variant
105    operation ieCrisisSet():ptBoolean
106    operation ieAlertSet():ptBoolean
107 }
108
109   output interface outactCoordinator {
110
111    //PI variant
112    operation oe GetAllRequests():ptBoolean
113    operation oeCheckAvailability(ARequestID:dtID):ptBoolean
114    operation oeDeliverRequest(ARequestID:dtID):ptBoolean
115
116    //Access rights variant
117    operation oeInvalidateAlert(AdtAlertID:dtAlertID):ptBoolean
118    operation oeValidateAlert(AdtAlertID:dtAlertID):ptBoolean
119    operation oeGetAlertSet(AetAlertStatus:etAlertStatus):ptBoolean
120
121    operation oeCloseCrisis(AdtCrisisID:dtCrisisID):ptBoolean

```

```

122  operation oeGetCrisisSet(AetCrisisStatus:etCrisisStatus):ptBoolean
123  operation oeSetCrisisHandler(AdtCrisisID:dtCrisisID):ptBoolean
124  operation oeReportOnCrisis(AdtCrisisID:dtCrisisID, AdtComment:dtComment):ptBoolean
125  operation oeSetCrisisStatus(AdtCrisisID:dtCrisisID, AetCrisisStatus:etCrisisStatus):ptBoolean
126  operation oeSetCrisisType(AdtCrisisID:dtCrisisID, AetCrisisType:etCrisisType):ptBoolean
127  }
128  }
129
130 actor actPerson role rnactPerson cardinality[1 .. *] extends actAuthenticated {
131
132  operation init():ptBoolean
133
134  input interface inactPerson {
135
136  //PI variant
137  operation iePIAdded():ptBoolean
138  }
139
140  output interface outactPerson {
141
142  //PI variant
143  operation oeSearchPI(APIName:dtName, APICategory:etCategory, APICity:dtCity):ptBoolean
144  operation oeSendNewRequest(APIName:dtName, APICategory:etCategory, APICity:dtCity):ptBoolean
145
146  operation oeGetGPSLocation(APIID:dtID):ptBoolean
147  operation oeGetDescription(APIID:dtID):ptBoolean
148  }
149  }
150
151 actor actComCompany role rnactComCompany cardinality[1 .. *] {
152  input interface inactComCompany {
153
154  //Access rights variant
155  operation ieSmsSend(APIName:dtName, APICategory:etCategory, ACity:dtCity, AdtPhoneNumber:
156    dtPhoneNumber, AdtSMS:dtSMS):ptBoolean
157  }
158  output interface outactComCompany {
159
160  //Access rights variant
161  operation oeAlert(APersonType:etPersonType, APIName:dtName, APIGPSLocation:dtGPSLocation,
162    AdtDate:dtDate, AdtTime:dtTime, AProblemDescription:dtDescription, PhoneNumber:dtPhoneNumber
163    ):ptBoolean
164  }
165  }
166
167  output interface outactActivator {
168
169  operation oeSollicitateCrisisHandling():ptBoolean
170  operation oeSetClock(AcurrentTime:dtDateAndTime):ptBoolean
171  }
172  }
173  }
174 }
```

Listing A.11: Messir Spec. file environment.msr.

A.12 File ./src-gen/messir-spec/operations/operations.msr

```

1 /*
2 * @author mikel
3 * @date Fri Mar 16 11:46:38 CET 2018
4 */
5
6 package lu.uni.lassy.excalibur.MyCrash.G02.operations {
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 Operation Model {
14
15 }
16 }
```

Listing A.12: Messir Spec. file operations.msr.

A.13 File [./src-gen/messir-spec/concepts/primarytypes-associations/primarytypes-associations.msr](#)

```

1 /*
2 * @author mikel
3 * @date Fri Mar 16 11:46:38 CET 2018
4 */
5
6 package lu.uni.lassy.excalibur.MyCrash.G02.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
13 import lu.uni.lassy.excalibur.MyCrash.G02.environment
14 import lu.uni.lassy.excalibur.MyCrash.G02.concepts.primarytypes.classes
15
16 Concept Model {
17
18 Primary Types {
19
20   association assctAlertctCrisis
21     ctAlert(rnAlerts) [1..*]
22     ctCrisis(rnTheCrisis) [1..1]
23
24   association assctAlertctPerson
25     ctAlert(rnSignaled) [0..*]
26     ctPerson(rnSignaler) [1..1]
27
28   association assctCoordinatorctAdministrator
29     ctCoordinator(rnCreated) [0..*]
30     ctAdministrator(rnCreator) [1..1]
31
32   association assctAlertctCoordinator
33     ctAlert(rnValidated) [0..*]
34     ctCoordinator(rnValidator) [0..1]
35
36   association assctCrisisctCoordinator
37     ctCrisis(rnHandled) [0..*]
38     ctCoordinator(rnHandler) [0..1]
39
40   association assctRequestctCoordinator
41     ctRequest(rnChecked) [0..*]
42     ctCoordinator(rnChecker) [0..1]
43
44   association assctRequestctAdministrator
45     ctRequest(rnBeingTreated) [0..*]
46     ctAdministrator(rnTreater) [0..1]
47
48   association assctPIctAdministrator
49     ctPI(rnManaged) [0..*]
50     ctAdministrator(rnManager) [0..1]
51
52   association assctPIctPerson
53     ctPI(rnRequested) [0..*]
54     ctPerson(rnRequester) [1..1]
```

```

55
56 // Actors' associations
57
58 association assctPersonactComCompany
59   ctPerson(rnctHuman) [0...*]
60   actComCompany(rnactComCompany) [1..1]
61
62 association assctPersonactPerson
63   ctPerson(rnctPerson) [1..1]
64   actPerson(rnactPerson) [1..1]
65
66 association assctAuthenticatedactAuthenticated
67   ctAuthenticated(rnctAuthenticated) [1..1]
68   actAuthenticated(rnactAuthenticated) [1..1]
69
70 association assctCoordinatoractCoordinator
71   ctCoordinator(rnctCoordinator) [1..1]
72   actCoordinator(rnactCoordinator) [1..1]
73
74 association assctAdministratoractAdministrator
75   ctAdministrator(rnctAdministrator) [1..1]
76   actAdministrator(rnactAdministrator) [1..1]
77 }
78 }
79 }
```

Listing A.13: Messir Spec. file primarytypes-associations.msr.

A.14 File [./src-gen/messir-spec/concepts/primarytypes-classes/primarytypes-classes.msr](#)

```

1 /*
2 * @author mikel
3 * @date Fri Mar 16 11:46:38 CET 2018
4 */
5
6 package lu.uni.lassy.excalibur.MyCrash.G02.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.messir.libraries.primitives
13
14  import lu.uni.lassy.excalibur.MyCrash.G02.concepts.primarytypes.datatypes
15
16  Concept Model {
17
18    Primary Types {
19
20      state class ctState {
21
22        attribute nextValueForAlertID:dtInteger
23        attribute nextValueForCrisisID:dtInteger
24        attribute clock:dtDateAndTime
25        attribute crisisReminderPeriod:dtSecond
26        attribute maxCrisisReminderPeriod:dtSecond
27        attribute vpLastReminder:dtDateAndTime
28        attribute vpStarted:ptBoolean
29
30        operation init(AnextValueForAlertID:dtInteger, AnextValueForCrisisID:dtInteger, Aclock:
31          dtDateAndTime, AcrisisReminderPeriod:dtSecond, AmaxCrisisReminderPeriod:dtSecond,
32          AvpLastReminder:dtDateAndTime, AvpStarted:ptBoolean):ptBoolean
33      }
34
35      class ctAuthenticated role rnctAuthenticated cardinality[0 .. *] {
36
37        attribute login:dtLogin
38
39      }
```

```

36   attribute pwd:dtPassword
37   attribute vpIsLogged:ptBoolean
38   attribute tries:dtInteger
39   attribute lastAccess:dtInteger
40   attribute capReq:ptBoolean
41   attribute cap2Solve:dtCaptcha
42
43   operation init(Alogin:dtLogin, Apwd:dtPassword):ptBoolean
44 }
45
46
47 class ctAdministrator role rnctAdministrator cardinality[1 .. 1] extends ctAuthenticated {
48
49   operation init(Alogin:dtLogin, Apwd:dtPassword):ptBoolean
50 }
51
52 class ctCoordinator role rnctCoordinator cardinality[0 .. *] extends ctAuthenticated {
53
54   attribute id:dtCoordinatorID
55   attribute accessRights:etCrisisType
56
57   operation init(Aid:dtCoordinatorID, Alogin:dtLogin, Apwd:dtPassword, Aaccessrights:etCrisisType):
58     :ptBoolean
59 }
60
61 class ctPerson role rnctPerson cardinality[0 .. *] extends ctAuthenticated {
62
63   attribute id:dtPhoneNumber
64   attribute personType:etPersonType
65
66   operation init(Aid:dtPhoneNumber, Alogin:dtLogin, Apwd:dtPassword, ApersonType:etPersonType):
67     ptBoolean
68 }
69
70 class ctRequest role rnctRequest cardinality[0 .. *] {
71
72   attribute id:dtID
73   attribute name:dtName
74   attribute city:dtCity
75   attribute category:etCategory
76   attribute status:etRequestStatus
77   attribute ignored:dtIgnored
78
79   operation init(Aid:dtID, Aname:dtName, Acity:dtCity, Acategory:etCategory, Astatus:
80     etRequestStatus, Aignored:dtIgnored):ptBoolean
81 }
82
83 class ctPI role rnctPI cardinality[0 .. *] {
84
85   attribute id:dtID
86   attribute name:dtName
87   attribute city:dtCity
88   attribute category:etCategory
89   attribute location:dtGPSLocation
90   attribute description:dtDescription
91
92   operation init(Aid:dtID, Aname:dtName, Acity:dtCity, Acategory:etCategory, Alocation:
93     dtGPSLocation, Adescription:dtDescription):ptBoolean
94 }
95
96 class ctAlert role rnctAlert cardinality[0 .. *] {
97
98   attribute id:dtAlertID
99   attribute status:etAlertStatus
100  attribute location:dtGPSLocation
101  attribute instant:dtDateAndTime
102  attribute comment:dtComment
103
104  operation init(Aid:dtAlertID, Astatus:etAlertStatus, Alocation:dtGPSLocation, Ainstant:
105    dtDateAndTime, Acomment:dtComment):ptBoolean
106 }
```

```

102     dtDateAndTime, Acomment:dtComment):ptBoolean
103   }
104
105   class ctCrisis role rnctCrisis cardinality[0 .. *] {
106
107     attribute id:dtCrisisID
108     attribute type:etCrisisType
109     attribute status:etCrisisStatus
110     attribute location:dtGPSLocation
111     attribute instant:dtDateAndTime
112     attribute comment:dtComment
113
114     operation init(Aid:dtCrisisID, Atype:etCrisisType, Astatus:etCrisisStatus, Alocation:
115       dtGPSLocation, Ainstant:dtDateAndTime, Acomment:dtComment):ptBoolean
116   }
117 }
118 }
```

Listing A.14: Messir Spec. file primarytypes-classes.msr.

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

```

1 /*
2 * @author mikel
3 * @date Fri Mar 16 11:46:38 CET 2018
4 */
5
6 package lu.uni.lassy.excalibur.MyCrash.G02.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
13  Concept Model {
14
15    Primary Types {
16
17      datatype dtID extends dtString {
18
19        operation is():ptBoolean
20      }
21
22      datatype dtAdministratorID extends dtString {
23
24        operation is():ptBoolean
25      }
26
27      datatype dtCoordinatorID extends dtString {
28
29        operation is():ptBoolean
30      }
31
32      datatype dtAlertID extends dtString {
33
34        operation is():ptBoolean
35      }
36
37      datatype dtCrisisID extends dtString {
38
39        operation is():ptBoolean
40      }
41
42      datatype dtLogin extends dtString {
```

```

44     operation is():ptBoolean
45 }
46
47 datatype dtPassword extends dtString {
48
49     operation is():ptBoolean
50 }
51
52 datatype dtCaptcha extends dtString {
53
54     operation is():ptBoolean
55 }
56
57 datatype dtName extends dtString {
58
59     operation is():ptBoolean
60 }
61
62 datatype dtCity extends dtString {
63
64     operation is():ptBoolean
65 }
66
67 datatype dtLatitude extends dtReal {
68
69     operation is():ptBoolean
70 }
71
72 datatype dtLongitude extends dtReal {
73
74     operation is():ptBoolean
75 }
76
77 datatype dtGPSLocation extends dtString {
78
79     attribute latitude:dtLatitude
80     attribute longitude:dtLongitude
81
82     operation is():ptBoolean
83 }
84
85 datatype dtDescription extends dtString {
86
87     operation is():ptBoolean
88 }
89
90 datatype dtComment extends dtString {
91
92     operation is():ptBoolean
93 }
94
95 datatype dtPhoneNumber extends dtString {
96
97     operation is():ptBoolean
98 }
99
100 datatype dtMessage extends dtString {
101
102     operation is():ptBoolean
103 }
104
105 datatype dtIgnored {
106     attribute attValue:ptBoolean
107     operation is():ptBoolean
108 }
109
110 enum etCategory {
111
112     constants["supermarket", "market", "hobby", "petrolstation", "building", "university", "school",
113         "hospital"]

```

```

113     operation is():ptBoolean
114 }
115
116 enum etPersonType {
117
118     constants["witness", "victim", "anonymous"]
119     operation is():ptBoolean
120 }
121
122 enum etRequestStatus {
123
124     constants["pending", "treated", "solved"]
125     operation is():ptBoolean
126 }
127
128 enum etAlertStatus {
129
130     constants["pending", "valid", "invalid"]
131     operation is():ptBoolean
132 }
133
134 enum etCrisisType {
135
136     constants["low", "medium", "high"]
137     operation is():ptBoolean
138 }
139
140 enum etCrisisStatus {
141     constants["pending", "handled", "solved", "closed"]
142     operation is():ptBoolean
143 }
144 }
145 }
146 }
```

Listing A.15: Messir Spec. file primarytypes-datatypes.msr.

A.16 File [./src-gen/messir-spec/concepts/secondarytypes-associations/secondarytypes-associations.msr](#)

```

1 /*
2 * @author mikel
3 * @date Fri Mar 16 11:46:38 CET 2018
4 */
5
6 package lu.uni.lassy.excalibur.MyCrash.G02.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 A.16: Messir Spec. file secondarytypes-associations.msr.

A.17 File [./src-gen/messir-spec/concepts/secondarytypes-classes/secondarytypes-classes.msr](#)

```
1 /*
```

```

2 * @author mikel
3 * @date Fri Mar 16 11:46:38 CET 2018
4 */
5
6 package lu.uni.lassy.excalibur.MyCrash.G02.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 A.17: Messir Spec. file secondarytypes-classes.msr.

A.18 File ./src-gen/messir-spec/concepts/secondarytypes-datatypes/secondarytypes-datatypes.msr

```

1 /*
2 * @author mikel
3 * @date Fri Mar 16 11:46:38 CET 2018
4 */
5
6 package lu.uni.lassy.excalibur.MyCrash.G02.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
13 Concept Model {
14
15   Secondary Types {
16
17     datatype dtSMS {
18
19       attribute value:ptString
20       operation is():ptBoolean
21     }
22   }
23 }
24 }
```

Listing A.18: Messir Spec. file secondarytypes-datatypes.msr.

A.19 File ./src-gen/messir-spec/tests/tests.msr

```

1 /*
2 * @author mikel
3 * @date Fri Mar 16 11:46:38 CET 2018
4 */
5
6 package lu.uni.lassy.excalibur.MyCrash.G02.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 A.19: Messir Spec. file tests.msr.

A.20 File ../src-gen/messir-spec/usecases/usecaseinstance-oeThirdLoginWrong-uci.msr

```

1 package usecases.uci {
2   import lu.uni.lassy.excalibur.MyCrash.G02.usecases
3   import lu.uni.lassy.excalibur.MyCrash.G02.environment
4
5   Use Case Model {
6
7   }
8 }
```

Listing A.20: Messir Spec. file usecaseinstance-oeThirdLoginWrong-uci.msr.

A.21 File ../src-gen/messir-spec/usecases/usecaseinstance-suAddNewPI-ucisuAddNewPI.msr

```

1 package usecases.ucisuAddNewPI {
2
3   import lu.uni.lassy.excalibur.MyCrash.G02.usecases
4   import lu.uni.lassy.excalibur.MyCrash.G02.environment
5
6   Use Case Model {
7
8     use case instance ucisuAddNewPI : suAddNewPI{
9
10    actors {
11
12      theCreator:actMsrCreator
13      patrick:actPerson
14      bob:actAdministrator
15      carl:actCoordinator
16    }
17
18    use case steps {
19
20      theCreator
21      executed instanceof subfunction oeCreateSystemAndEnvironment() {
22
23        ieSystemCreated() returned to theCreator
24      }
25
26      patrick
27      executed instanceof subfunction oeLogin("014092450D", "6543210") {
28
29        ieLoggedIn("You are logged in, 014092450D") returned to patrick
30      }
31
32      patrick
33      executed instanceof subfunction oeSearchPI("Cactus", "Hobby", "Esch/Alzette") {
34
35        ieMessage("The point of interest is NOT in the system!") returned to patrick
36      }
37
38      patrick
39      executed instanceof subfunction oeSendNewRequest("Cactus", "Hobby", "Esch/Alzette") {
40
41        ieMessage("We will handle your request.") returned to patrick
42      }
43    }
```

A.21. FILE /SRC-GEN/MESSIR-SPEC/USECASES/USECASEINSTANCE-SUADDNEWPI-UCISUADDNEWPI.M

```
44 carl
45 executed instanceof subfunction oeLogin("coordin", "coordinChecks") {
46
47     ieLoggedIn("You are logged in, coordin") returned to carl
48 }
49
50 carl
51 executed instanceof subfunction oe GetAllRequests() {
52
53     ieRequestListToCheck() returned to carl
54 }
55
56 carl
57 executed instanceof subfunction oeCheckAvailability("1001") {
58
59     ieMessage("The PI is NOT available!") returned to carl
60 }
61
62 carl
63 executed instanceof subfunction oeDeliverRequest("1001") {
64
65     ieRequestDelivered() returned to carl
66 }
67
68 carl
69 executed instanceof subfunction oeLogout() {
70
71     ieLoggedOut("You are logged out!") returned to carl
72 }
73
74 bob
75 executed instanceof subfunction oeLogin("admin", "adminHandles") {
76
77     ieLoggedIn("You are logged in, admin") returned to bob
78 }
79
80 bob
81 executed instanceof subfunction oe GetAllRequestsFromCoordinator() {
82
83     ieRequestList() returned to bob
84 }
85
86 bob
87 executed instanceof subfunction oeTreatRequest("1001") {
88
89     ieRequestBeingTreated() returned to bob
90 }
91
92 bob
93 executed instanceof subfunction oeSolveRequest("1001") {
94
95     ieRequestSolved() returned to bob
96     ieRequestSolved() returned to patrick
97
98 }
99 bob
100 executed instanceof subfunction oeAddPI("Cactus", "Esch/Alzette", "78.8888/89.6565", "Cactus
Hobby is a market for garden activities.", "Hobby") {
101
102     iePIAdded returned to bob
103     iePIAdded returned to patrick
104 }
105
106 bob
107 executed instanceof subfunction oeLogout() {
108
109     ieLoggedOut("You are logged out!") returned to bob
110 }
111
112 }
```

```
113 }
114 }
```

Listing A.21: Messir Spec. file usecaseinstance-suAddNewPI-ucisuAddNewPI.msr.

A.22 File [./src-gen/messir-spec/usecases/usecaseinstance-suGenerateNewAlert-ucisuGenerateNewAlert.msr](#)

```
1 package usecaseinstances.uci {
2   import lu.uni.lassy.excalibur.MyCrash.G02.usecases
3   import lu.uni.lassy.excalibur.MyCrash.G02.environment
4
5   Use Case Model {
6
7     use case instance ucisuGenerateNewAlert : suGenerateNewAlert {
8
9       actors {
10
11         theCreator:actMsrCreator
12         patrick:actPerson
13         orange:actComCompany
14     }
15
16     use case steps {
17
18       theCreator
19       executed instanceof subfunction oeCreateSystemAndEnvironment() {
20
21         ieSystemCreated() returned to theCreator
22     }
23
24       patrick
25       executed instanceof subfunction oeLogin("014092450D", "6543210") {
26
27         ieLoggedIn("You are logged in, 014092450D") returned to patrick
28     }
29
30       patrick
31       executed instanceof subfunction oeSearchPI("Cactus", "Supermarket", "Esch/Alzette") {
32
33         ieMessage("The point of interest is in the system. How to proceed?") returned to patrick
34     }
35
36       patrick
37       executed instanceof subfunction oeGetGPSLocation("1001") {
38
39         ieMessage("The GPS location of the PI is: 56.8989/46.7878.") returned to patrick
40         ieMessage("Your Sms has been sent to your communication operator.") returned to patrick
41         ieSmsSend("Cactus", "Supermarket", "Esch/Alzette", "661777777", "Supermarket on fire!")
42         returned to orange
43     }
44
45       patrick
46       executed instanceof subfunction oeLogout() {
47
48         ieLoggedOut("You are logged out!") returned to patrick
49     }
50
51       orange
52       executed instanceof subfunction oeAlert("Witness", "Cactus", "Esch/Alzette", "27/03/2018", "10:00",
53         "Supermarket on fire!", "661777777", "High") {
54
55         ieMessage("Alert has been sent. It will be handled!") returned to orange
56     }
57 }
```

58 }

Listing A.22: Messir Spec. file usecaseinstance-suGenerateNewAlert-ucisuGenerateNewAlert.msr.

A.23 File [./src-gen/messir-spec/usecases/usecaseinstance-suGlobalCrisisHandling-ucisuGlobalCrisisHandling.msr](#)

```

1 package usecases.ucisuGlobalCrisisHandling {
2   import lu.uni.lassy.excalibur.MyCrash.G02.usecases
3   import lu.uni.lassy.excalibur.MyCrash.G02.environment
4
5   Use Case Model {
6
7     use case instance ucisuGlobalCrisisHandling : suGlobalCrisisHandling{
8       actors {
9         bob:actCoordinator
10        steve:actCoordinator
11      }
12      use case steps {
13
14        bob
15        executed instanceof subfunction oeLogin("bob", "password") {
16          ieLogin("You successfully logged in!") returned to bob
17        }
18
19        steve
20        executed instanceof subfunction oeLogin("steve", "password") {
21          ieLogin("You successfully logged in!") returned to steve
22        }
23
24        bob
25        executed instanceof subfunction oeGetAlertSet("pending", "2") {
26          ieMessage("AlertSet") returned to bob
27        }
28
29        bob
30        executed instanceof subfunction oeValidateAlert("1") {
31          ieMessage("Permission denied! Your access rights are too low to validate this alert!") returned
32            to bob
33        }
34
35        steve
36        executed instanceof subfunction oeGetAlertSet("pending", "2") {
37          ieMessage("AlertSet") returned to steve
38        }
39
40        steve
41        executed instanceof subfunction oeValidateAlert("1") {
42          ieMessage("Alert validated") returned to steve
43        }
44
45        bob
46        executed instanceof subfunction oeGetCrisisSet("pending", "2") {
47          ieMessage("CrisisSet") returned to bob
48        }
49
50        bob
51        executed instanceof subfunction oeSetCrisisHandler("1") {
52          ieMessage("Permission denied! Your access rights are too low to handle this crisis!") returned
53            to bob
54        }
55
56        steve
57        executed instanceof subfunction oeGetCrisisSet("pending", "1") {
58          ieMessage("CrisisSet") returned to steve
59        }
60
61        steve

```

```

60  executed instanceof subfunction oeSetCrisisHandler("1") {
61    ieMessage("Crisis handler set to steve") returned to steve
62  }
63
64  steve
65  executed instanceof subfunction oeSetCrisisStatus("1", "in progression") {
66    ieMessage("Crisis status set to in progression") returned to steve
67  }
68
69  steve
70  executed instanceof subfunction oeReportOnCrisis("1", "Crisis handled") {
71    ieMessage("Report added to the crisis") returned to steve
72  }
73
74  steve
75  executed instanceof subfunction oeCloseCrisis("1") {
76    ieMessage("Crisis closed") returned to steve
77  }
78
79  steve
80  executed instanceof subfunction oeSetCrisisType("2", "1") {
81    ieMessage("Crisis type set to 1") returned to steve
82  }
83
84  bob
85  executed instanceof subfunction oeGetCrisisSet("pending", "1") {
86    ieMessage("CrisisSet") returned to bob
87  }
88
89  bob
90  executed instanceof subfunction oeSetCrisisHandler("2") {
91    ieMessage("Crisis handler set to bob") returned to bob
92  }
93
94  bob
95  executed instanceof subfunction oeSetCrisisStatus("2", "in progression") {
96    ieMessage("Crisis status set to in progression") returned to bob
97  }
98
99  bob
100 executed instanceof subfunction oeReportOnCrisis("2", "Crisis handled") {
101   ieMessage("Report added to the crisis") returned to bob
102 }
103
104 bob
105 executed instanceof subfunction oeCloseCrisis("2") {
106   ieMessage("Crisis closed") returned to bob
107 }
108
109 bob
110 executed instanceof subfunction oeLogout() {
111   ieLogout("You successfully logged out!") returned to bob
112 }
113
114 steve
115 executed instanceof subfunction oeLogout() {
116   ieLogout("You successfully logged out!") returned to steve
117 }
118 }
119 }
120 }
121 }
```

Listing A.23: Messir Spec. file
usecaseinstance-suGlobalCrisisHandling-ucisuGlobalCrisisHandling.msr.

A.24 File **./src-gen/messir-spec/usecases/usecaseinstance-suScenarioPresentation-ucisuScenarioPresentation.msr**

```

1 package usecases.ucisuScenarioPresentation {
2   import lu.uni.lassy.excalibur.MyCrash.G02.usecases
3   import lu.uni.lassy.excalibur.MyCrash.G02.environment
4
5   Use Case Model {
6
7     use case instance ucisuScenarioPresentation : suScenarioPresentation{
8       actors {
9         theCreator:actMsrCreator
10        patrick:actPerson
11        admin:actAdministrator
12        carl:actCoordinator
13        bob:actCoordinator
14        orange:actComCompany
15      }
16      use case steps {
17        theCreator
18        executed instanceof subfunction oeCreateSystemAndEnvironment() {
19
20          ieSystemCreated() returned to theCreator
21        }
22
23        admin
24        executed instanceof subfunction oeLogin("icrashadmin", "7WXC1359") {
25          ieLogin("You successfully logged in!") returned to admin
26        }
27
28        admin
29        executed instanceof subfunction oeAddCoordinator("1", "bob", "password", "low") {
30          ieCoordinatorAdded() returned to admin
31        }
32
33        admin
34        executed instanceof subfunction oeAddCoordinator("2", "carl", "password", "medium") {
35          ieCoordinatorAdded() returned to admin
36        }
37
38        bob
39        executed instanceof subfunction oeLogin("bob", "pass") {
40          ieLogin("Wrong password! Tries left: 2") returned to bob
41        }
42
43        bob
44        executed instanceof subfunction oeLogin("bob", "pass") {
45          ieLogin("Wrong password! Tries left: 1") returned to bob
46        }
47
48        bob
49        executed instanceof subfunction oeLogin("bob", "pass") {
50          ieLogin("Wrong password! Tries left: 0.") returned to bob
51          ieLogin("Login with captcha required!") returned to bob
52        }
53
54        bob
55        executed instanceof subfunction oeLoginWithCaptcha("bob", "password", "267324") {
56          ieLogin("You successfully logged in!") returned to bob
57        }
58
59        patrick
60        executed instanceof subfunction oeLogin("014092450D", "6543210") {
61
62          ieLoggedIn("You are logged in, 014092450D") returned to patrick
63        }
64
65        patrick
66        executed instanceof subfunction oeSearchPI("Cactus", "Hobby", "Esch/Alzette") {
67
68          ieMessage("The point of interest is NOT in the system!") returned to patrick
69        }
70

```

```

71 patrick
72 executed instanceof subfunction oeSendNewRequest("Cactus", "Hobby", "Esch/Alzette") {
73
74     ieMessage("We will handle your request.") returned to patrick
75 }
76
77 carl
78 executed instanceof subfunction oeLogin("carl", "password") {
79
80     ieLoggedIn("You are logged in, carl") returned to carl
81 }
82
83 carl
84 executed instanceof subfunction oe GetAllRequests() {
85
86     ieRequestListToCheck() returned to carl
87 }
88
89 carl
90 executed instanceof subfunction oeCheckAvailability("1001") {
91
92     ieMessage("The PI is NOT available!") returned to carl
93 }
94
95 carl
96 executed instanceof subfunction oeDeliverRequest("1001") {
97
98     ieRequestDelivered() returned to carl
99 }
100
101 admin
102 executed instanceof subfunction oe GetAllRequestsFromCoordinator() {
103
104     ieRequestList() returned to admin
105 }
106
107 admin
108 executed instanceof subfunction oeTreatRequest("1001") {
109
110     ieRequestBeingTreated() returned to admin
111 }
112
113 admin
114 executed instanceof subfunction oeSolveRequest("1001") {
115
116     ieRequestSolved() returned to admin
117     ieRequestSolved() returned to patrick
118 }
119
120 admin
121 executed instanceof subfunction oeAddPI("Cactus", "Esch/Alzette", "78.8888/89.6565", "Cactus
122     Hobby is a market for garden activities.", "Hobby") {
123
124     iePIAdded returned to admin
125     iePIAdded returned to patrick
126 }
127
128 admin
129 executed instanceof subfunction oeLogout() {
130
131     ieLoggedOut("You are logged out!") returned to admin
132 }
133
134 patrick
135 executed instanceof subfunction oeSearchPI("Cactus", "Supermarket", "Esch/Alzette") {
136
137     ieMessage("The point of interest is in the system. How to proceed?") returned to patrick
138 }
139

```

```

140    patrick
141    executed instanceof subfunction oeGetGPSLocation("Cactus", "Supermarket", "Esch/Alzette") {
142
143        ieMessage("The GPS location of the PI is: 56.8989/46.7878.") returned to patrick
144        ieMessage("Your Sms has been sent to your communication operator.") returned to patrick
145        ieSmsSend("Cactus", "Supermarket", "Esch/Alzette", "661777777", "Supermarket on fire!")
146            returned to orange
147    }
148
149    patrick
150    executed instanceof subfunction oeLogout() {
151
152        ieLoggedOut("You are logged out!") returned to patrick
153    }
154
155    orange
156    executed instanceof subfunction oeAlert("Witness", "Cactus", "Esch/Alzette", "27/03/2018", "
157        10:00", "Supermarket on fire!", "661777777", "Medium") {
158
159        ieMessage("Alert has been sent. It will be handled!") returned to orange
160    }
161
162    bob
163    executed instanceof subfunction oeGetAlertSet("pending") {
164        ieMessage("AlertList") returned to bob
165    }
166
167    bob
168    executed instanceof subfunction oeValidateAlert("1") {
169        ieMessage("Alert validated") returned to bob
170    }
171
172    bob
173    executed instanceof subfunction oeGetCrisisSet("pending", "medium") {
174        ieMessage("Crisis List") returned to bob
175    }
176
177    bob
178    executed instanceof subfunction oeSetCrisisHandler("1") {
179        ieMessage("Permission denied! Your access rights are to low to handle this crisis!") returned
180            to bob
181
182    carl
183    executed instanceof subfunction oeGetCrisisSet("pending", "medium") {
184        ieMessage("Crisis List") returned to carl
185    }
186
187    carl
188    executed instanceof subfunction oeSetCrisisHandler("1") {
189        ieMessage("Crisis handler set to carl") returned to carl
190    }
191
192    carl
193    executed instanceof subfunction oeSetCrisisStatus("1", "in progression") {
194        ieMessage("Crisis status set to in progression") returned to carl
195    }
196
197    carl
198    executed instanceof subfunction oeReportOnCrisis("1", "Crisis handled") {
199        ieMessage("Report added to the crisis") returned to carl
200    }
201
202    carl
203    executed instanceof subfunction oeCloseCrisis("1") {
204        ieMessage("Crisis closed") returned to carl
205    }
206
207    bob
208    executed instanceof subfunction oeLogout() {

```

```

207     ieLogout("You successfully logged out!") returned to bob
208 }
209
210     carl
211     executed instanceof subfunction oeLogout() {
212         ieLogout("You successfully logged out!") returned to carl
213     }
214 }
215 }
216 }
217 }
```

Listing A.24: Messir Spec. file usecaseinstance-suScenarioPresentation-ucisuScenarioPresentation.msr.

A.25 File [./src-gen/messir-spec/usecases/usecaseinstance-ugAdministrateTheSystem-uciugAdministrateTheSystem.msr](#)

```

1 package usecases.uciugAdministrateTheSystem {
2   import lu.uni.lassy.excalibur.MyCrash.G02.usecases
3   import lu.uni.lassy.excalibur.MyCrash.G02.environment
4
5   Use Case Model {
6
7     use case instance uciugAdministrateTheSystem : ugAdministrateTheSystem{
8       actors {
9         admin:actAdministrator
10      }
11      use case steps {
12
13        admin
14        executed instanceof subfunction oeLogin("icrashadmin", "7WXC1359") {
15          ieLogin("You successfully logged in!") returned to admin
16        }
17
18        admin
19        executed instanceof subfunction oeAddCoordinator("1", "bob", "password", "1") {
20          ieCoordinatorAdded() returned to admin
21        }
22
23        admin
24        executed instanceof subfunction oeUpdateCoordinatorAccessRights("1", "2") {
25          ieCoordinatorUpdated() returned to admin
26        }
27
28        admin
29        executed instanceof subfunction oeDeleteCoordinator("1") {
30          ieCoordinatorDeleted() returned to admin
31        }
32
33        admin
34        executed instanceof subfunction oeLogout() {
35          ieLogout("You successfully logged out!") returned to admin
36        }
37      }
38    }
39  }
40 }
```

Listing A.25: Messir Spec. file usecaseinstance-ugAdministrateTheSystem-uciugAdministrateTheSystem.msr.

A.26 File [./src-gen/messir-spec/usecases/usecaseinstance-ugLoginWithCaptcha-uciugLoginWithCaptcha.msr](#)

```

1 package usecases.uciugLoginWithCaptcha {
2   import lu.uni.lassy.excalibur.MyCrash.G02.usecases
```

```

3 import lu.uni.lassy.excalibur.MyCrash.G02.environment
4
5 Use Case Model {
6
7 use case instance uciugLoginWithCaptcha : ugLoginWithCaptcha{
8   actors {
9     bob:actAuthenticated
10  }
11 use case steps {
12
13   bob
14   executed instanceof subfunction oeLogin("bob", "qwertz") {
15     ieLogin("Wrong Password, try again.") returned to bob
16   }
17
18   bob
19   executed instanceof subfunction oeLogin("bob", "idontknowanymore") {
20     ieLogin("Wrong Password, try again.") returned to bob
21   }
22
23   bob
24   executed instanceof subfunction oeLogin("bob", "nothing") {
25     ieLogin("Wrong Password, try again.") returned to bob
26     ieLogin("Login with captcha required.") returned to bob
27     //ieLoginWrongSendCaptcha("C4p7cha") returned to bob
28   }
29
30   bob
31   executed instanceof subfunction oeLoginWithCaptcha("bob", "sendhelp", "C4p7cha") {
32     ieLogin("Welcome bob.") returned to bob
33   }
34 }
35 }
36 }
37 }
```

Listing A.26: Messir Spec. file usecaseinstance-ugLoginWithCaptcha-uciugLoginWithCaptcha.msr.

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

```

1 /*
2 * @author mikel
3 * @date Fri Mar 16 11:46:38 CET 2018
4 */
5
6 package lu.uni.lassy.excalibur.MyCrash.G02.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
13 import lu.uni.lassy.excalibur.MyCrash.G02.concepts.primarytypes.datatypes
14 import lu.uni.lassy.excalibur.MyCrash.G02.concepts.secondarytypes.datatypes
15
16 import lu.uni.lassy.excalibur.MyCrash.G02.environment
17
18 import lu.uni.lassy.messir.libraries.primitives
19
20 Use Case Model {
21   use case system subfunction oeCreateSystemAndEnvironment() {
22
23   actor actMsrCreator[primary, active]
24
25   returned messages {
26
27     ieSystemCreated returned to actMsrCreator
28   }
29 }
```

```

30
31 use case system subfunction oeLogin(ALogin:dtLogin, APassword:dtPassword) {
32
33   actor actAuthenticated[primary, active]
34
35   returned messages {
36
37     ieLogin returned to actAuthenticated
38   }
39 }
40
41 use case system subfunction oeLogout() {
42
43   actor actAuthenticated[primary, active]
44
45   returned messages {
46
47     ieLoggedOut returned to actAuthenticated
48   }
49 }
50
51 use case system subfunction oe GetAllRequestsFromCoordinator() {
52
53   actor actAdministrator[primary, active]
54   actor actCoordinator[secondary, passive]
55   actor actPerson[secondary, multiple]
56
57   returned messages {
58
59     ieRequestList returned to actAdministrator
60   }
61 }
62
63 use case system subfunction oeTreatRequest(ARequestID:dtID) {
64
65   actor actAdministrator[primary, active]
66   actor actPerson[secondary, passive]
67 }
68
69 use case system subfunction oeSolveRequest(ARequestID:dtID) {
70
71   actor actAdministrator[primary, active]
72   actor actPerson[secondary, passive]
73
74   returned messages {
75
76     ieRequestSolved returned to actAdministrator
77   }
78 }
79
80 use case system subfunction oeAddPI(APIID:dtID, APIName:dtName, APICity:dtCity, APIGPSLocation:
81           dtGPSLocation, APIDescription:dtDescription, APICategory:etCategory) {
82
83   actor actAdministrator[primary, active]
84   actor actPerson[secondary, passive]
85
86   returned messages {
87
88     iePIAdded returned to actAdministrator
89     iePIAdded returned to actPerson
90   }
91 }
92 use case system subfunction oeUpdatePI(APIID:dtID, APIName:dtName, APICity:dtCity, APIGPSLocation:
93           dtGPSLocation, APIDescription:dtDescription, APICategory:etCategory) {
94
95   actor actAdministrator[primary, active]
96
97   returned messages {

```

```
98     iePIUpToDate returned to actAdministrator
99   }
100 }
101
102 use case system subfunction oeDeletePI(APIID:dtID) {
103
104   actor actAdministrator[primary, active]
105
106   returned messages {
107
108     iePIDeleted returned to actAdministrator
109   }
110 }
111
112 use case system subfunction oe GetAllRequests() {
113
114   actor actCoordinator[primary, active]
115   actor actPerson[secondary, multiple]
116
117   returned messages {
118
119     ieRequestListToCheck returned to actCoordinator
120   }
121 }
122
123 use case system subfunction oeCheckAvailability(ARequestID:dtID) {
124
125   actor actCoordinator[primary, active]
126   actor actPerson[secondary, passive]
127
128   returned messages {
129
130     ieMessage returned to actCoordinator
131   }
132 }
133
134 use case system subfunction oeDeliverRequest(ARequestID:dtID) {
135
136   actor actCoordinator[primary, active]
137   actor actPerson[secondary, passive]
138   actor actAdministrator[secondary, passive]
139
140   returned messages {
141
142     ieRequestDelivered returned to actCoordinator
143   }
144 }
145
146 use case system subfunction oeSearchPI(APIName:dtName, APICategory:etCategory, APICity:dtCity) {
147
148   actor actPerson[primary, active]
149   actor actAdministrator[secondary, passive]
150
151   returned messages {
152
153     ieMessage returned to actPerson
154   }
155 }
156
157 use case system subfunction oeSendNewRequest(APIName:dtName, APICategory:etCategory, APICity:
158   dtCity) {
159
160   actor actPerson[primary, active]
161   actor actCoordinator[secondary, passive]
162
163   returned messages {
164
165     ieMessage returned to actPerson
166   }
```

```

167
168 use case system subfunction oeGetGPSLocation(APIID:dtID) {
169
170   actor actPerson[primary, active]
171   actor actAdministrator[secondary, passive]
172
173   returned messages {
174
175     ieMessage returned to actPerson
176   }
177 }
178
179 use case system subfunction oeGetDescription(APIID:dtID) {
180
181   actor actPerson[primary, active]
182   actor actAdministrator[secondary, passive]
183
184   returned messages {
185
186     ieMessage returned to actPerson
187   }
188 }
189
190 use case system subfunction oeLoginWithCaptcha(ALogin:dtLogin, APassword:dtPassword, ACaptcha:
191   dtCaptcha) {
192
193   actor actAuthenticated[primary, active]
194
195   returned messages {
196
197     ieLogin returned to actAuthenticated
198   }
199
200 use case system subfunction oeSollicitateCrisisHandling() {
201
202   actor actActivator[primary, proactive]
203
204   returned messages {
205
206     ieMessage returned to actActivator
207   }
208 }
209
210 use case system subfunction oeSetClock(AcurrentTime:dtDateAndTime) {
211
212   actor actActivator[primary, proactive]
213
214   returned messages {
215
216     ieMessage returned to actActivator
217   }
218 }
219
220 use case system usergoal ugSecurelyUseSystem() {
221
222   actor actAuthenticated[primary, active]
223
224   reuse oeLogin[1..1]
225   reuse oeLogout[1..1]
226
227   step a: actAuthenticated executes oeLogin
228   step b: actAuthenticated executes oeLogout
229
230   ordering constraint
231     "step (a) must always precede step (b)."
232   }
233
234 use case system usergoal ugCheckRequest() {
235

```

```

236 actor actCoordinator[primary, active]
237
238 reuse ugSecurelyUseSystem[1..1]
239 reuse oe GetAllRequests[1..1]
240 reuse oeCheckAvailability[1..*]
241 reuse oeDeliverRequest[1..*]
242
243 step a: actCoordinator executes ugSecurelyUseSystem
244 step b: actCoordinator executes oe GetAllRequests
245 step c: actCoordinator executes oeCheckAvailability
246 step d: actCoordinator executes oeDeliverRequest
247
248 ordering constraint
249 "step (a) must always be performed before all the other steps."
250
251 ordering constraint
252 "Subsequently, all the steps follow after step (a) is performed."
253 }
254
255 use case system usergoal ugManageRequest() {
256
257 actor actAdministrator[primary, active]
258
259 reuse ugSecurelyUseSystem[1..1]
260 reuse oe GetAllRequestsFromCoordinator[1..1]
261 reuse oeTreatRequest[1..*]
262 reuse oeSolveRequest[1..*]
263
264 step a: actAdministrator executes ugSecurelyUseSystem
265 step b: actAdministrator executes oe GetAllRequestsFromCoordinator
266 step c: actAdministrator executes oeTreatRequest
267 step d: actAdministrator executes oeSolveRequest
268
269 ordering constraint
270 "step (a) must always be performed before all the other steps."
271
272 ordering constraint
273 "Subsequently, all the steps follow after step (a) is performed."
274 }
275
276 use case system summary suAddNewPI() {
277
278 actor actPerson[primary, active]
279 actor actMsrCreator[secondary, active]
280 actor actCoordinator[secondary, proactive]
281 actor actAdministrator[secondary, proactive]
282
283 reuse oeCreateSystemAndEnvironment[1..1]
284 reuse ugSecurelyUseSystem[1..1]
285 reuse oeSearchPI[1..*]
286 reuse oeSendNewRequest[1..*]
287
288 reuse ugCheckRequest[1..*]
289 reuse ugManageRequest[1..*]
290 reuse oeAddPI[1..*]
291
292 step a: actMsrCreator executes oeCreateSystemAndEnvironment
293 step b: actPerson executes ugSecurelyUseSystem
294 step c: actPerson executes oeSearchPI
295 step d: actPerson executes oeSendNewRequest
296 step e: actCoordinator executes ugSecurelyUseSystem
297 step f: actCoordinator executes ugCheckRequest
298 step g: actCoordinator executes ugSecurelyUseSystem
299 step h: actAdministrator executes ugManageRequest
300 step i: actAdministrator executes oeAddPI
301
302 ordering constraint
303 "step (a) is the first step to perform."
304
305 ordering constraint

```

```

306     "step (b), (d) and (f) must always be performed before (c), (e) and (g)."
307
308 ordering constraint
309     "Subsequently, all the steps follow after step (a) is performed."
310 }
311
312 use case system summary suGenerateNewAlert() {
313
314     actor actPerson[primary, active, multiple]
315     actor actComCompany[primary, active, multiple]
316     actor actMsrCreator[secondary, active]
317
318     reuse oeCreateSystemAndEnvironment[1..1]
319     reuse ugSecurelyUseSystem[1..1]
320     reuse oeSearchPI[1...*]
321     reuse oeGetGPSLocation[1...*]
322     reuse oeAlert[1...*]
323
324     step a: actMsrCreator executes oeCreateSystemAndEnvironment
325     step b: actPerson executes ugSecurelyUseSystem
326     step c: actPerson executes oeSearchPI
327     step d: actPerson executes oeGetGPSLocation
328     step e: actComCompany executes oeAlert
329
330 ordering constraint
331     "step (a) and (b) must always be performed before all the other steps."
332
333 ordering constraint
334     "step (a) is the first step to perform."
335
336 ordering constraint
337     "Subsequently, all the steps follow after step (a) is performed."
338 }
339
340 use case system subfunction oeAlert(APersonType:etPersonType, APIName:dtName, APIGPSLocation:
341     dtGPSLocation, AdtDate:lu.uni.lassy.messir.libraries.calendar.dtDate, AdtTime:lu.uni.lassy.
342     messir.libraries.calendar.dtTime, AProblemDescription:dtDescription, PhoneNumber:dtPhoneNumber
343     )
344
345     actor actComCompany[primary, active]
346
347     returned messages {
348         ieSmsSend returned to actComCompany
349     }
350
351
352     use case system subfunction oeAddCoordinator(AdtCoordinatorID:dtCoordinatorID, AdtLogin:dtLogin,
353         AdtPassword:dtPassword, CoordinatorAccessRights:etCrisisType) {
354         actor actAdministrator[primary, active]
355
356         returned messages {
357             ieCoordinatorAdded returned to actAdministrator
358         }
359     }
360
361     use case system subfunction oeDeleteCoordinator(AdtCoordinatorID:dtCoordinatorID) {
362         actor actAdministrator[primary, active]
363
364         returned messages {
365             ieCoordinatorDeleted returned to actAdministrator
366         }
367     }
368
369     use case system subfunction oeUpdateCoordinatorAccessRights(AdtCoordinatorID:dtCoordinatorID,
370         CoordinatorAccessRights:etCrisisType) {
371         actor actAdministrator[primary, active]
372
373         returned messages {
374             ieCoordinatorUpdated returned to actAdministrator
375         }

```

```
371 }
372
373 use case system usergoal ugAdministrateTheSystem() {
374   actor actAdministrator[primary, active]
375
376   reuse ugSecurelyUseSystem[1..1]
377   reuse oeAddCoordinator[1..*]
378   reuse oeDeleteCoordinator[1..*]
379   reuse oeUpdateCoordinatorAccessRights[1..*]
380
381   step a: actAdministrator executes ugSecurelyUseSystem
382   step b: actAdministrator executes oeAddCoordinator
383   step c: actAdministrator executes oeDeleteCoordinator
384   step d: actAdministrator executes oeUpdateCoordinatorAccessRights
385
386   ordering constraint
387     "Step a must be executed before all other steps"
388
389   ordering constraint
390     "Step b must be executed before executing steps c or d"
391 }
392
393 use case system subfunction oeGetCrisisSet(AetCrisisStatus:etCrisisStatus) {
394   actor actCoordinator[primary, active]
395
396   returned messages {
397     ieCrisisSet() returned to actCoordinator
398   }
399 }
400
401 use case system subfunction oeGetAlertSet(AetAlertStatus:etAlertStatus) {
402   actor actCoordinator[primary, active]
403
404   returned messages {
405     ieAlertSet() returned to actCoordinator
406   }
407 }
408
409 use case system usergoal ugMonitor() {
410   actor actCoordinator[primary, active]
411
412   reuse ugSecurelyUseSystem[1..1]
413   reuse oeGetCrisisSet[1..*]
414   reuse oeGetAlertSet[1..*]
415
416   step a: actCoordinator executes ugSecurelyUseSystem
417   step b: actCoordinator executes oeGetCrisisSet
418   step c: actCoordinator executes oeGetAlertSet
419
420   ordering constraint
421     "Step a must be executed before all other step"
422 }
423
424 use case system subfunction oeValidateAlert(AdtAlertID:dtAlertID) {
425   actor actCoordinator[primary, active]
426
427   returned messages {
428     ieMessage() returned to actCoordinator
429   }
430 }
431
432 use case system subfunction oeInvalidateAlert(AdtAlertID:dtAlertID) {
433   actor actCoordinator[primary, active]
434
435   returned messages {
436     ieMessage() returned to actCoordinator
437   }
438 }
439
440 use case system subfunction oeSetCrisisStatus(AdtCrisisID:dtCrisisID, AetCrisisStatus:
```

```

        etCrisisStatus) {
441 actor actCoordinator[primary, active]
442
443 returned messages {
444     ieMessage() returned to actCoordinator
445 }
446 }
447
448 use case system subfunction oeSetCrisisType(AdtCrisisID:dtCrisisID, AetCrisisType:etCrisisType) {
449 actor actCoordinator[primary, active]
450
451 returned messages {
452     ieMessage() returned to actCoordinator
453 }
454 }
455
456 use case system subfunction oeSetCrisisHandler(AdtCrisisID:dtCrisisID) {
457 actor actCoordinator[primary, active]
458
459 returned messages {
460     ieMessage() returned to actCoordinator
461 }
462 }
463
464 use case system subfunction oeReportOnCrisis(AdtCrisisID:dtCrisisID, AdtComment:dtComment) {
465 actor actCoordinator[primary, active]
466
467 returned messages {
468     ieMessage() returned to actCoordinator
469 }
470 }
471
472 use case system subfunction oeCloseCrisis(AdtCrisisID:dtCrisisID) {
473 actor actCoordinator[primary, active]
474
475 returned messages {
476     ieMessage() returned to actCoordinator
477 }
478 }
479
480 use case system usergoal ugManageCrisis() {
481 actor actCoordinator[primary, active]
482
483 reuse ugSecurelyUseSystem[1...1]
484 reuse oeValidateAlert[1...*]
485 reuse oeInvalidateAlert[1...*]
486 reuse oeSetCrisisStatus[1...*]
487 reuse oeSetCrisisType[1...*]
488 reuse oeSetCrisisHandler[1...*]
489 reuse oeReportOnCrisis[1...*]
490 reuse oeCloseCrisis[1...*]
491
492 step a: actCoordinator executes ugSecurelyUseSystem
493 step b: actCoordinator executes oeValidateAlert
494 step c: actCoordinator executes oeInvalidateAlert
495 step d: actCoordinator executes oeSetCrisisHandler
496 step e: actCoordinator executes oeSetCrisisStatus
497 step f: actCoordinator executes oeSetCrisisType
498 step g: actCoordinator executes oeReportOnCrisis
499 step h: actCoordinator executes oeCloseCrisis
500
501 ordering constraint
502     "Step a must be executed before executing all other steps"
503
504 ordering constraint
505     "Step b must be executed before executing step d"
506
507 ordering constraint
508     "Step d must be executed before executing steps e, f, g and h"
509 }

```

```

510
511 use case system summary suGlobalCrisisHandling() {
512   actor actCoordinator[primary, active]
513
514   reuse ugSecurelyUseSystem
515   reuse ugManageCrisis
516   reuse ugMonitor
517
518   step a: actCoordinator executes ugSecurelyUseSystem
519   step b: actCoordinator executes ugManageCrisis
520   step c: actCoordinator executes ugMonitor
521
522   ordering constraint
523     "Step a must be executed before executing all other steps"
524 }
525 use case system summary suScenarioPresentation() {
526   actor actMsrCreator[primary, active]
527   actor actAdministrator[primary, active]
528   actor actCoordinator[primary, active]
529   actor actPerson[primary, active]
530   actor actComCompany[primary, active]
531
532   reuse oeCreateSystemAndEnvironment[1..1]
533   reuse oeLoginWithCaptcha[1..*]
534   reuse oeSearchPI[1..*]
535   reuse oeSendNewRequest[1..*]
536   reuse ugCheckRequest[1..*]
537   reuse ugManageRequest[1..*]
538   reuse oeSearchPI[1..*]
539   reuse oeGetGPSLocation[1..*]
540   reuse oeAlert[1..*]
541   reuse ugAdministateTheSystem[1..*]
542   reuse ugMonitor[1..*]
543   reuse ugManageCrisis[1..*]
544
545   step a: actMsrCreator executes oeCreateSystemAndEnvironment
546   step b: actAdministrator executes ugAdministateTheSystem
547   step c: actCoordinator executes oeLoginWithCaptcha
548   step d: actPerson executes oeSearchPI
549   step e: actPerson executes oeSendNewRequest
550   step f: actCoordinator executes ugCheckRequest
551   step g: actAdministrator executes ugManageRequest
552   step h: actPerson executes oeSearchPI
553   step i: actPerson executes oeGetGPSLocation
554   step j: actComCompany executes oeAlert
555   step k: actCoordinator executes ugMonitor
556   step l: actCoordinator executes ugManageCrisis
557
558   ordering constraint
559     "Step a must be executed before executing all other steps"
560
561   ordering constraint
562     "Step b must follow step a"
563 }
564 use case system subfunction oeResetPassword(ALogin:dtLogin) {
565   actor actAuthenticated[primary, active]
566
567   returned messages {
568
569     ieResetPassword returned to actAuthenticated
570   }
571 }
572 use case system usergoal ugLoginWithCaptcha() {
573   actor actAuthenticated[primary, active]
574
575   reuse oeLogin[3..*]
576   reuse oeLoginWithCaptcha[1..*]
577
578   step a: actAuthenticated executes oeLogin
579   step b: actAuthenticated executes oeLogin

```

```
580  step c: actAuthenticated executes oeLogin
581  step d: actAuthenticated executes oeLoginWithCaptcha
582
583  ordering constraint
584      "Step a to c must be executed before executing all other steps"
585
586  ordering constraint
587      "Step d must be the last step"
588  }
589 }
590 }
```

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

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