RoboCup Rescue Simulation League
Agent Competition 2010
Rules and Setup (preliminary)

February 8, 2010

1 Simulation Environment

1.1 Kernel

The new 1.0 kernel will be used in the competition. The feature set will be frozen on February 1st, 2010 thereafter only bug fixes will be allowed to kernel or simulators. The software is available from http://www.sourceforge.net/projects/roborescue.

1.2 Traffic Simulator and GIS

The new network-area traffic simulator will be used. The AK_MOVE command will be extended to contain an optional X and Y coordinate for the desired destination.

The new model of traffic only uses roads and buildings. Nodes no longer exist.

1.3 Communications Model

A new implementation of channel-based communications will be used. This model allows for both voice and radio channels that may be limited by range, bandwidth or number of messages. Agents will be able to subscribe to a limited number of channels.

Communication is now synchronous, i.e. messages are heard at the start of each timestep as part of the sense cycle.

Both voice and radio channels may have random noise added.

1.4 Perception Model

The perception model has been updated to use a more realistic line-of-sight algorithm for computing sensory information. "Far fire" perception will be removed.

1.5 Collapse and Blockade Simulator

The reliance on *polydata.dat files will be replaced with a simplified collapse simulator. The collapse simulator will also handle adding blockages to roads as a result of building collapse.

1.6   Fire Simulator

The ResQ fire simulator will be used with adjusted parameters. The parameters need to be changed to handle OpenStreetMap-style maps. Support for multiple nozzles has been removed.

1.7   Ignition Simulator

A new ignition simulator will be used to determine when fires ignite, both at the start of the simulation and during the run. These may be random or scripted.

1.8   Misc Simulator

A Java version of the misc simulator will be used.

2   Hardware

- **PCs for competition:** There will be 3 clusters with 4 computers each (12 computers in total). One PC per cluster will be reserved for the simulation components, the other three will run the agent software.

- **Specs for each PC:**

    - CPU $\geq$ Dual core 3.0 GHz
    - RAM $\geq$ 4.0 GB
    - Gigabit network card

- **Graphics card for 3D viewer:** ?

2.1   Operating System

A 64-bit Linux OS (Ubuntu) with a Java 1.7 run-time will be used.

3   Scenarios

A *scenario* is a map, a set of initial agent/civilian positions, and a set of configuration options for each of the simulator components. The technical committee will produce a set of scenarios for the competition. All teams will run on the same set of scenarios.

3.1   Maps

The maps will be provided by the technical committee. All maps will fulfill the following constraints:

- Roads are connected correctly, buildings have appropriate entrances and all roads and buildings are reachable.

- Maps will be limited to 5000 buildings and 5000 roads.

These constraints will be checked by a validation tool that will be available to teams beforehand to check its correctness.

Scale: The scale of the maps will be changed to match the real world. Simulation parameters will be adjusted accordingly.

3.2 Challenges

There will be two kinds of extra challenges in the competition:

- **Communications:** Measure the change in performance as communication degrades.

- **Save the city:** In this challenge, fires will continually start at random locations. The rate of new fires can increase over time and the winner is the team that protects the city for the longest time.

3.3 Parameters

The following tables describe the set of parameters that can change during the competition. Note that agents will not be given all parameters - see table 13 for the set of parameters that agents are guaranteed to be given.

Entity	Min.	Max.
Fire brigade	0	30
Police force	0	30
Ambulance	0	30
Fire station	0	5
Police office	0	5
Ambulance centre	0	5
Civilians	0	200
Refuges	0	unlimited
Ignition points	0	50^1

Table 1: Allowed number of agents, refuges and ignition points.

The simulation parameters can be varied between simulations. The following tables list all variable parameters and their possible ranges. For a list of all simulation parameters, refer to appendix A.

Parameter	Description	Range
random.seed	Seed for random number generator	Anything

Table 2: Allowed ranges for simulation parameters common to all components.

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[1]Even though the maximum number of initial fires is 50, those will be grouped into no more than 10 fire sites (i.e. buildings on fire that are next to each other).

Parameter	Description	Range
kernel.timesteps	The number of timesteps in the simulation	100 - 1000
kernel.agents.think-time	The number of milliseconds each agent has to send commands	500 - 2000

Table 3: Allowed ranges for kernel parameters.

Parameter: comms.channels.*	Description	Range
count	Number of communication channels	0 - 20
x.type	The type of channel x	*voice* or *radio*
max.platoon	The number of channels a platoon agent can subscribe to	0 - 10
max.centre	The number of channels a centre agent can subscribe to	0 - 20
Voice channel parameters		
x.range	The maximum range of a message in mm	0 - 100000
x.messages.size	The maximum size of a voice message in bytes	0 - 2048
x.messages.max	The maximum number of a voice message an agent can send in one timestep	0 - 100
Radio channel parameters		
x.bandwidth	The maximum capacity of the channel in bytes per timestep	0 - 4096
Noise parameters		
Noise can be specified as *input* or *output* (or both). Input noise is applied as the agent sends a message to the server; output noise is applied as an agent receives a message. Thus, input noise is identical for all receivers but output noise is unique to each receiver. There are two types of noise: *failure* noise and *dropout* noise. Failure noise means a message disappears completely with no notification to either the sender or the receiver. Dropout noise removes the content of a message but the receiver still receives a zero-length communication from the sender, i.e. the sender knows a message was sent but the content is lost.		
x.noise.*input—output*.failure.use	Whether to use failure noise on channel x in input or output mode.	*yes* or *no*.
x.noise.*input—output*.failure.p	The probability of message failure.	0 - 1
x.noise.*input—output*.dropout.use	Whether to use dropout noise on channel x in input or output mode.	*yes* or *no*.
x.noise.*input—output*.dropout.p	The probability of message dropout.	0 - 1

Table 4: Allowed ranges for communication parameters.

Parameter	Description	Range

Table 5: Allowed ranges for perception parameters.

Parameter	Description	Range
collapse.wood.*	Proportion of wooden buildings with each degree of damage	Between 0 and 1; sum to 1.
collapse.steel.*	Proportion of steel buildings with each degree of damage	Between 0 and 1; sum to 1.
collapse.concrete.*	Proportion of concrete buildings with each degree of damage	Between 0 and 1; sum to 1.

Table 6: Allowed ranges for collapse simulator parameters.

Parameter	Description	Range
fire.tank.maximum	Water tank capacity	5000 - 30000
fire.tank.refill-rate	Water tank refill rate	500 - 3000
fire.extinguish.max-power	Maximum amount of water that can be used per timestep	500 - 3000
fire.extinguish.max-distance	Maximal extinguish distance	10000 - 50000

Table 7: Allowed ranges for fire simulator parameters.

Parameter: misc.*	Description	Range
buriedness.*type.severity*.rate	The probability that an agent in a collapsed building of type *type* with a degree of collapse *severity* will be buried	0 - 1
buriedness.*type.severity*.value	The initial buriedness value for a buried agent in a collapsed building of type *type* with a degree of collapse *severity*	0 - 200
injury.collapse.*type.severity*.slight	The probability that an agent inside a collapsing building of type *type* with a degree of collapse *severity* will receive a slight injury	0 - 1
injury.collapse.*type.severity*.serious	The probability that an agent inside a collapsing building of type *type* with a degree of collapse *severity* will receive a serious injury	0 - 1
injury.collapse.*type.severity*.critical	The probability that an agent inside a collapsing building of type *type* with a degree of collapse *severity* will receive a critical injury	0 - 1
injury.collapse.slight	The amount of damage that a slight injury due to collapse causes	0 - 10000
injury.collapse.serious	The amount of damage that a serious injury due to collapse causes	0 - 10000
injury.collapse.critical	The amount of damage that a critical injury due to collapse causes	0 - 10000
injury.collapse.multiplier.*type*	The damage multiplier for an agent of type *type* due to collapse	0 - 1
injury.bury.*type.severity*.slight	The probability that an agent buried inside a building of type *type* with a degree of collapse *severity* will receive a slight injury	0 - 1
injury.bury.*type.severity*.serious	The probability that an agent buried inside a building of type *type* with a degree of collapse *severity* will receive a serious injury	0 - 1
injury.bury.*type.severity*.critical	The probability that an agent buried inside a building of type *type* with a degree of collapse *severity* will receive a critical injury	0 - 1
injury.bury.slight	The amount of damage that a slight injury due to buriedness causes	0 - 10000
injury.bury.serious	The amount of damage that a serious injury due to buriedness causes	0 - 10000
injury.bury.critical	The amount of damage that a critical injury due to buriedness causes	0 - 10000
injury.bury.multiplier.*type*	The damage multiplier for an agent of type *type* due to buriedness	0 - 1

Table 8: Allowed ranges for misc simulator parameters.

Parameter: misc.*	Description	Range
injury.fire.*type.severity*.slight	The probability that an agent inside a burning building of type *type* with a degree of collapse *severity* will receive a slight injury	0 - 1
injury.fire.*type.severity*.serious	The probability that an agent inside a burning building of type *type* with a degree of collapse *severity* will receive a serious injury	0 - 1
injury.fire.*type.severity*.critical	The probability that an agent inside a burning building of type *type* with a degree of collapse *severity* will receive a critical injury	0 - 1
injury.fire.slight	The amount of damage that a slight injury due to fire causes	0 - 10000
injury.fire.serious	The amount of damage that a serious injury due to fire causes	0 - 10000
injury.fire.critical	The amount of damage that a critical injury due to fire causes	0 - 10000
injury.fire.multiplier.*type*	The damage multiplier for an agent of type *type* due to fire	0 - 1
injury.*type*.k	The k parameter for the damage progression function for injury type *type* (collapse, bury or fire)	0 - 1
injury.*type*.l	The l parameter for the damage progression function for injury type *type* (collapse, bury or fire)	0 - 1
injury.*type*.noise.mean	The mean noise added to the damage progression function for injury type *type* (collapse, bury or fire)	0 - 1
injury.*type*.noise.sd	The standard deviation of noise added to the damage progression function for injury type *type* (collapse, bury or fire)	0 - 1

Table 9: Allowed ranges for misc simulator parameters (continued).

Parameter	Description	Range
clear.repair.rate	The rate of road clearing per police force agent in square m per timestep	0 - 1000

Table 10: Allowed ranges for clear simulator parameters.

Parameter	Description	Range
ignition.random.lambda	The parameter of the Poission distribution used to determine frequency of building ignition	0 - 1

Table 11: Allowed ranges for ignition simulator parameters.

Parameter	Description	Range

Table 12: Allowed ranges for traffic simulator parameters.

- kernel.agents.think-time

- kernel.startup.connect-time

- comms.channels.count

- comms.channels.x.type

- comms.channels.x.range

- comms.channels.x.messages.size

- comms.channels.x.messages.max

- comms.channels.x.bandwidth

- fire.tank.maximum

- fire.tank.refill-rate

- fire.extinguish.max-power

- fire.extinguish.max-distance

- clear.repair.rate

- scenario.agents.fb The number of fire brigades in the scenario

- scenario.agents.fs The number of fire stations in the scenario

- scenario.agents.pf The number of police forces in the scenario

- scenario.agents.po The number of police offices in the scenario

- scenario.agents.at The number of ambulance teams in the scenario

- scenario.agents.ac The number of ambulance centres in the scenario

- kernel.communication-model The class name of the communication model in use

- kernel.perception The class name of the perception model in use

Table 13: Parameters that agents are guaranteed to be sent.

4 Scoring

Scores will be calculated using a weighted function of the parameters described in Table 14.

Parameter	Description
CS	Number of civilians saved
BD	Minimisation of building damage
ES	Speed of extinguishing fires
EE	Efficiency of extinguishing fires (time)
DT	Minimisation of distance travelled
IN	Minimisation of injuries
VD	Speed of discovering all victims
CE	Efficiency of clearing roads

Table 14: Parameters influencing the final score.

The final formula for the score will be announced by April 15 2010.

5 Rules

1. **Rounds:** The competition is structured into several rounds, each round taking usually one day. There will be two preliminary rounds, one semifinal and one final round.

2. **Sessions:** Each round consists of several session. A session is the set of simulation runs for all teams in a specific scenario. A member of the technical or organising committee will be responsible for each session. This *session chair* is responsible for starting the session, collecting scores and logs, and handling any issues that arise during the session.

3. **Ranking:** The ranking of the teams for each session will be determined using the scoring scheme described in section 4. To calculate the ranking of the teams for a round, the rankings in each session are added together. In case of a tie, the sum of all scores in this round will be used.

4. **Code submission:** Teams shall submit working binaries at the start of each session.

5. **Scenarios:** The scenarios will be provided by the Technical Committee as described in section 3. Teams shall NOT know the disaster situation (map, random seeds, simulator configuration, parameter values) of the session before it starts.

   All the conditions for a particular disaster situation, including random numbers, etc shall be identical for all the teams.

6. **Agents:** Teams shall implement all kinds of agents and must connect the correct number of agents as specified for the current session.

7. **Connection:** Teams must connect all their agents to the kernel with 5 minutes. The simulation will begin no later than 5 minutes after the first agent begins its handshake with the kernel.

8. **Shared memory:** Agents **must not** use any form of shared memory, including static memory accessible to all agents, direct function calls between agents, or writing files for use by other agents during a run. The technical committee may require each agent to run in a different virtual machine if teams are suspected of violating this rule.

9. **Precomputation**, defined as an agent's loading and using *map-specific* data which has been created and processed by another program and saved in a file, is allowed under the following conditions:

    (a) The data should have been generated by a computer program with no human interaction.

    (b) Information for all known maps should have been generated by a single computer program.

    (c) The computer program used for computing data for known maps should work properly if it is given a new map.

    (d) An agent should choose the data file to be used itself.

    (e) Agents should be able to work if no precomputed data is present for a map.

    (f) The source of the precomputation program shall be open after the competition.

    (g) The simulation will start no more than 5 minutes after the first agent's connection.

10. **Valid games:** In some cases a simulation may fail. There are two general cases:

    (a) A simulator or the kernel crashes.

    (b) Some agents stop or crash.

    In the first case, the score for that run shall be zero. In the second case the final score is calculated as usual.

    Teams will **not** be entitled to a rerun in most circumstances. It is expected that teams will write their agents so that they work correctly with the given simulators. In extreme circumstances teams may request a rerun. Examples of circumstances that may result in a rerun are:

    (a) A power failure.

    (b) Accidental or deliberate termination of a kernel, simulator or agent process.

    Examples of events that will not result in a rerun are:

    (a) A simulator crash.

    (b) Agents failing to fully connect before the simulation begins.

(c) Agents crashing or failing to act during the run.

(d) Observing apparently incorrect behaviour by a simulator or the viewer.

Teams who wish to request a rerun must do so in writing. The request must include the team name, the scenario name, a description of the problem and the reasons why the team feel a rerun is appropriate. The request must also state whether the request is for a rerun of just that team or for a full rerun of the session.

11. **Simulation bugs:** It is the responsibility of teams to ensure that their code works correctly with the provided simulators. Although the technical committee makes every attempt to provide a reliable simulation environment the committee accepts no responsibility for any kind of software failure at competition time. Bugs reported at competition time will be fixed at the first opportunity but generally this will be after the competition has ended. Simulator bugs are not sufficient grounds to request a rerun.

12. **Committee decisions:** If a problem arises during a session then teams may ask for the session chair to resolve the problem. The session chair may make a decision on the spot, or may refer it to the committee. Decisions are final, but if a team strongly disagrees then they may submit a written appeal to the committee. In order to allow the competition to continue, appeals will not be heard during a round but will be discussed by the committee at the end of each day.

13. **Comments from teams:** Occasionally, members of participating teams may wish to voice concerns or make suggestions to the TC about the running of the competition. If these comments or suggestions are deemed derogatory or abusive then the matter will be referred to the Robocup Trustees and may result in penalties for the team concerned. Penalties may include points reduction, or, in the worst case, disqualification.

14. **Exploits:** A team that knowingly uses bugs in the simulation package to gain an advantage will be disqualified from the competition. Disqualifications will be made only after consultation with the Robocup trustees.

15. **Open source policy:**

- Source code files must be open immediately after games when other teams request to guarantee fair play and to encourage community activity after competition.
- Log files and related parameter files will be open.

6 Summary of changes from 2009

The following major changes were introduced for the 2010 competition:

- New kernel (section 1.1)
- New traffic simulator and gis (section 1.2)

- New communications model (section 1.3)

- New perception model (section 1.4)

- Modified collapse and blockade simulators (section 1.5)

- New ignition simulator (section 1.7)

- Adjustment of the map scale to match real-world date (section 3.1)

- Introduction of special challenges in addition to normal simulation runs (section 3.2)

- Introduction of variable simulation parameters (section 3.3)

A   Configuration Files

A set of example configuration files follows. Note that this is a **preliminary** set of configuration parameters and is subject to chage.

A.1   common.cfg

```
# Random seed for all components
random.seed: 1

kernel.host: localhost
kernel.port: 7000
```

A.2   kernel.cfg

```
# Name of the kernel log file
kernel.logname: logs/rescue.log

# Number of timesteps to run
kernel.timesteps: 300

# The simulation termination conditions
kernel.termination: kernel.TimestepTerminationCondition
#kernel.termination: kernel.TimestepTerminationCondition
    rescuecore2.standard.kernel.CiviliansDeadOrRescuedTerminationCondition

# The amount of time (ms) agents have to send commands each timestep
kernel.agents.think-time: 1000
# Number of timesteps that agents commands are ignored
kernel.agents.ignoreuntil: 3

# List of command collectors to use
kernel.commandcollectors: kernel.TimedCommandCollector
```

```
#kernel.commandcollectors: kernel.TimedCommandCollector
    rescuecore2.standard.kernel.StandardCommandCollector

# List of command filters to use
kernel.commandfilters: kernel.WrongTimeCommandFilter
    kernel.FrozenAgentsCommandFilter
    rescuecore2.standard.kernel.DeadAgentsCommandFilter

# The agent registrar
kernel.agents.registrar: rescuecore2.standard.kernel.StandardAgentRegistrar

# The amount of time agents have to start up
kernel.startup.connect-time: 300000 # 5 minute startup time
# kernel.startup.connect-time: 10000 # 10 second startup time

# Automatic choice of GIS
kernel.gis.auto: gis2.GMLWorldModelCreator

# Automatic choice of perception
kernel.perception.auto: rescuecore2.standard.kernel.StandardPerception

# Automatic choice of communication model
kernel.communication.auto:
    rescuecore2.standard.kernel.comms.ChannelCommunicationModel

# Automatically start simulators/viewers/agents
kernel.simulators.auto: collapse.CollapseSimulator clear.ClearSimulator
    misc.MiscSimulator firesimulator.FireSimulatorWrapper
    traffic3.simulator.TrafficSimulator ignition.IgnitionSimulator
kernel.viewers.auto: sample.SampleViewer
kernel.agents.auto: sample.SampleFireBrigade*n sample.SamplePoliceForce*n
    sample.SampleAmbulanceTeam*n sample.SampleCentre*n sample.SampleCivilian*n

# Kernel UI components
kernel.ui.components:
    rescuecore2.standard.kernel.StandardWorldModelViewerComponent
```

A.3   comms.cfg

```
comms.channels.count: 5
comms.channels.0.type: voice
# Range of a voice message in mm
comms.channels.0.range: 30000
# Maximum size of a voice message
comms.channels.0.messages.size: 256
# Maximum number of voice messages each agent can utter each timestep
comms.channels.0.messages.max: 1
comms.channels.0.noise.input.dropout.use: yes
comms.channels.0.noise.input.dropout.p: 0.1
```

```
# A low-bandwidth, reliable radio channel
comms.channels.1.type: radio
comms.channels.1.bandwidth: 64

# A very high-bandwidth, unreliable radio channel
comms.channels.2.type: radio
comms.channels.2.bandwidth: 2048
comms.channels.2.noise.input.failure.use: yes
comms.channels.2.noise.input.failure.p: 0.2

# A high-bandwidth radio channel that is unreliable on output
comms.channels.3.type: radio
comms.channels.3.bandwidth: 1024
comms.channels.3.noise.output.dropout.use: yes
comms.channels.3.noise.output.dropout.p: 0.1

# A medium-bandwidth radio channel that sometimes fails on input and is
    unreliable on output
comms.channels.4.type: radio
comms.channels.4.bandwidth: 512
comms.channels.4.noise.input.failure.use: yes
comms.channels.4.noise.input.failure.p: 0.05
comms.channels.4.noise.output.dropout.use: yes
comms.channels.4.noise.output.dropout.p: 0.05


comms.channels.max.platoon: 2
comms.channels.max.centre: 4




comms.standard.say.range: 30000
comms.standard.platoon.max: 4
comms.standard.size.max: 256
```

A.4 perception.cfg

```
# Legacy perception module parameters
perception.standard.view-distance:    10000
perception.standard.use-far-fires:     true
perception.standard.far-fire-distance: 10000
perception.standard.hp-precision:      1000
perception.standard.damage-precision: 100
```

A.5 score.cfg

```
score.function: rescuecore2.standard.score.LegacyScoreFunction

score.standard.building-fire.heating: 0.66
score.standard.building-fire.burning: 0.33
```

```
score.standard.building-fire.inferno: 0.0
score.standard.building-fire.water-damage: 0.90
score.standard.building-fire.minor-damage: 0.75
score.standard.building-fire.moderate-damage: 0.5
score.standard.building-fire.severe-damage: 0.25
score.standard.building-fire.burnt-out: 0
score.standard.building-fire.absolute: false

score.standard.health.absolute: false
```

A.6   collapse.cfg

```
# Damage distribution for wooden buildings
collapse.wood.p-destroyed: 0.2
collapse.wood.p-severe: 0.2
collapse.wood.p-moderate: 0.2
collapse.wood.p-slight: 0.2
collapse.wood.p-none: 0.2

# Damage distribution for steel buildings
collapse.steel.p-destroyed: 0.1
collapse.steel.p-severe: 0.15
collapse.steel.p-moderate: 0.2
collapse.steel.p-slight: 0.25
collapse.steel.p-none: 0.3

# Damage distribution for concrete buildings
collapse.concrete.p-destroyed: 0.3
collapse.concrete.p-severe: 0.25
collapse.concrete.p-moderate: 0.2
collapse.concrete.p-slight: 0.15
collapse.concrete.p-none: 0.1

# Amount of damage for each collapse degree class
collapse.destroyed.mean: 100
collapse.destroyed.sd: 5
collapse.severe.mean: 75
collapse.severe.sd: 5
collapse.moderate.mean: 50
collapse.moderate.sd: 5
collapse.slight.mean: 25
collapse.slight.sd: 5
```

A.7   resq-fire.cfg

```
# Synonyms
resq-fire.water_capacity:15000
fire.tank.maximum:15000

resq-fire.water_distance:60000
```

```
fire.extinguish.max-distance:60000

fire.extinguish.max-sum: 1000
resq-fire.max_extinguish_power_sum:1000

# Fire simulator options
resq-fire.rays.dir:rays

resq-fire.wind_speed:0
resq-fire.steel_capacity:1.0
resq-fire.wooden_energy:1200.0
resq-fire.cell_size:5000
resq-fire.wooden_ignition:47.0
resq-fire.water_thermal_capacity:135.0
resq-fire.steel_burning:850.0
resq-fire.concrete_energy:350.0
resq-fire.air_to_air_flow:1.0
resq-fire.gamma:0.2
resq-fire.ambulancecenter_inflammable:false
resq-fire.steel_ignition:47.0
resq-fire.wind_random:1
resq-fire.radiation_coefficient:0.0023
resq-fire.steel_energy:800.0
resq-fire.wooden_burning:800.0
resq-fire.refuge_inflammable:false
resq-fire.policeoffice_inflammable:false
resq-fire.air_to_building_flow:400.0
resq-fire.concrete_burning:800.0
resq-fire.water_refill_rate:1000
resq-fire.wooden_capacity:1.1
resq-fire.concrete_ignition:47.0
resq-fire.wind_direction:100.0
resq-fire.concrete_speed:0.05
resq-fire.firestation_inflammable:false
resq-fire.steel_speed:0.05
resq-fire.randomseed:23
resq-fire.concrete_capacity:1.5
resq-fire.wooden_speed:0.05
resq-fire.energy_loss:0.86
```

A.8   misc.cfg

```
# Degrees of buriedness for building codes and levels of collapse
misc.buriedness.wood.partial.value: 20
misc.buriedness.wood.half.value: 30
misc.buriedness.wood.all.value: 60

misc.buriedness.steel.partial.value: 20
misc.buriedness.steel.half.value: 35
```

```
misc.buriedness.steel.all.value: 70

misc.buriedness.concrete.partial.value: 35
misc.buriedness.concrete.half.value: 60
misc.buriedness.concrete.all.value: 80

# Buriedness rates for building codes and levels of collapse
misc.buriedness.wood.partial.rate: 1
misc.buriedness.wood.half.rate: 1
misc.buriedness.wood.all.rate: 1

misc.buriedness.steel.partial.rate: 0.008
misc.buriedness.steel.half.rate: 0.008
misc.buriedness.steel.all.rate: 0.008

misc.buriedness.concrete.partial.rate: 0.008
misc.buriedness.concrete.half.rate: 0.008
misc.buriedness.concrete.all.rate: 0.008

# Injury rates for collapse damage
misc.injury.collapse.wood.partial.slight: 0.5
misc.injury.collapse.wood.partial.serious: 0.3
misc.injury.collapse.wood.partial.critical: 0.02
misc.injury.collapse.wood.half.slight: 0.5
misc.injury.collapse.wood.half.serious: 0.3
misc.injury.collapse.wood.half.critical: 0.02
misc.injury.collapse.wood.all.slight: 0.5
misc.injury.collapse.wood.all.serious: 0.3
misc.injury.collapse.wood.all.critical: 0.02

misc.injury.collapse.steel.partial.slight: 0.1
misc.injury.collapse.steel.partial.serious: 0.03
misc.injury.collapse.steel.partial.critical: 0.005
misc.injury.collapse.steel.half.slight: 0.1
misc.injury.collapse.steel.half.serious: 0.03
misc.injury.collapse.steel.half.critical: 0.005
misc.injury.collapse.steel.all.slight: 0.1
misc.injury.collapse.steel.all.serious: 0.03
misc.injury.collapse.steel.all.critical: 0.005

misc.injury.collapse.concrete.partial.slight: 0.1
misc.injury.collapse.concrete.partial.serious: 0.03
misc.injury.collapse.concrete.partial.critical: 0.005
misc.injury.collapse.concrete.half.slight: 0.1
misc.injury.collapse.concrete.half.serious: 0.03
misc.injury.collapse.concrete.half.critical: 0.005
misc.injury.collapse.concrete.all.slight: 0.1
misc.injury.collapse.concrete.all.serious: 0.03
misc.injury.collapse.concrete.all.critical: 0.005
```

```
misc.injury.collapse.slight: 2
misc.injury.collapse.serious: 10
misc.injury.collapse.critical: 10000

misc.injury.collapse.multiplier.ambulance: 0.2
misc.injury.collapse.multiplier.police: 0.2
misc.injury.collapse.multiplier.fire: 0.2

# Injury rates for buriedness damage
misc.injury.bury.wood.partial.slight: 0.4
misc.injury.bury.wood.partial.serious: 0.5
misc.injury.bury.wood.partial.critical: 0.1
misc.injury.bury.wood.half.slight: 0.4
misc.injury.bury.wood.half.serious: 0.5
misc.injury.bury.wood.half.critical: 0.1
misc.injury.bury.wood.all.slight: 0.4
misc.injury.bury.wood.all.serious: 0.5
misc.injury.bury.wood.all.critical: 0.1

misc.injury.bury.steel.partial.slight: 0.4
misc.injury.bury.steel.partial.serious: 0.5
misc.injury.bury.steel.partial.critical: 0.1
misc.injury.bury.steel.half.slight: 0.4
misc.injury.bury.steel.half.serious: 0.5
misc.injury.bury.steel.half.critical: 0.1
misc.injury.bury.steel.all.slight: 0.4
misc.injury.bury.steel.all.serious: 0.5
misc.injury.bury.steel.all.critical: 0.1

misc.injury.bury.concrete.partial.slight: 0.4
misc.injury.bury.concrete.partial.serious: 0.5
misc.injury.bury.concrete.partial.critical: 0.1
misc.injury.bury.concrete.half.slight: 0.4
misc.injury.bury.concrete.half.serious: 0.5
misc.injury.bury.concrete.half.critical: 0.1
misc.injury.bury.concrete.all.slight: 0.4
misc.injury.bury.concrete.all.serious: 0.5
misc.injury.bury.concrete.all.critical: 0.1

misc.injury.bury.slight: 3
misc.injury.bury.serious: 15
misc.injury.bury.critical: 100

misc.injury.bury.multiplier.ambulance: 0.2
misc.injury.bury.multiplier.police: 0.2
misc.injury.bury.multiplier.fire: 0.2

# Injury rates for fire damage
```

```
misc.injury.fire.wood.partial.slight: 0.4
misc.injury.fire.wood.partial.serious: 0.2
misc.injury.fire.wood.partial.critical: 0.1
misc.injury.fire.wood.half.slight: 0.4
misc.injury.fire.wood.half.serious: 0.2
misc.injury.fire.wood.half.critical: 0.1
misc.injury.fire.wood.all.slight: 0.4
misc.injury.fire.wood.all.serious: 0.2
misc.injury.fire.wood.all.critical: 0.1

misc.injury.fire.steel.partial.slight: 0.4
misc.injury.fire.steel.partial.serious: 0.2
misc.injury.fire.steel.partial.critical: 0.1
misc.injury.fire.steel.half.slight: 0.4
misc.injury.fire.steel.half.serious: 0.2
misc.injury.fire.steel.half.critical: 0.1
misc.injury.fire.steel.all.slight: 0.4
misc.injury.fire.steel.all.serious: 0.2
misc.injury.fire.steel.all.critical: 0.1

misc.injury.fire.concrete.partial.slight: 0.4
misc.injury.fire.concrete.partial.serious: 0.2
misc.injury.fire.concrete.partial.critical: 0.1
misc.injury.fire.concrete.half.slight: 0.4
misc.injury.fire.concrete.half.serious: 0.2
misc.injury.fire.concrete.half.critical: 0.1
misc.injury.fire.concrete.all.slight: 0.4
misc.injury.fire.concrete.all.serious: 0.2
misc.injury.fire.concrete.all.critical: 0.1

misc.injury.fire.slight: 5
misc.injury.fire.serious: 20
misc.injury.fire.critical: 100

misc.injury.fire.multiplier.ambulance: 1
misc.injury.fire.multiplier.police: 1
misc.injury.fire.multiplier.fire: 0.2

# Damage progression
misc.injury.collapse.k: 0.00025
misc.injury.collapse.l: 0.01
misc.injury.collapse.noise.mean: 0.1
misc.injury.collapse.noise.sd: 0.01

misc.injury.bury.k: 0.000035
misc.injury.bury.l: 0.01
misc.injury.bury.noise.mean: 0.1
misc.injury.bury.noise.sd: 0.01
```

```
misc.injury.fire.k: 0.00025
misc.injury.fire.l: 0.03
misc.injury.fire.noise.mean: 0.1
misc.injury.fire.noise.sd: 0.01
```

A.9   clear.cfg

```
# The road clear rate in square meters per timestep per police force
clear.repair.rate: 10
```

A.10   ignition.cfg

```
# The lambda value of the Poisson distribution used to choose how many fires
   to ignite per timestep
ignition.random.lambda: 0.1
```

A.11   traffic3.cfg

A.12   civilian.cfg

```
# The probability that a buried civilian will call for help
civilian.help.probability : 0.1
# The probability that a damaged civilian will call for help
civilian.ouch.probability : 0.1
# Civilians with HP less than this threshold will not call for help
civilian.conscious.threshold : 2500
```

A.13   gis.cfg

```
# The map directory to read
gis.map.dir : ../maps/gml/test


# Optional: The map file to read. Defaults to map.gml
gis.map.file : map.gml
# Optional: The scenario file to read. Defaults to scenario.xml
gis.map.scenario : scenario.xml
```

A.14   logviewer.cfg

```
log.viewers : rescuecore2.standard.view.StandardWorldModelViewer
```

A.15   types.cfg

```
# Where to look for jars that might contain factories, gis, perception,
   communication, agents, simulators, viewers.
loadabletypes.inspect.dir: ../jars
# Whether to inspect jars for likely-looking class names. If false (or "no")
   then only the manifest will be read. If true (or "yes") then all classes in
    the jar will be tested to see if they are implementations of the various
   interfaces.
loadabletypes.inspect.deep: yes
```

A.16 viewer.cfg

```
view.standard.human.icons.size: 24
view.standard.human.icons.use: no
```