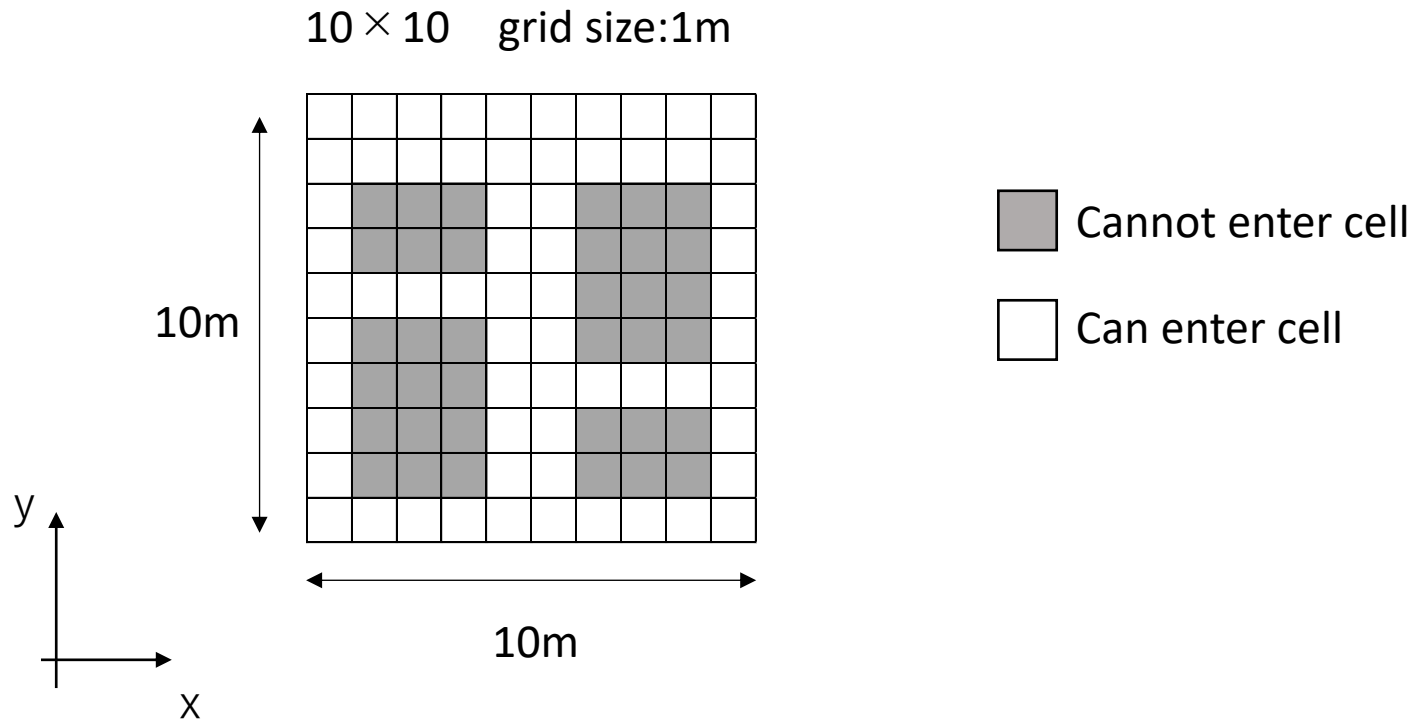


## Agent tutorial

### Calculation case

- calc (searching shortest route)
- calc-danger (searching route avoiding tsunami inundation)
- WP (calculation to write shelter potential)
- RP (calculation to read shelter potential)

### Test case



calc

## Making input data

Required files to execute Multi-agent

Input data

- move\_boundary.inp (entry permission data)
  - shelter.inp (shelter data)
  - agent.inp (evacuee data)
  - namelist.inp (condition data)
  - .ma file (STOC output data)
- 
- execute file(.sh) or execute command

## move\_boundary.inp (entry permission data)

0: non-accessible cell

-1: accessible cell

First line has to start from “#”

```
#
0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0
0 -1 -1 -1 0 0 0 -1 -1 -1 0
0 -1 -1 -1 0 0 0 -1 -1 -1 0
0 0 0 0 0 0 0 -1 -1 -1 0
0 -1 -1 -1 0 0 0 -1 -1 -1 0
0 -1 -1 -1 0 0 0 0 0 0 0
0 -1 -1 -1 0 0 0 -1 -1 -1 0
0 -1 -1 -1 0 0 0 -1 -1 -1 0
0 0 0 0 0 0 0 0 0 0 0
```

【 ! 】 Because of the large area of real terrain,  
there are other ways to create it.

## • shelter.inp (shelter data)

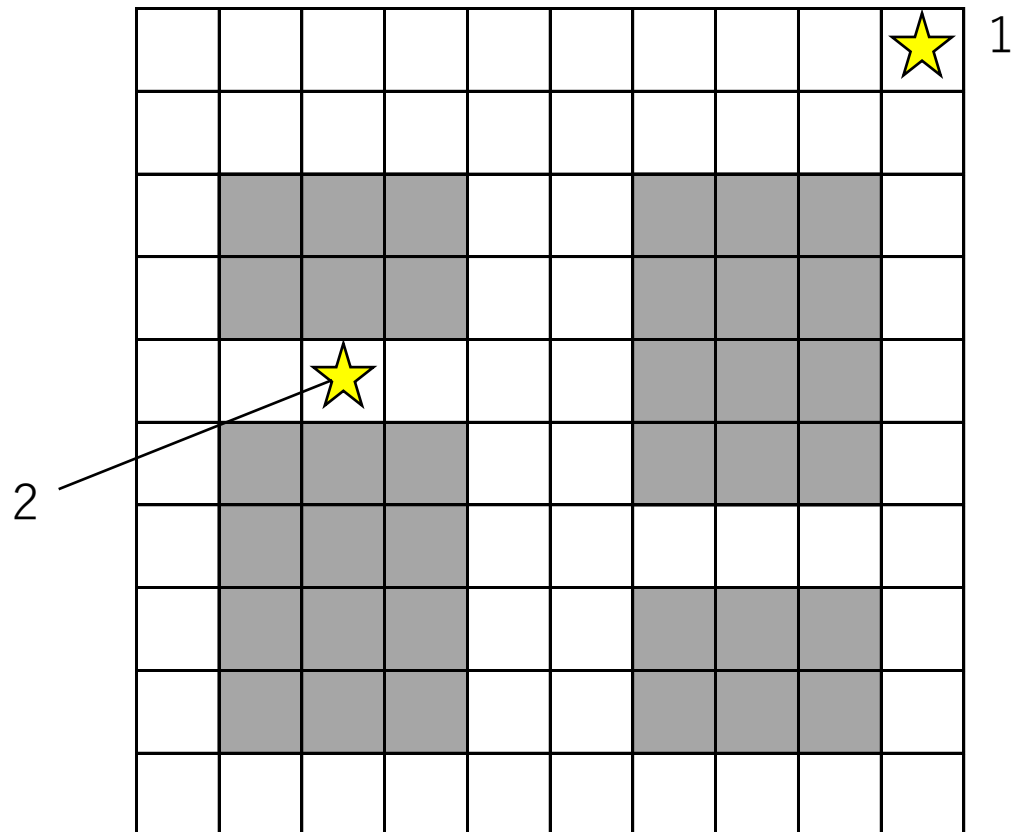
Describe one shelter information per line

From left to right,

- index
- cell number of x-direction
- cell number of y-direction
- Height in z direction (height from elevation at that point)

```
#N, i, j  
1, 10, 10, 100  
2, 3, 6, 100
```

First line has to start from “#”



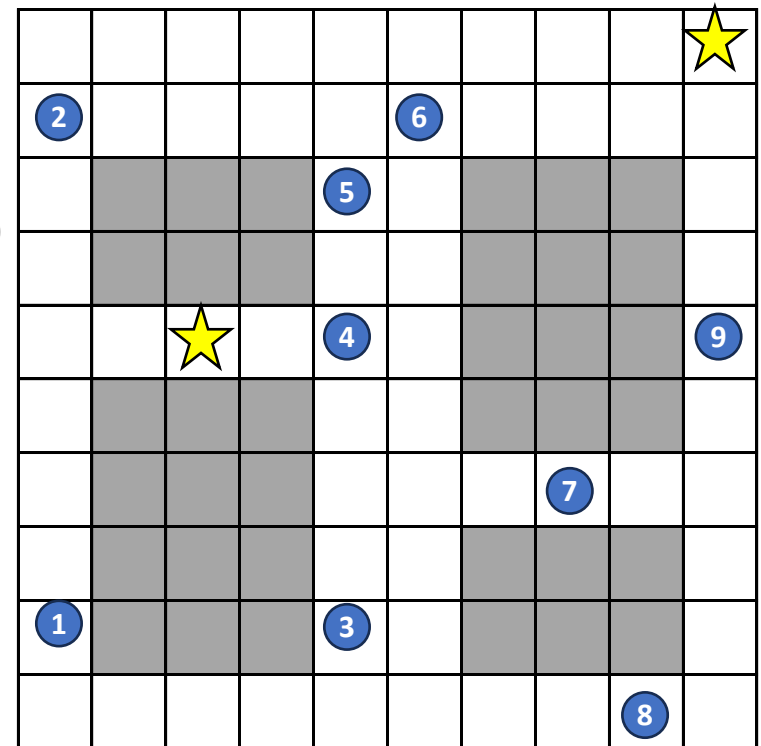
### Agent.inp (evacuee data)

From left to right,

- index
- first x coordinate[m]
- first y coordinate[m]
- basic moving speed[m/s]
- dead determined water depth[m]
- Standard deviation of the direction-of-travel uncertainty[deg]
- Probability of following a signpost (0.0~1.0)
- Evacuation shelter potential weights (0.0以上)
- Weight of mob potential (0.0以上)
- evacuation start time [s]

First line has to start from “#”

	i0	i1	i2	i3	i4	i5	i6	i7	i8		
1	#	N,	Y0,	V,	deadline,	rw_sigma,	W_sigma,	post,	W_shelter,	W_mod,	starttime
2	1,	0.5,	1.5,	1.00,	0.3,	0.000000.00,	0.000000.00,	0.000000.00,	0.000000.00,	0.000000.00,	
3	2,	0.5,	0.5,	1.00,	0.3,	0.000000.00,	0.000000.00,	0.000000.00,	0.000000.00,	0.000000.00,	
4	3,	4.5,	1.5,	1.00,	0.3,	0.000000.00,	0.000000.00,	0.000000.00,	0.000000.00,	0.000000.00,	
5	4,	4.5,	5.5,	1.00,	0.3,	0.000000.00,	0.000000.00,	0.000000.00,	0.000000.00,	0.000000.00,	
6	5,	4.5,	7.5,	1.00,	0.3,	0.000000.00,	0.000000.00,	0.000000.00,	0.000000.00,	0.000000.00,	
7	6,	5.5,	8.5,	1.00,	0.3,	0.000000.00,	0.000000.00,	0.000000.00,	0.000000.00,	0.000000.00,	
8	7,	7.5,	3.5,	1.00,	0.3,	0.000000.00,	0.000000.00,	0.000000.00,	0.000000.00,	0.000000.00,	
9	8,	8.5,	0.5,	1.00,	0.3,	0.000000.00,	0.000000.00,	0.000000.00,	0.000000.00,	0.000000.00,	
10	9,	9.5,	5.5,	1.00,	0.3,	0.000000.00,	0.000000.00,	0.000000.00,	0.000000.00,	0.000000.00,	[EOF]



【！】 If there are many evacuees in the local terrain, there is a program for creating

## • namelist.inp (condition file)

```
1 |&time|
2 |uustep=999999|
3 |uustart=0.0|
4 |uustop=20.00|
5 |uudt=0.5|
6 |/|
7 |&agent|
8 |uun_rw=0|
9 |uurw_dt=0|
10 |uun_slope=1|
11 |/|
12 |&potential|
13 |uuxpin=0|
14 |uuypin=0|
15 |uupmax=10|
16 |uujpmax=10|
17 |uudxy=1|
18 |uun_signpost=0|
19 |uun_shelter=2|
20 |uun_mob=0|
21 |uur_mob=0|
22 |/|
23 |&flag|
24 |uuflag_WP=0|
25 |uuflag_RP=0|
26 |uuflag_danger=0|
27 |uuflag_prob=0|
28 |/|
29 |&output|
30 |uout_start=0.0|
31 |uout_end=20.0|
32 |uout_interval=0.5|
33 |/|
34 |&offline|
35 |uunregion=1|
36 |uufile="./tutorial.ma"|
37 |/|
[EOF]
```

end : calculation end time  
dt : time step

xpin,ypin : original coordinates  
lpmax,jpmax : x/y number of cells  
dxy : cell size (m)  
n\_shelter : number of shelters

flag\_WP : flag of writing shelter potential  
flag\_RP : flag of reading shelter potential

file : .ma file directory

## • .sh (execute file)

```
#!/bin/sh↓
#PBS-q C064↓
#PBS-P tchuo↓
#PBS-N agent_fkt↓
#PBS-l select=1:mpiprocs=1↓
#PBS-o outfile↓
#PBS-e errfile↓
#PBS-V↓
↓
export I_MPI_HYDRA_COLLECTIVE_LAUNCH=1↓
↓
cd ${PBS_O_WORKDIR} ↓
date>lp↓
mpiexec.hydra -np 1 /lustre1/home1/zshonda/03.program/privatecode/11.fukuto/agent/agent_ver3.3/ma.out↓
date>>lp[EOF]
```

-N job name  
-l select : number of nodes  
mpiprocs : number of cores per node

-np [number of parallels] [executable file path]

【 ! 】 agent is basically parallel-free (intra-node parallelism is possible with ver3.5\_omp)

【 ! 】 Need to write in a way that fits the scheduler

## • When the scheduler is not used

Execute the following on the command line

```
cd [inputfile directory]
[executable file path] -np 1
```

【 ! 】 ctrl+c : stop calculation



**calc-danger**

## calc-danger

Required files to execute Multi-agent

Input data

- move\_boundary.inp (entry permission data)
  - shelter.inp (shelter data)
  - agent.inp (evacuee data)
  - namelist.inp (condition data)
  - .ma file (STOC output data) → modify OnOff flag
  - **danger.inp (for method of searching route avoiding tsunami)**
- 
- execute file(.sh) or execute command

- modify namelist.inp

```
1 &time ←
2 uu_maxstepu=0999999 ←
3 uu_startuuu=00.0 ←
4 uu_enduuuuu=020.00 ←
5 uu_dtuuuuu=00.5 ←
6 / ←
7 &agent ←
8 uu_n_rwuuuuuuu=0 ←
9 uu_rw_dtuuuuuu=0 ←
10 uu_n_slopeuuuu=1 ←
11 / ←
12 &potential ←
13 uu_xpinuuuuuu=0 ←
14 uu_ypinuuuuuu=0 ←
15 uu_ipmaxuuuuu=10 ←
16 uu_jpmaxuuuuu=10 ←
17 uu_dxyuuuuuu=1 ←
18 uu_n_signpostu=0 ←
19 uu_n_shelteruu=2 ←
20 uu_n_mobuuuuuu=0 ←
21 uu_r_mobuuuuuu=0 ←
22 / ←
23 &flag ←
24 uu_flag_WPuuuuu=0 ←
25 uu_flag_BPuuuuu=0 ←
26 uu_flag_dangeru=1 ←
27 uu_flag_probuuu=0 ←
28 / ←
29 &danger ←
30 uu_danger_pathu="./danger.inp" ←
31 / ←
32 &output ←
33 uu_out_startuuuu=00.0 ←
34 uu_out_enduuuuuu=020.0 ←
35 uu_out_intervalu=00.5 ←
36 / ←
37 &offline ←
38 uu_nregionu=1 ←
39 uu_fileu="tutorial.ma" ←
40 / ←
[EOF]
```

flag\_danger : flag of searching route avoiding tsunami  
→1(On)

Add danger section

danger\_path : tsunami arrived time file path

- danger.inp (tsunai arrived time file)

Describes tsunami arrival time for each cell ✖ not required “#”

[illegible]

**WP**

## WP (calculate to write shelter potential)

Agent's calculation flow

Read input file



Calculate potential shelter ⇒ takes the most time



Time integration (evacuees move)

→ In real field calculations, only the potential for each shelter is often done first.

✕ To make multiple-case calculations with different parameters more efficient

## • namelist.inp (condition file)

```
1 &time ←
2 uu_maxstepu=0999999 ←
3 uu_startuuu=00.0 ←
4 uu_enduuuuu=20.00 ←
5 uu_dtuuuuuu=0.5 ←
6 / ←
7 &agent ←
8 uu_n_rwuuuuuuuu=0 ←
9 uu_rw_dtuuuuuuuu=0 ←
10 uu_n_slopeuuuuu=1 ←
11 / ←
12 &potential ←
13 uu_xpinuuuuuuuu=0 ←
14 uu_ypinuuuuuuu=0 ←
15 uu_ipmaxuuuuuu=10 ←
16 uu_jpmaxuuuuuu=10 ←
17 uu_dxyuuuuuuuu=1 ←
18 uu_n_signpostu=0 ←
19 uu_n_shelteruu=2 ←
20 uu_n_mobuuuuuu=0 ←
21 uu_r_mobuuuuuu=0 ←
22 / ←
23 &flag ←
24 uu_flag_WPuuuuu=1 ←
25 uu_flag_RPuuuuu=0 ←
26 uu_flag_dangeru=0 ←
27 uu_flag_probuuu=0 ←
28 / ←
29 &output ←
30 uu_out_startuuuu=00.0 ←
31 uu_out_enduuuuuu=20.0 ←
32 uu_out_intervalu=0.5 ←
33 / ←
34 &offline ←
35 uu_nregionu=01 ←
36 uu_fileu=0"/tutorial.ma" ←
37 / ←
[EOF]
```

flag\_danger : flag of writing shelter potential  
→1(On)

**RP**



## RP

Required files to execute Multi-agent

Input data

- move\_boundary.inp (entry permission data)
  - shelter.inp (shelter data)
  - agent.inp (evacuee data)
  - namelist.inp (condition data)
  - .ma file (STOC output data) → modify OnOff flag
  - **shelter potential files(000.txt, 001.txt)** → output file by case WP
- 
- execute file(.sh) or execute command

- **namelist.inp** (condition file)

```
1 &time
2  uumaxstep=999999
3  uustart=0.0
4  uuend=20.00
5  uudt=1.0
6  /
7 &agent
8  uun_rw=0
9  uunw_dt=0
10 uun_slope=1
11 uagent_start=0
12 /
13 &potential
14 uuxpin=0
15 uuypin=0
16 uuiymax=10
17 uuijymax=10
18 uudxy=1
19 uun_signpost=0
20 uun_shelter=2
21 uun_mob=0
22 uunr_mob=0
23 /
24 &flag
25 uuflag_WP=0
26 uuflag_RP=1
27 uuflag_danger=0
28 uuflag_prob=0
29 /
30 &danger
31 udanger_path="../danger.inp"
32 /
33 &prob
34 uunini_prob=1
35 uunrelaxation_rate=1
36 uunsunami_prob_directory=""
37 uunpot_directory=""
38 /
39 &output
40 uout_start=0.0
41 uout_end=20.0
42 uout_interval=1.0
43 /
44 &offline
45 uunregion=1
46 uunfile="../test.ma"
47 /
```

flag\_RP : flag of reading shelter potential(1=ON 0=OFF)

→ON = 1

## **Visualization**

CADMASVR is used for visualization

**Files required for visualization**

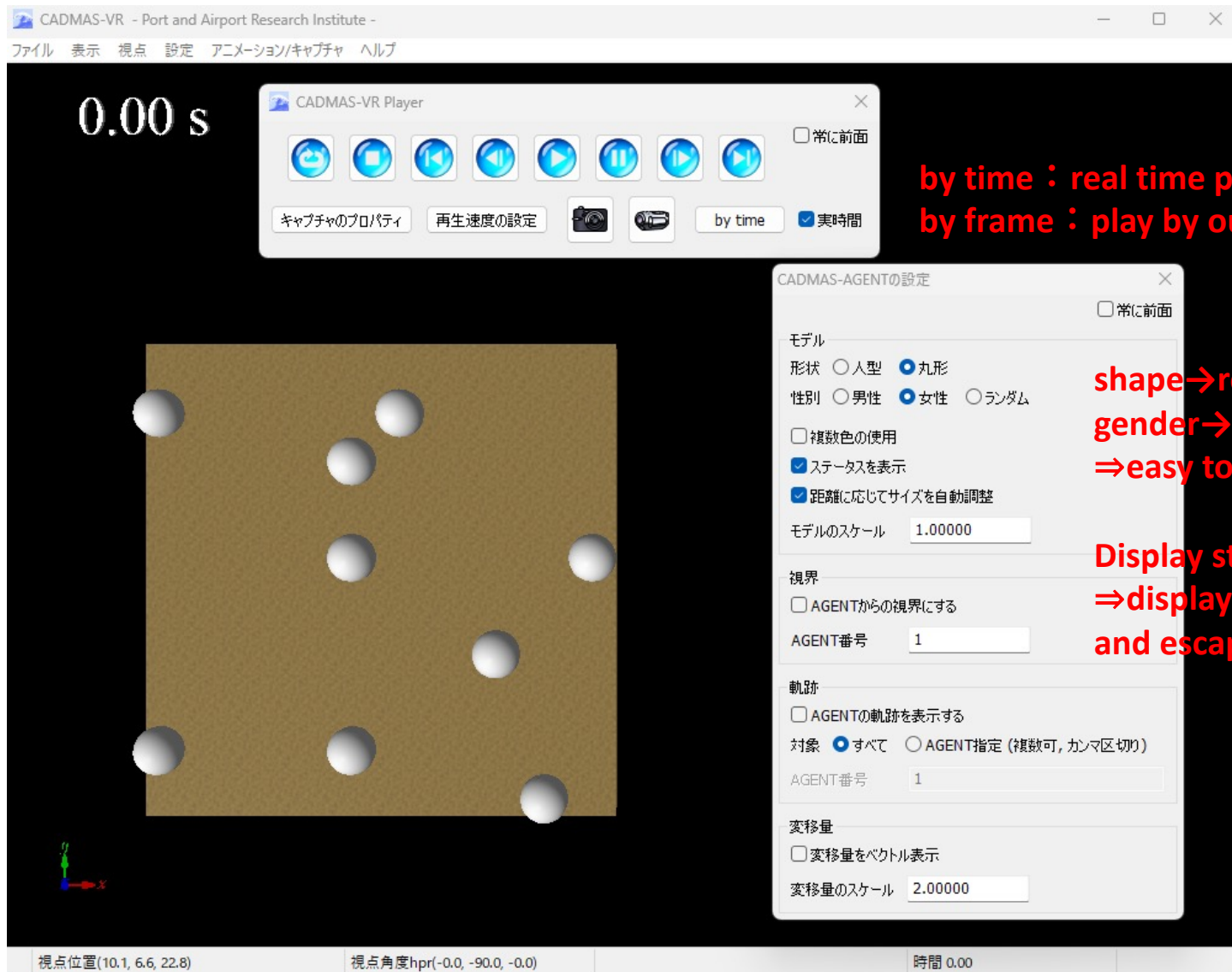
.grp file (STOC output file)

agent.out (agent output file)

【 ! 】 Simple operating instructions are provided in the agent manual

【 ! 】 All grp contents are described in the STOC manual

## • CADMAS-VR agent settings



by time : real time play  
by frame : play by output time

shape→round  
gender→female  
⇒easy to look

Display status  
⇒display status about dead  
and escaped