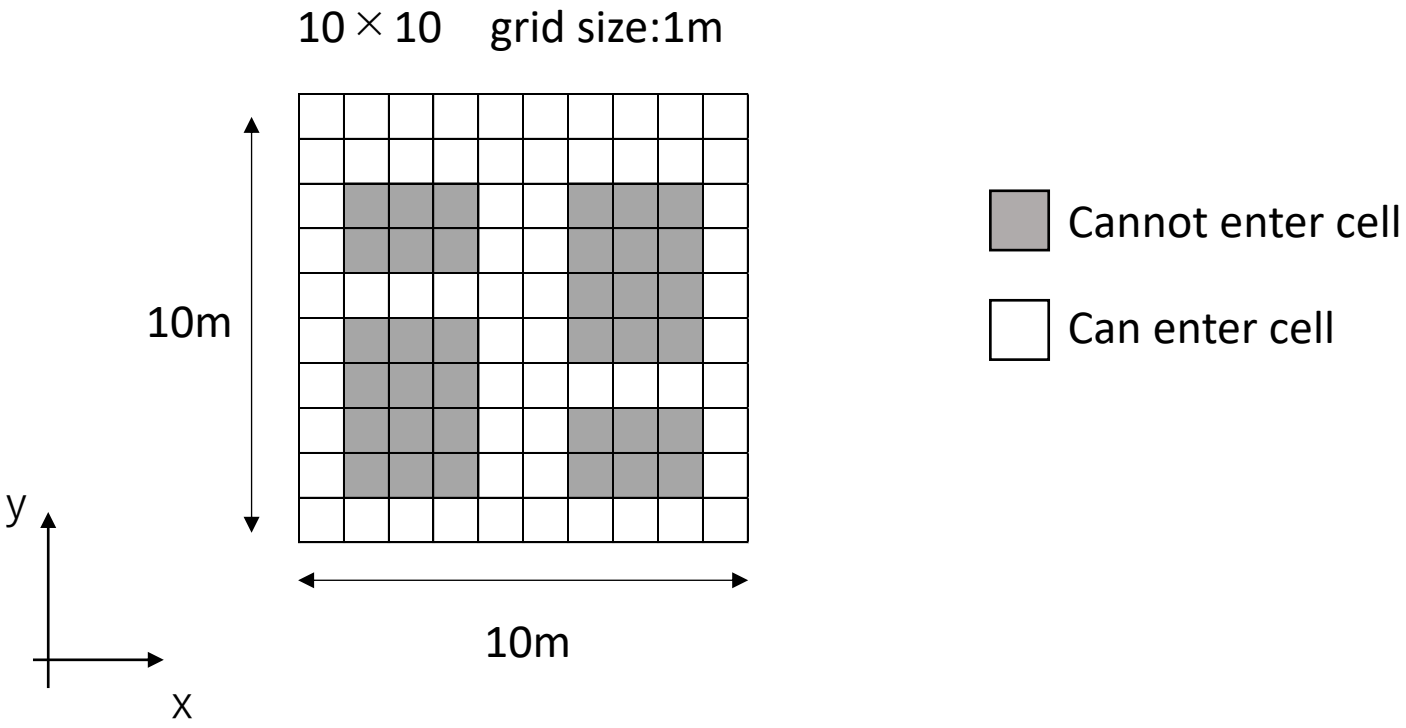
Agent tutorial

Calculation case

- calc（searching shortest route）
- calc-danger（searching route avoiding tsunami inundaiton）

- 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

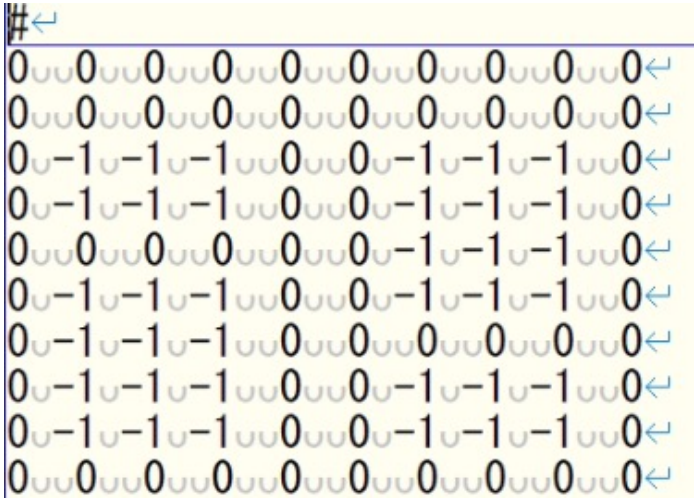
- move_boundary.inp（entry permission data）
- shelter.inp（shelter data）
- agent.inp（evacuee data）
- namelist.inp（condition data）
- .ma file（STOC output data）

- 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 “#”



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

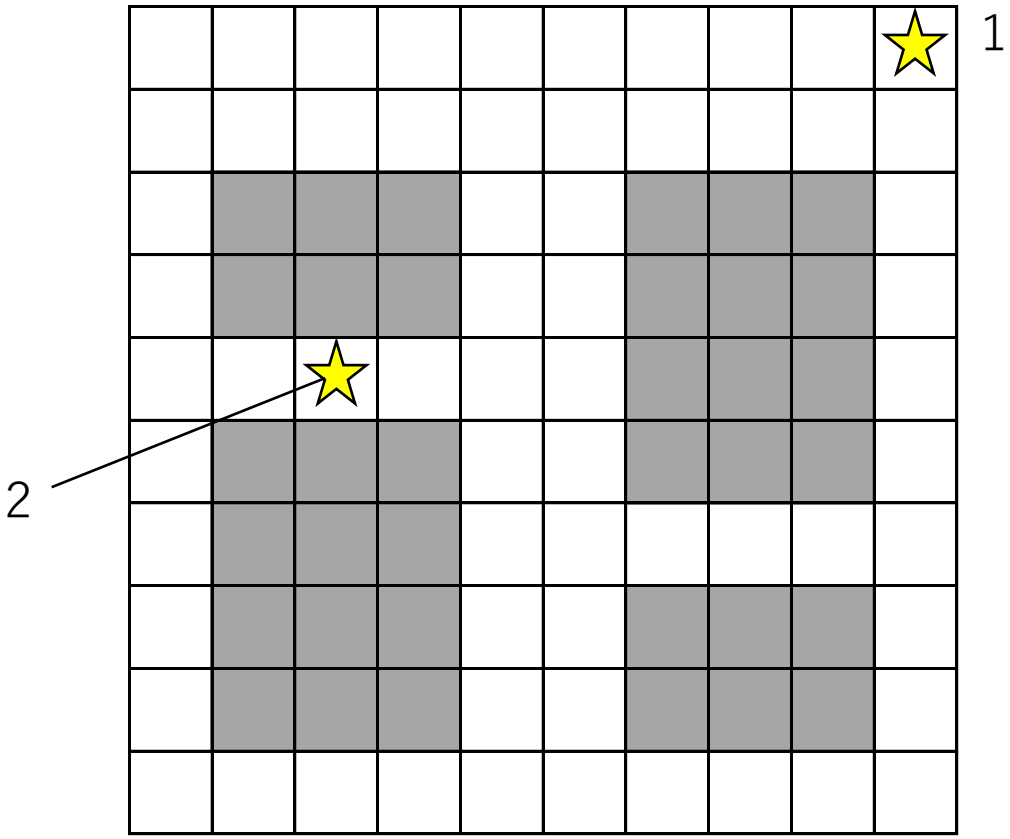
・shelter.inp（shelter data）

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 “#”



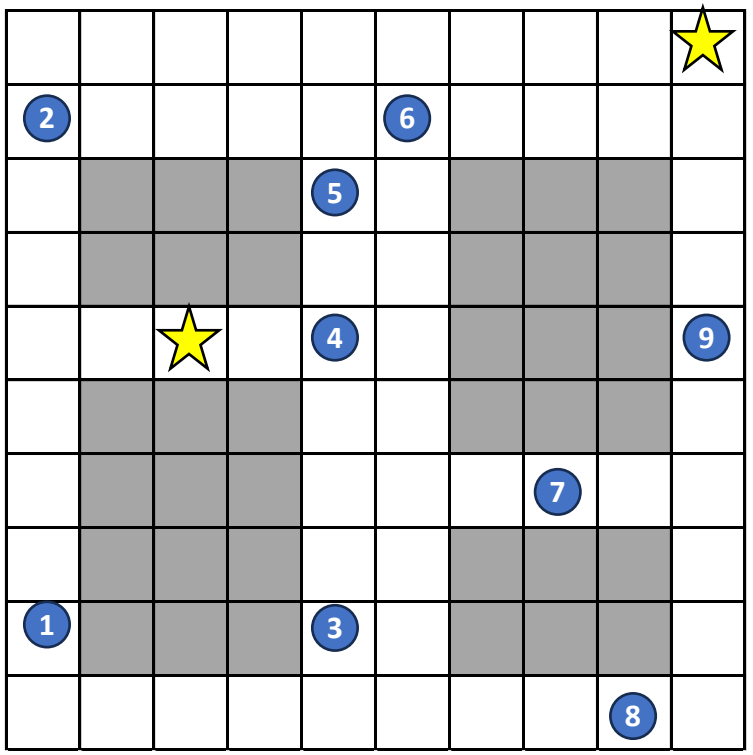
Agent.inp（evacuee data）

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 “#”

```
#,N,X0,Y0,V,deadline,rw_sigma,W_signpost,W_shelter,W_mod,starttime
1,0.5,1.5,1.00,0.3,0.00,1.00,1.00,0.00,0.0
2,0.5,8.5,1.00,0.3,0.00,1.00,1.00,0.00,0.0
3,4.5,1.5,1.00,0.3,0.00,1.00,1.00,0.00,0.0
4,4.5,5.5,1.00,0.3,0.00,1.00,1.00,0.00,0.0
5,4.5,7.5,1.00,0.3,0.00,1.00,1.00,0.00,0.0
6,5.5,8.5,1.00,0.3,0.00,1.00,1.00,0.00,0.0
7,7.5,3.5,1.00,0.3,0.00,1.00,1.00,0.00,0.0
8,8.5,0.5,1.00,0.3,0.00,1.00,1.00,0.00,0.0
9,9.5,5.5,1.00,0.3,0.00,1.00,1.00,0.00,0.0[EOF]
```



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

・namelist.inp（condition file）

```
&time
  maxstep = 999999
  start   = 0.0
  end     = 20.00
  dt      = 0.5
/
&agent
  n_rw      = 0
  rw_dt     = 0
  n_slope   = 1
/
&potential
  xpin      = 0
  ypin      = 0
  ipmax     = 10
  jpmax     = 10
  dxy       = 1
  n_signpost= 0
  n_shelter = 2
  n_mob     = 0
  r_mob     = 0
/
&flag
  flag_WP   = 0
  flag_RP   = 0
  flag_danger= 0
  flag_prob = 0
/
&output
  out_start = 0.0
  out_end   = 20.0
  out_interval= 0.5
/
&offline
  nregion = 1
  file = "./tutorial.ma"
/
[EOF]
```

end：calculation end time
dt：time step

xpin,ypin：original coordinates
Ipmax,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

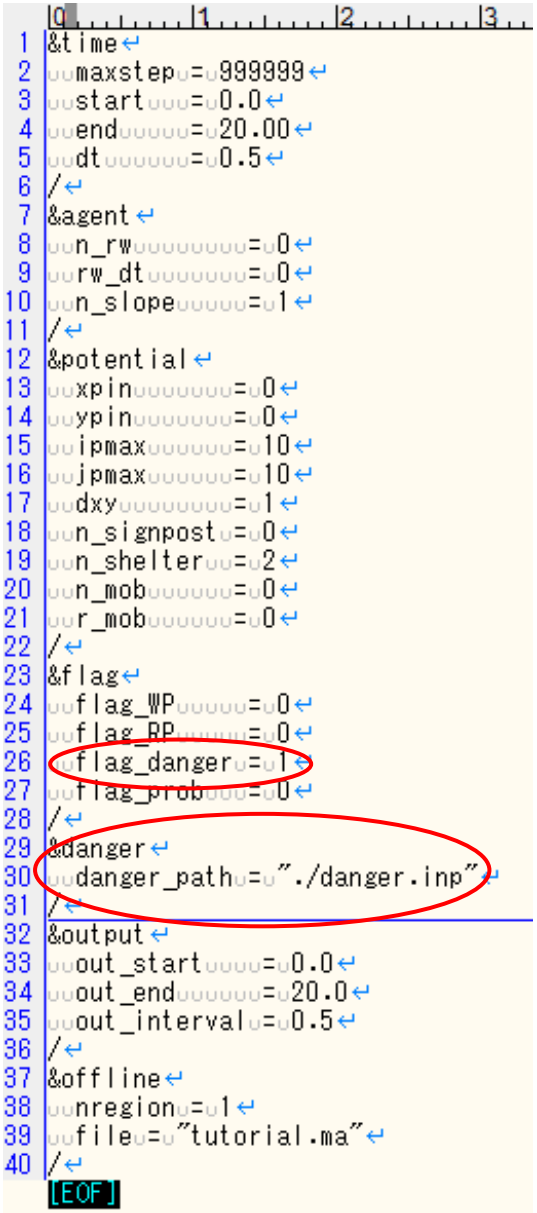
Required files to execute Multi-agent

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



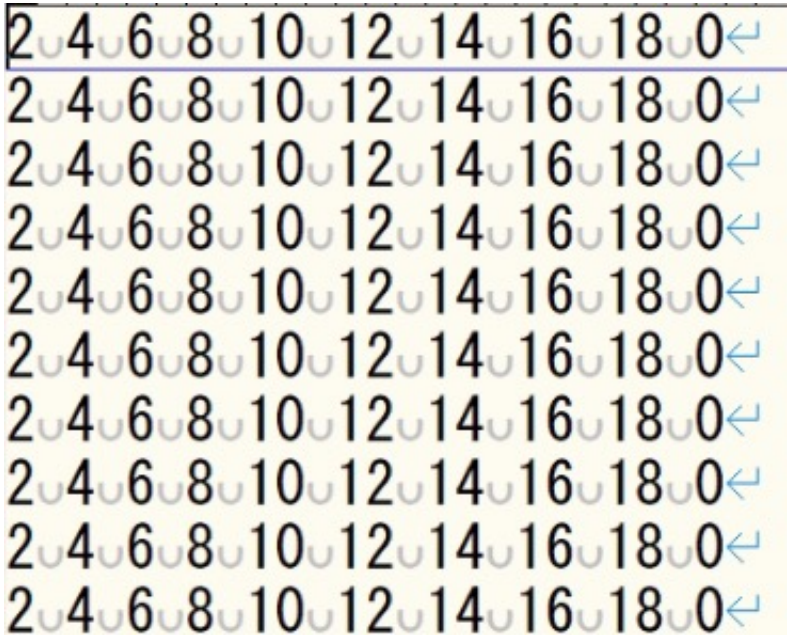
```
&time
  maxstep = 999999
  start   = 0.0
  end     = 20.00
  dt      = 0.5
/
&agent
  n_rw      = 0
  rw_dt     = 0
  n_slope   = 1
/
&potential
  xpin      = 0
  ypin      = 0
  ipmax     = 10
  jpmax     = 10
  dxy       = 1
  n_signpost= 0
  n_shelter = 2
  n_mob     = 0
  r_mob     = 0
/
&flag
  flag_WP   = 0
  flag_RP   = 0
  flag_danger = 1
  flag_prob   = 0
/
&danger
  danger_path = "./danger.inp"
/
&output
  out_start   = 0.0
  out_end     = 20.0
  out_interval= 0.5
/
&offline
  nregion = 1
  file = "tutorial.ma"
/
[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 “#”



WP

WP（calculate to write shelter potential）

Agent's calculation flow

Read input file

⇩

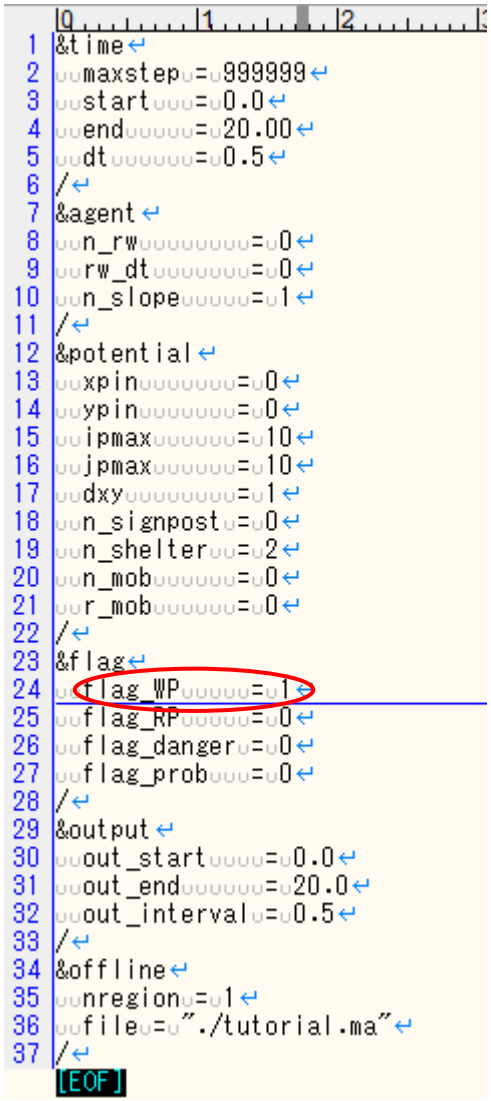
Calculate potential shelter　⇒takes the most time

⇩

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）



```
&time
  maxstep = 999999
  start   = 0.0
  end     = 20.00
  dt      = 0.5
/
&agent
  n_rw      = 0
  rw_dt     = 0
  n_slope   = 1
/
&potential
  xpin      = 0
  ypin      = 0
  ipmax     = 10
  jpmax     = 10
  dxy       = 1
  n_signpost= 0
  n_shelter = 2
  n_mob     = 0
  r_mob     = 0
/
&flag
  flag_WP   = 1
  flag_RP   = 0
  flag_danger= 0
  flag_prob = 0
/
&output
  out_start = 0.0
  out_end   = 20.0
  out_interval= 0.5
/
&offline
  nregion = 1
  file = "./tutorial.ma"
/
[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）

```
&time
  maxstep = 999999
  start   = 0.0
  end     = 20.00
  dt      = 1.0
/
&agent
  n_rw      = 0
  rw_dt     = 0
  n_slope   = 1
  agent_start = 0
/
&potential
  xpin      = 0
  ypin      = 0
  ipmax     = 10
  jpmax     = 10
  dxy       = 1
  n_signpost = 0
  n_shelter = 2
  n_mob     = 0
  r_mob     = 0
/
&flag
  flag_WP   = 0
  flag_RP   = 1
  flag_danger = 0
  flag_prob = 0
/
&danger
  danger_path = "../danger.inp"
/
&prob
  ini_prob          = 1
  relaxation_rate   = 1
  tsunami_prob_directory = ""
  n_pot_directory   = ""
/
&output
  out_start   = 0.0
  out_end     = 20.0
  out_interval = 1.0
/
&offline
  nregion = 1
  file = "../test.ma"
/
```

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

→ON＝1

Visualization

CADMASVR is used for visualization

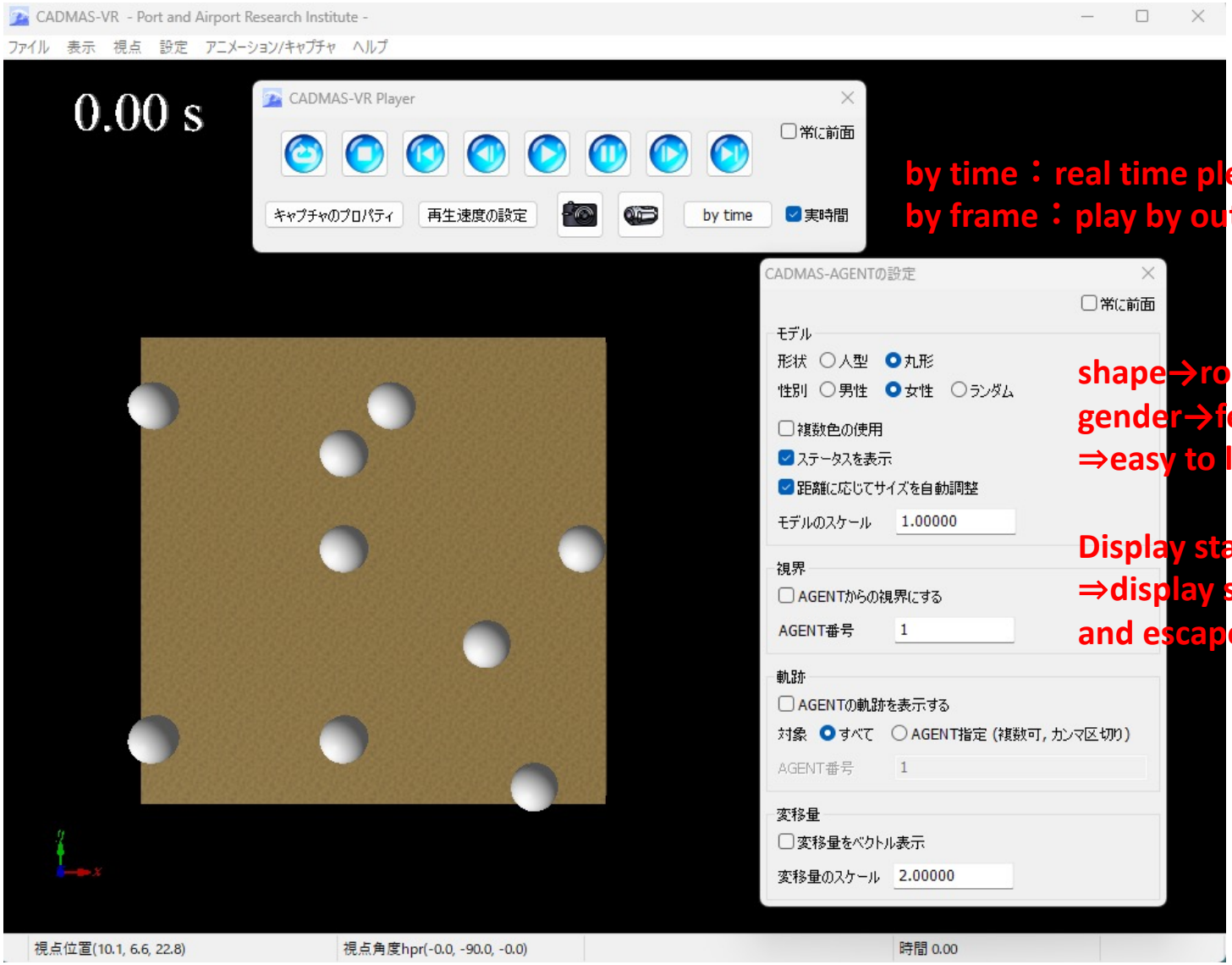
Files required for visualization

.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 pley
by frame：play by output time

shape→round
gender→female
⇒easy to look

Display status
⇒display status about dead and escaped