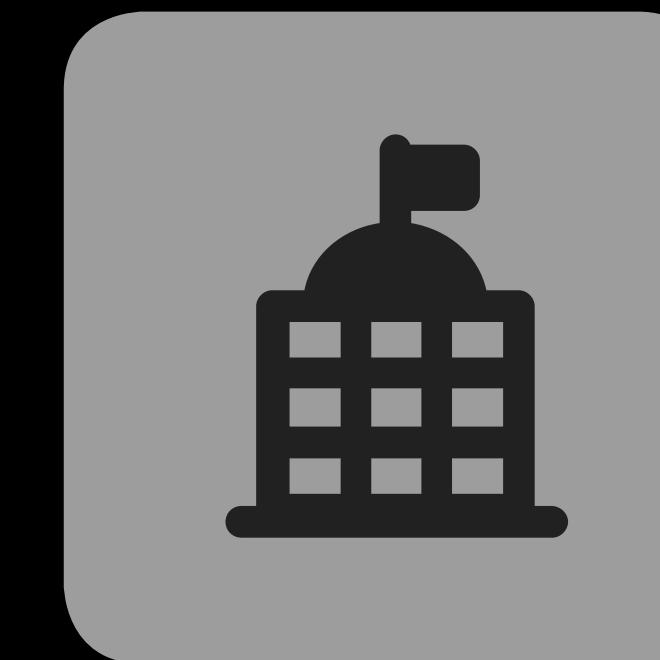
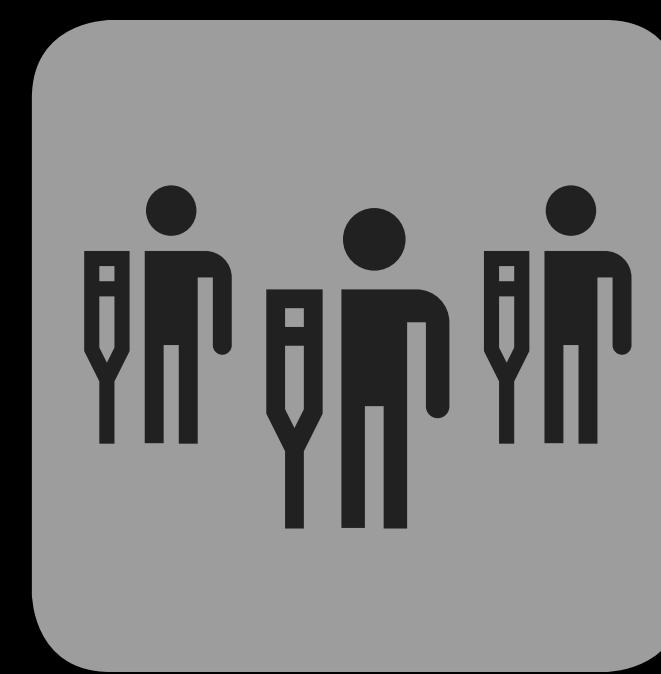


Doctor ASP

Brief

The MoH of Loanostan tasked Doctor ASP to help create a pilot ER service capable of quickly switching from a normal situation to a Mass Casualty Incidents (MCI). The pilot hospital is vulnerable to large surges, has limits of space and resources. Intervention is needed to address crowd control, communication, management and reaction to MCI. Doctor ASP needs to design an ER department that fulfills the need of all stakeholders.

Stakeholders



MCI

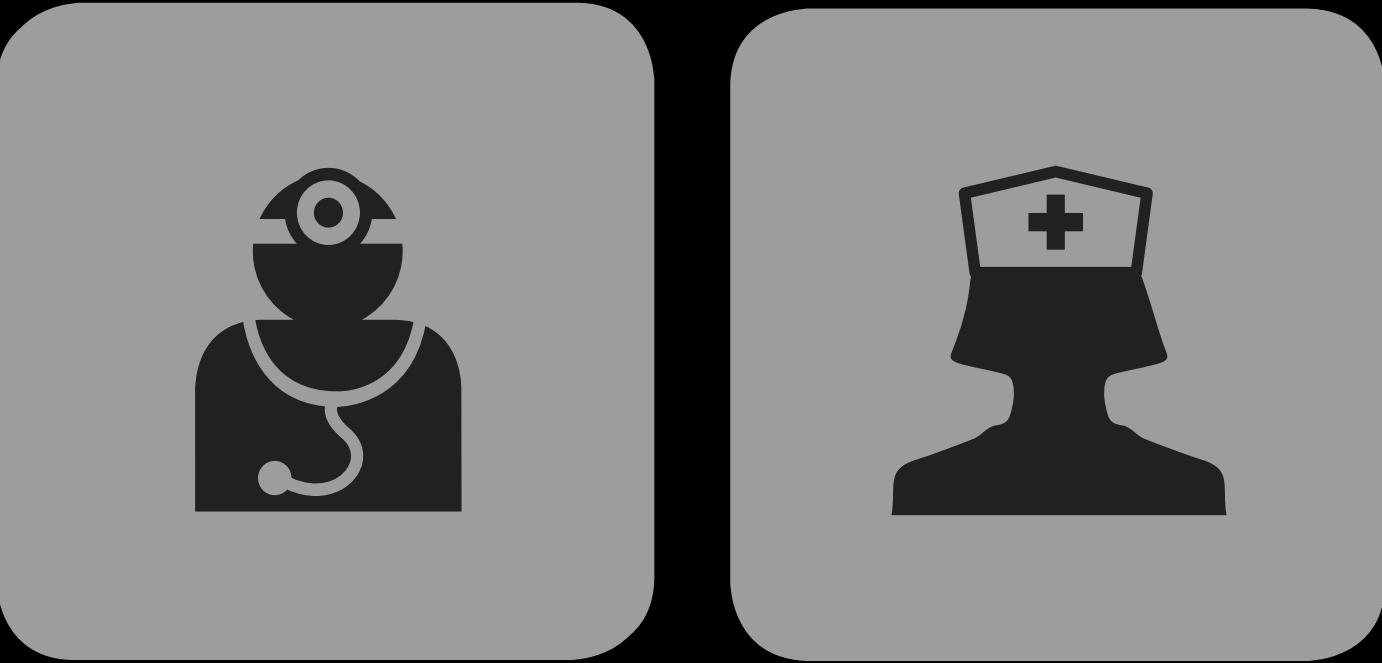


Which is the best way to communicate with ambulances and local authorities and how to rapidly notify hospital staff in case of a MCI ?



Needs

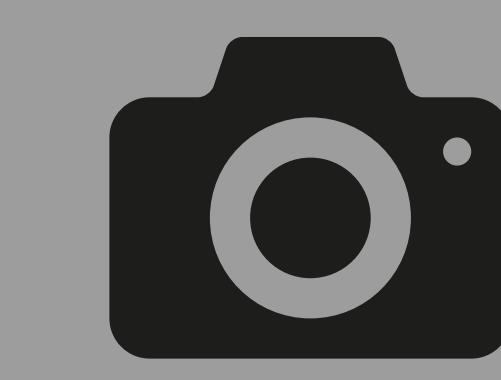
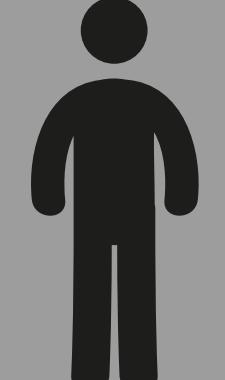
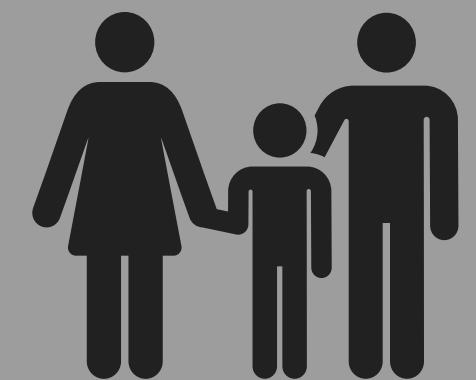
**Effective communication
with hospitals and local
authorities**

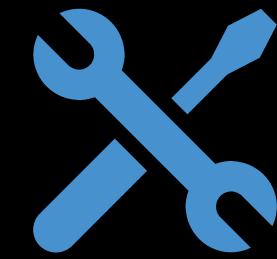


Requirements

**Being able to receive
concurrently 10 reports**

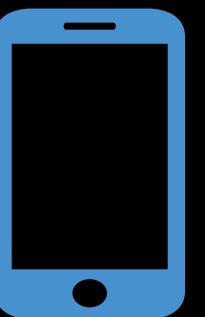
**Reduce internal communication
down to 1 minute**





Have a widespread and simple tool

- Develop a mobile application
- Drivers, staff and police use the app to achieve coordination based on real-time information on the MCI



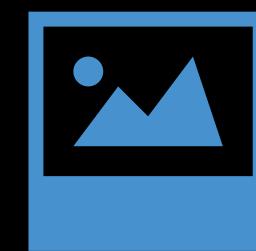
Wearable devices (also smartphones)

- Have an instrument to rapidly notify the staff about the occurrence of an MCI



Common area

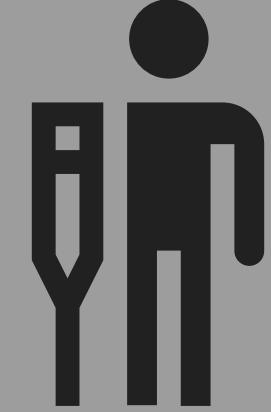
- Provide an information centre, psychological support with psychologists and social workers
- Provide basic commodities such as good phone signal and food and drinks



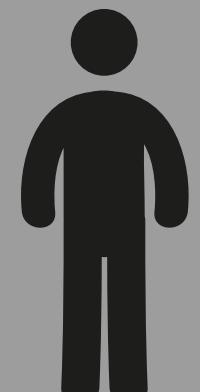
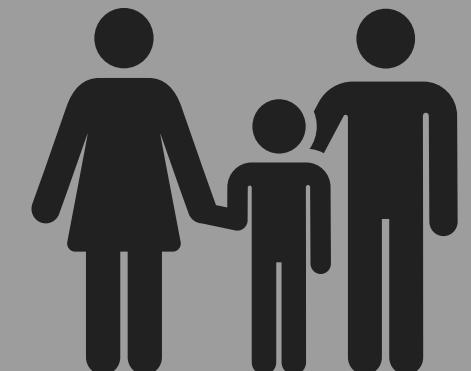
Take pictures to identify the patients

- Allow patients to be immediately recognizable by their relatives

How do you avoid traffic congestion
at the hospital entrance ?



Needs
Outside space management



Requirements

Max 60 people every 10 minutes for each entrance

Patient waiting time reduced by 75%

Avoid traffic congestion

Maximum of 5 staff member for each entrance



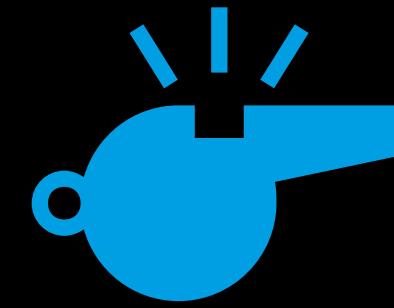
**Rerouting and use
of pathways that are
already present in the
hospital**

- Only one entrance to avoid misunderstandings
- One flow of people instead of multiple fluxes



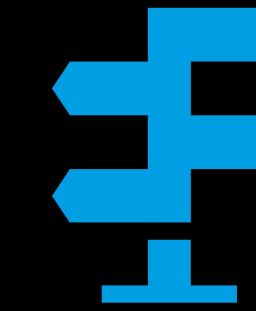
**Provide a communication
alert system with the
police after a few minutes
the MCI happens**

- Facilitate the influx to the hospital
- Block the road entrances



Staff members managing external traffic

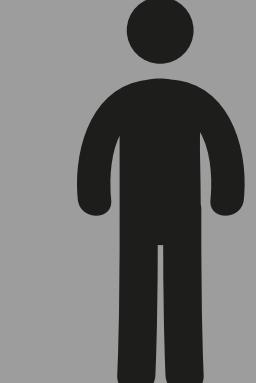
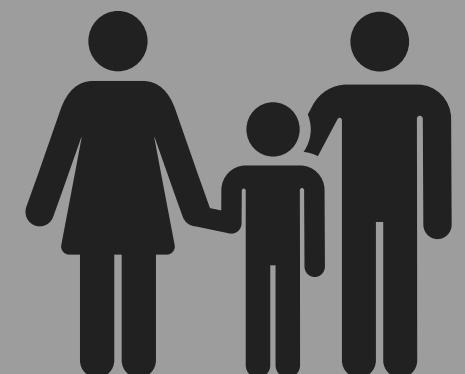
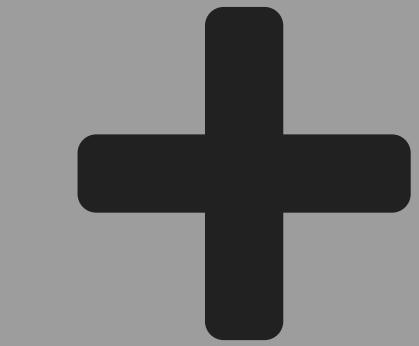
- Police might not be available due to MCI



Implement a better signaling system outside the building

- Road signs up to 2km away from the hospital
- Paint roads up to 1km away
- Decals up to 500m away

How to manage this huge influx of people
when it comes inside the hospital ?



Needs

Inside space management

Requirements

Guarantee 5 sqm pp in normal situation, 2.5 sqm in MCI, 30 sqm for triage

Make patients find the orientation in less than 30 seconds

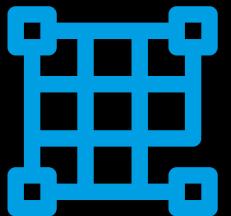
Max 10 people per 10 mins for each entrance

At least 50% of free space in corridors



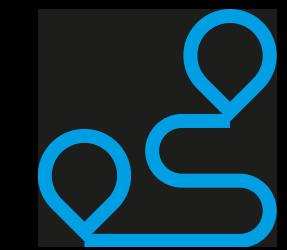
Limited number of objects in corridors

- Allow more space for movements of both medical staff and patients
- Easy to implement and cost effective



Modular optimized internal space

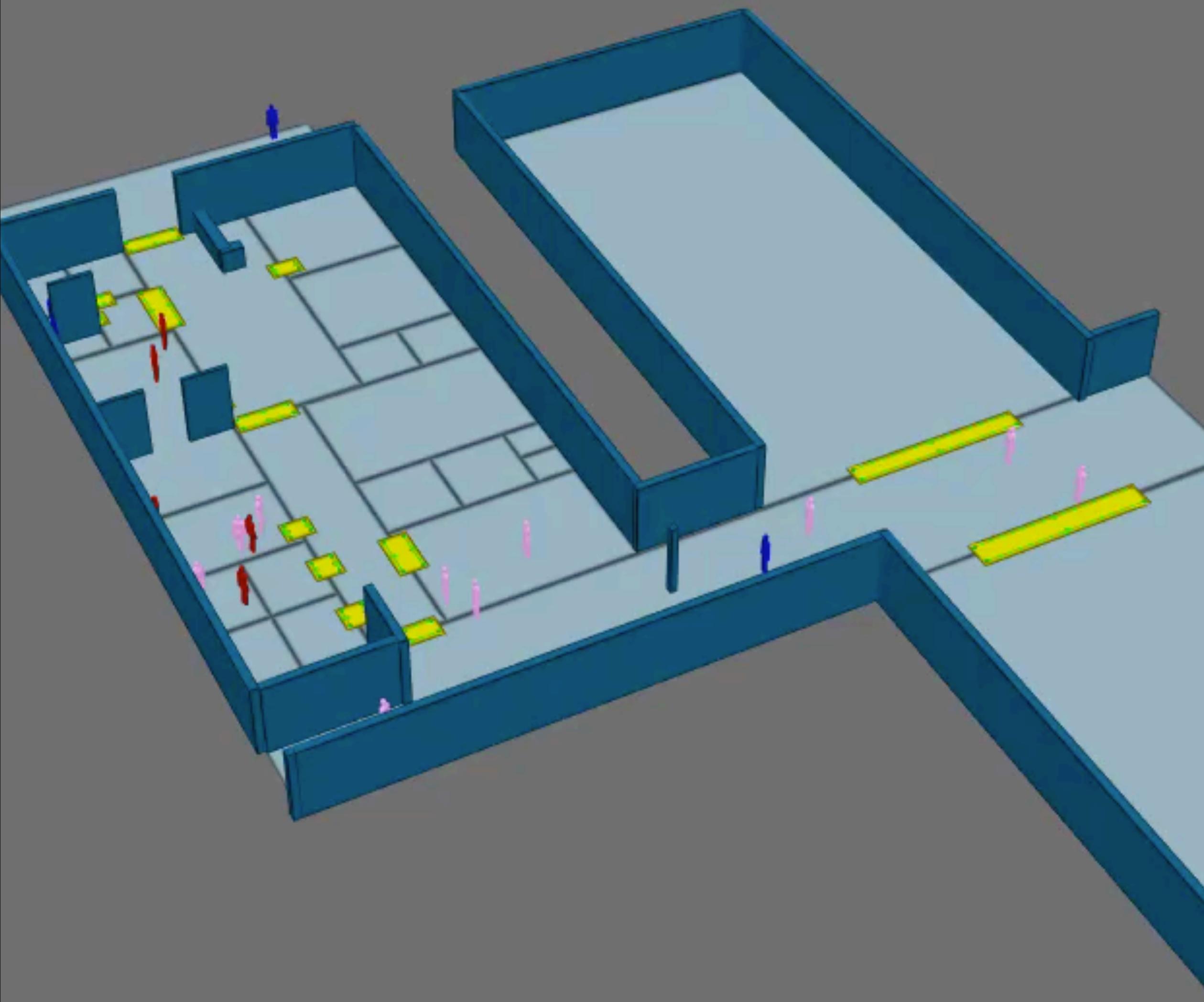
- Better circulation of people inside the structure
- Flexibility in organizing the spaces



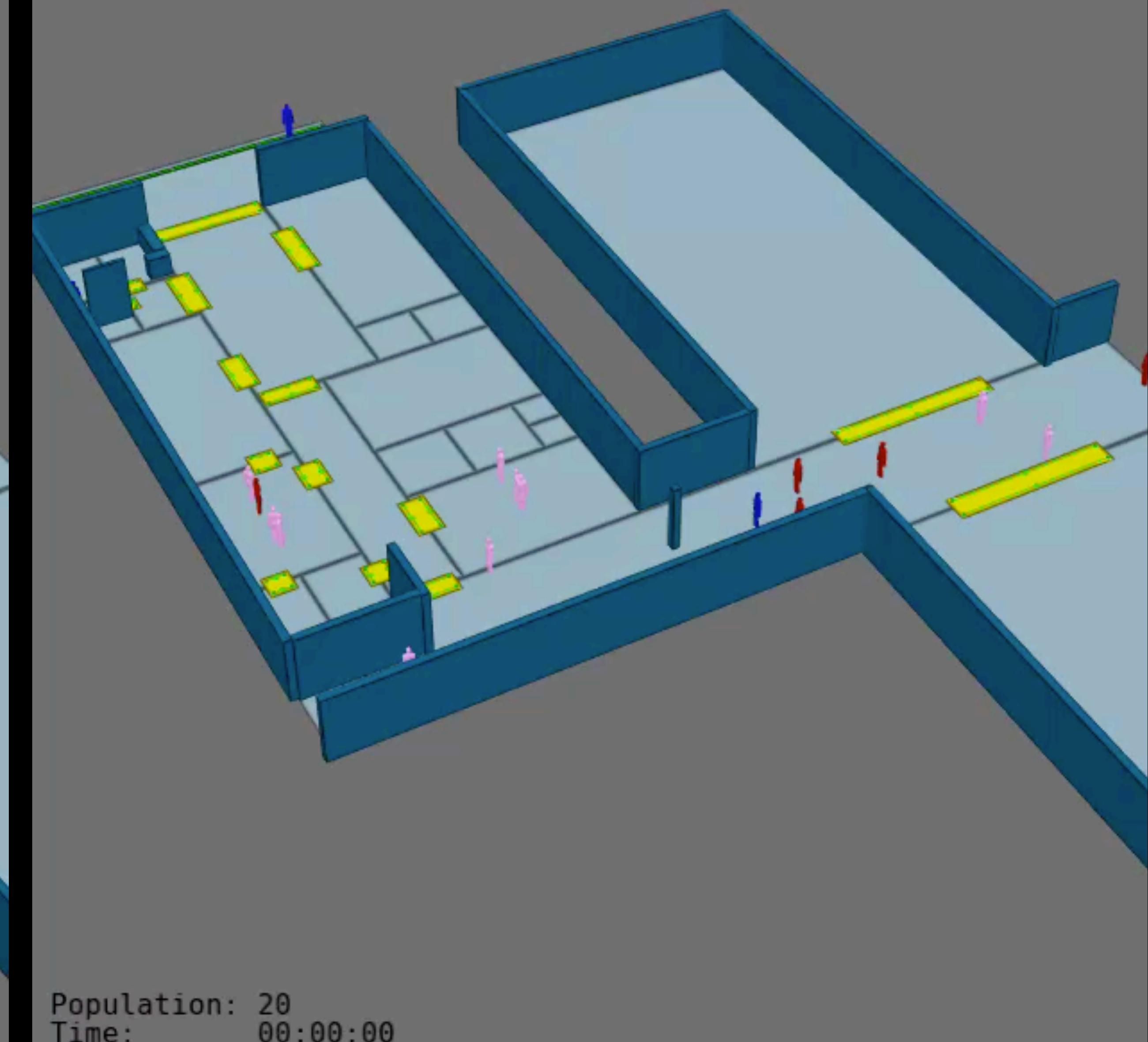
Fluorescent exit orienteering paths

- Easily installed fluorescent path to make exit orienteering efficient
- Reduced need of human intervention

Current

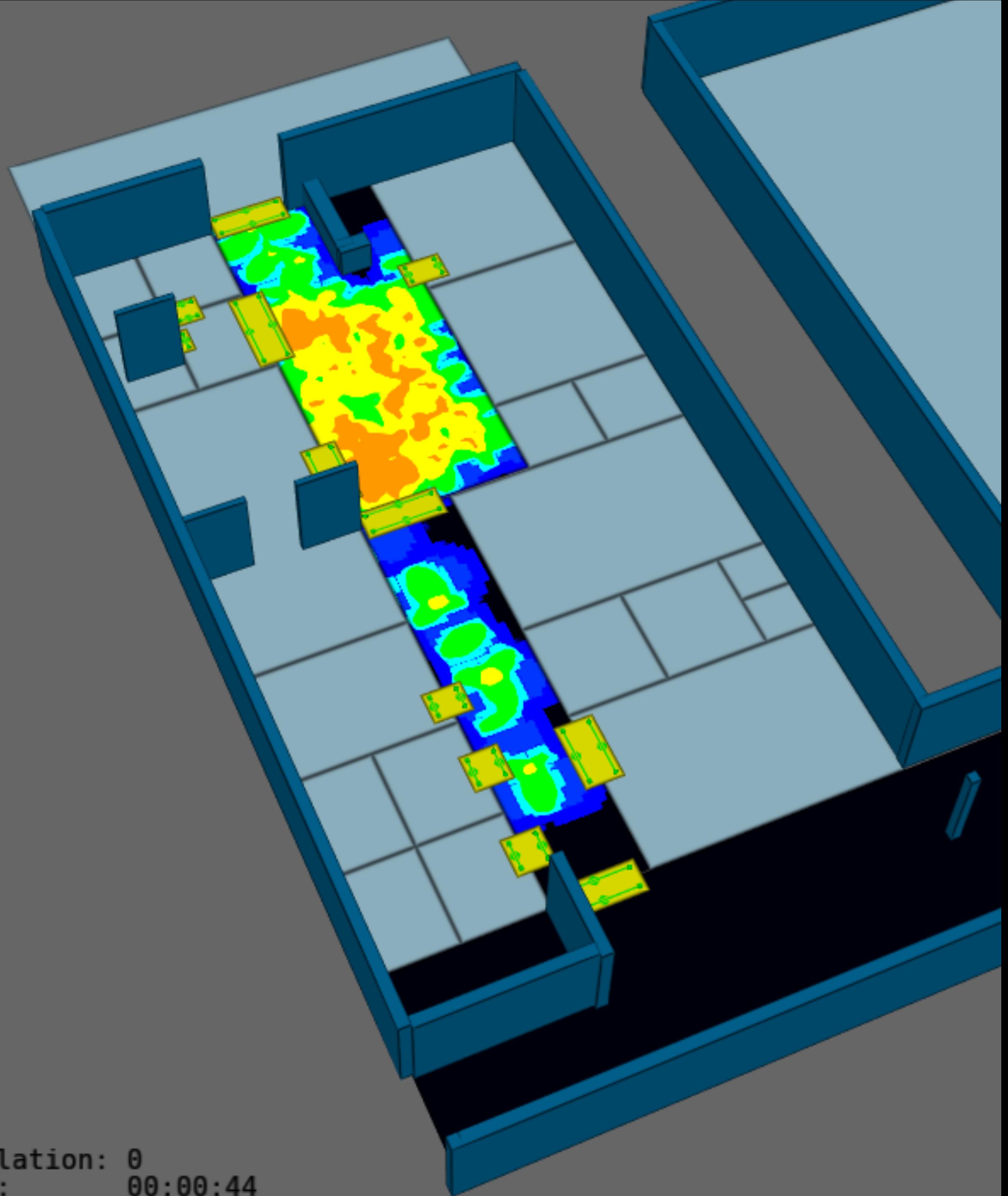


Proposal

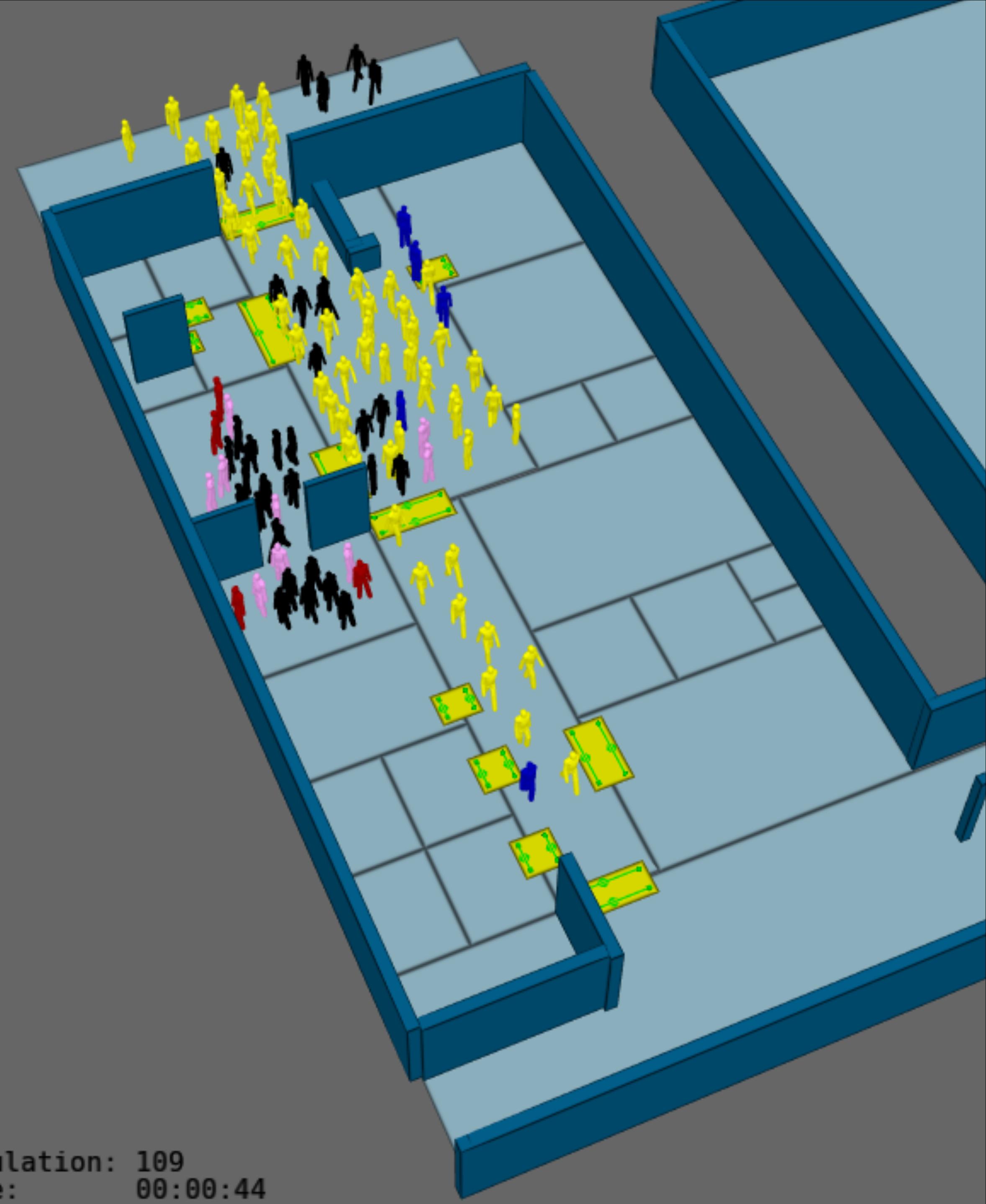


Population: 20
Time: 00:00:00

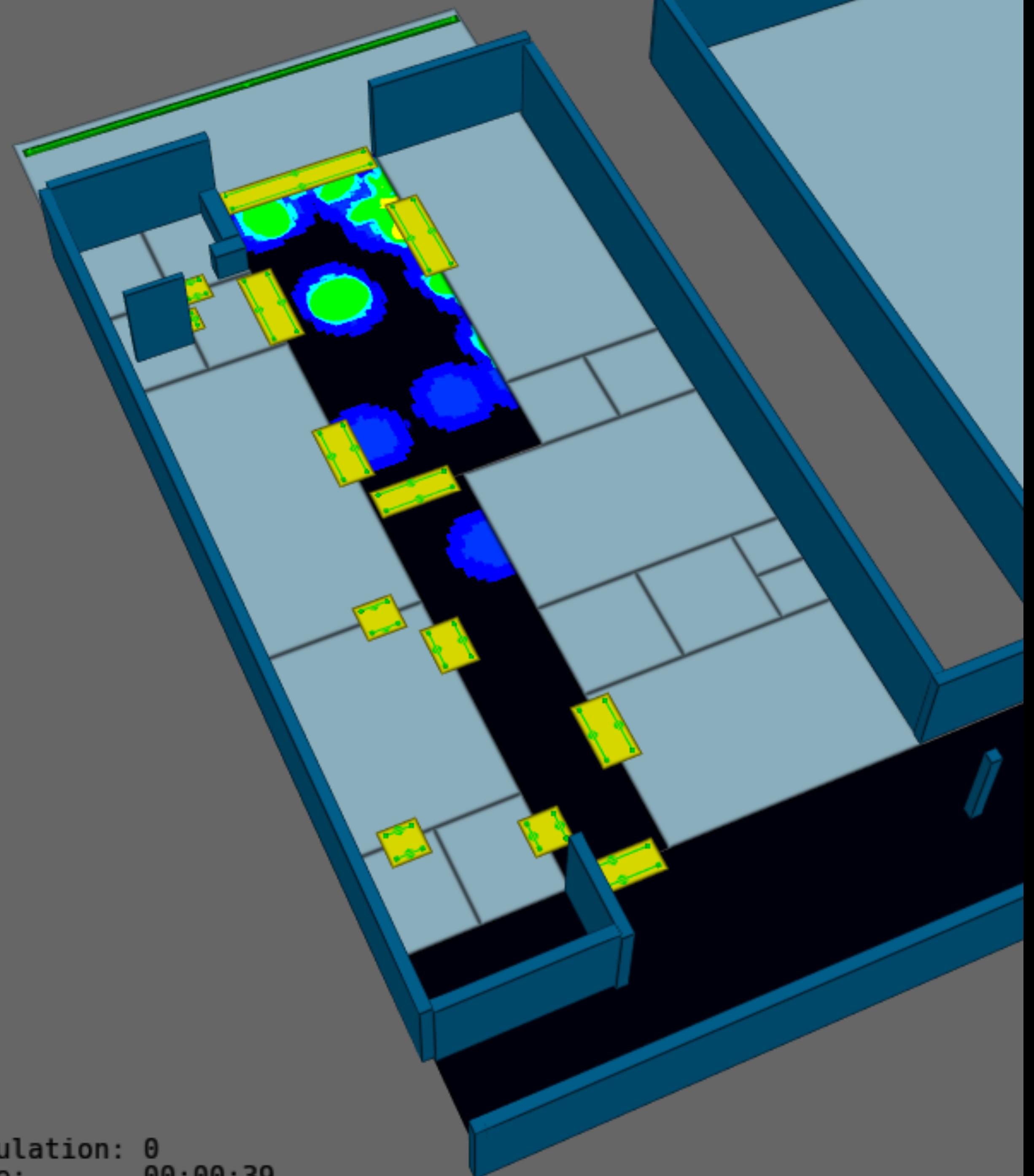
Population: 20
Time: 00:00:00



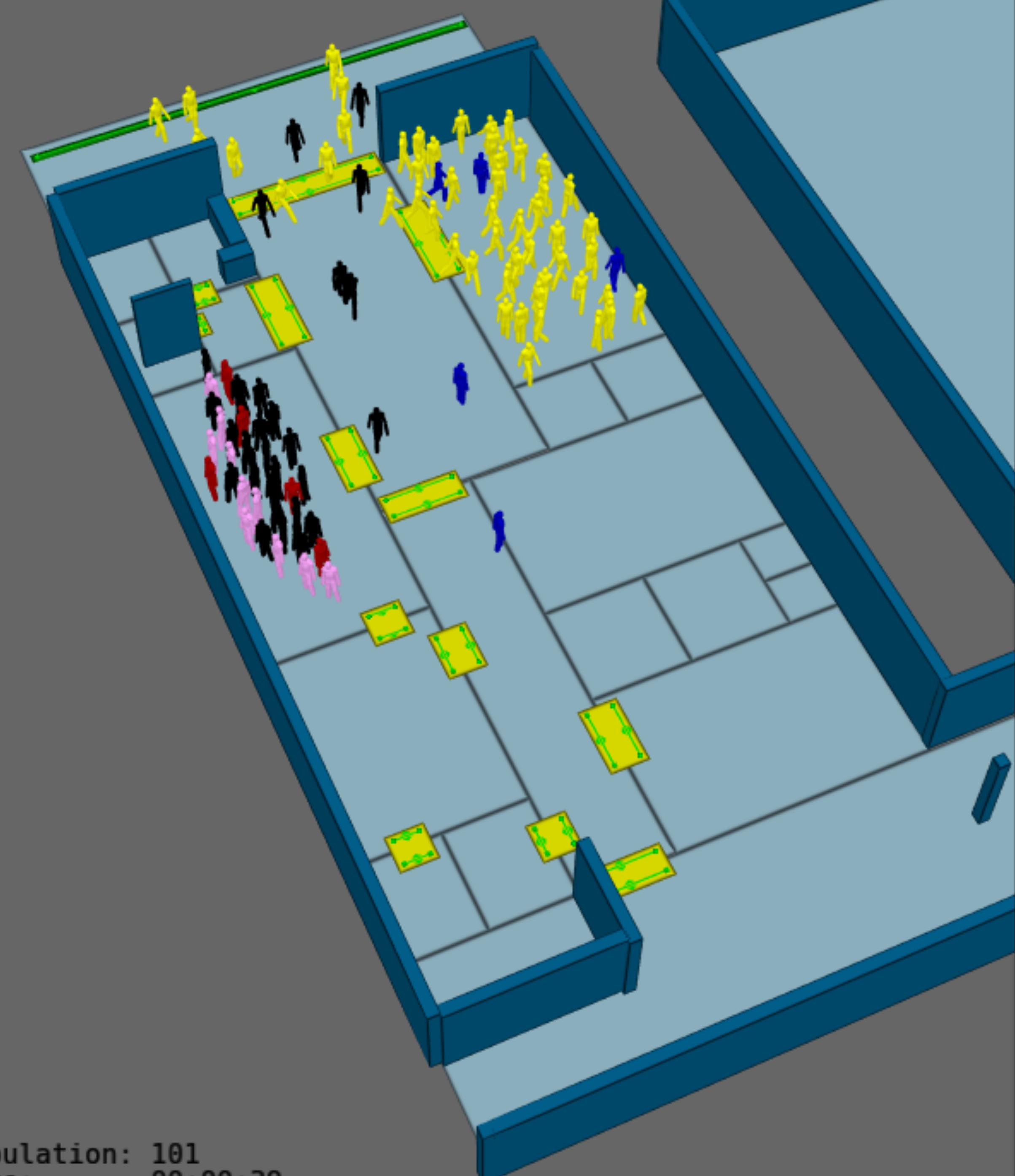
Population: 0
Time: 00:00:44



Population: 109
Time: 00:00:44



Population: 0
Time: 00:00:39



Population: 101
Time: 00:00:39

How do you guarantee the availability and proper organization of the hospital's equipment, maintaining excellent levels of hygiene ?



Needs

Working in a comfortable and equipped enviroment

keep people alive

Have an hygienic and sterilized hospital

Requirements

Patient waiting time < 1minute

Delivery time of medicines and equipment to doctors < 1 minute

Have in-house resources to address at least 80% of MCI patients

< 5% adhesion and proliferation of bacteria



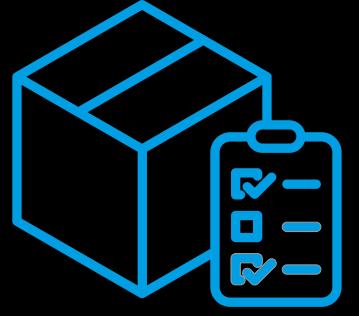
Warehouse organized by pre-assembled portable carts

-Pre-assembled portable carts guarantee very fast preparation and delivery of medicines and equipment in case of MCI



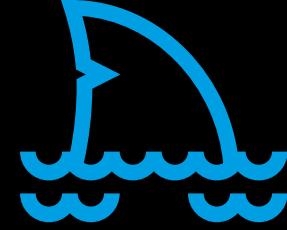
Role identification with distinguishable vests

-Distinguishable vests allow to reduce access time into the hospital
-Help people recognize medical staff who can suggest them the way



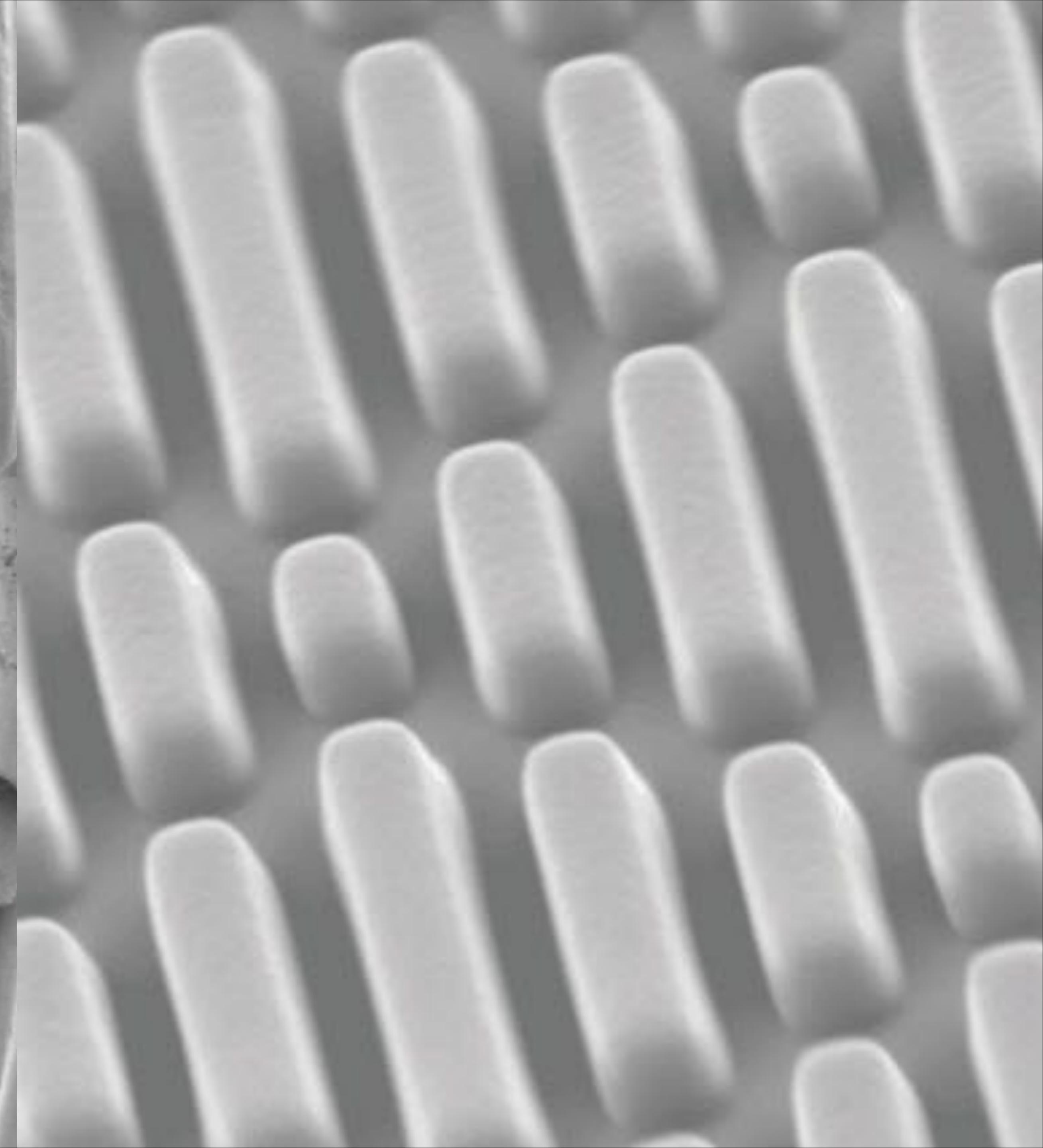
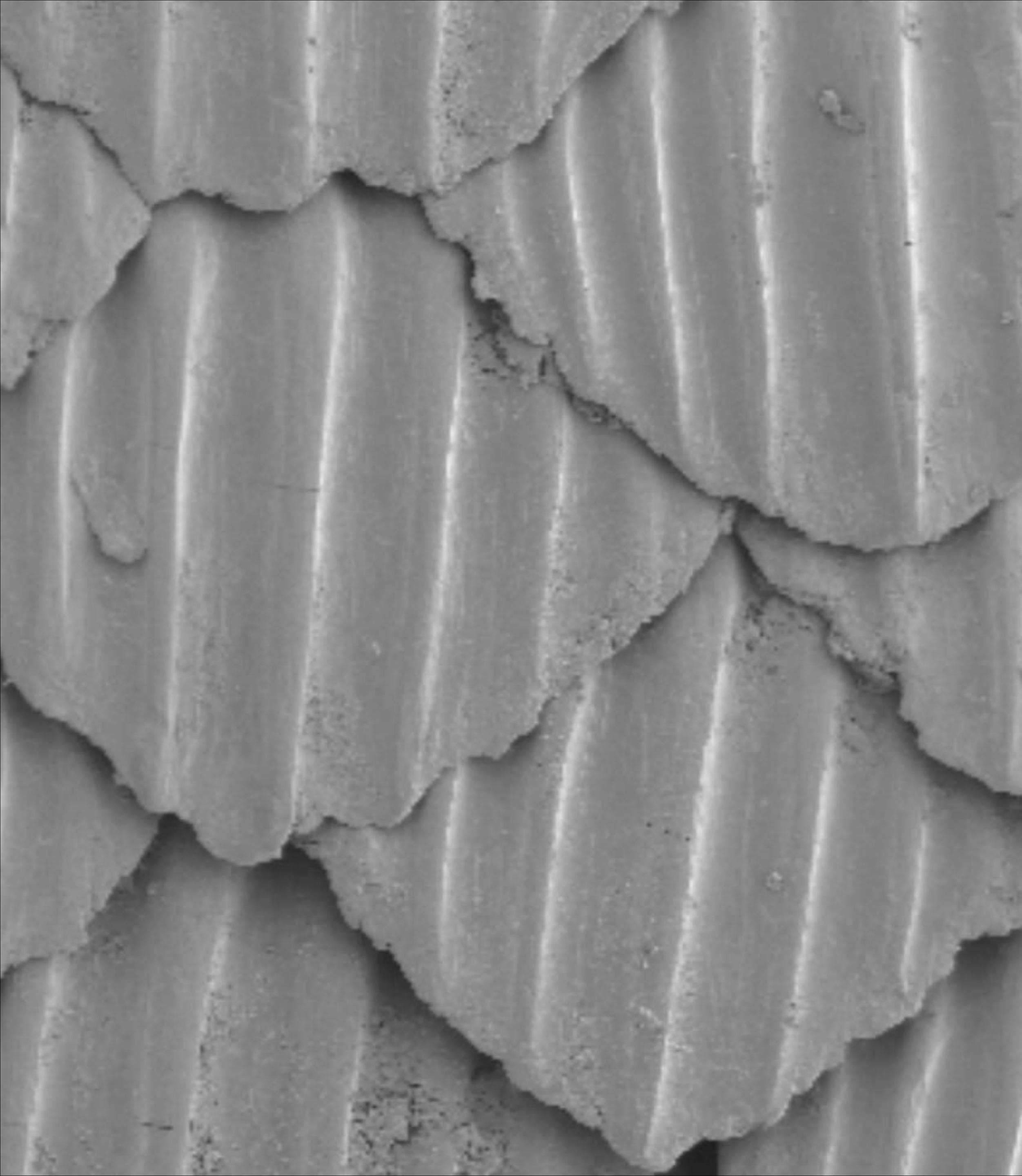
Add a second warehouse dedicated only to MCI situations

-Availability of a second MCI-dedicated warehouse ensuring enough reliability in terms of resource storage

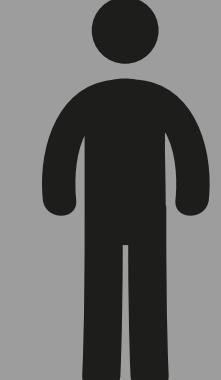
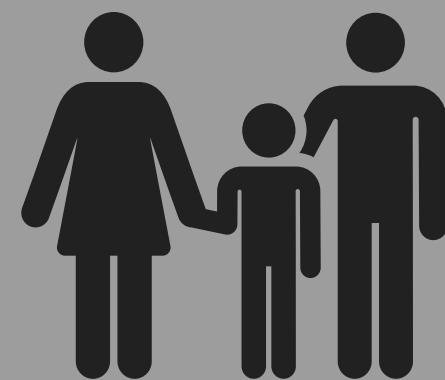
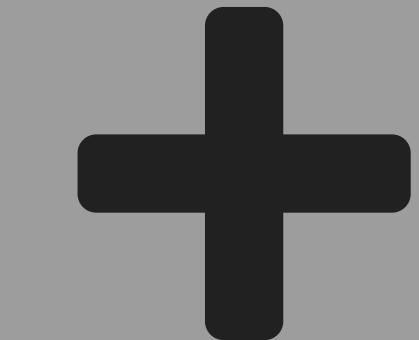


Micro-patterned surfaces shark-skin shaped

-Bio-inspired solution to guarantee a minimum level of bacterial adhesion and proliferation by means of a micro-patterned surface.



There must be a lot waste generated: how do you ensure is kept under control ? What about supply ?



Needs

Have a functional sewage system

Have an efficient water supply

Have an efficient mass fatalities management

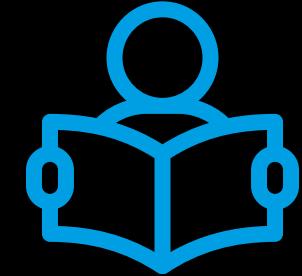
Requirements

Dispose out of the hospital at least 85% of the maximum waste capacity each hour

Not having corpses in the wrong place for more than 10 minutes

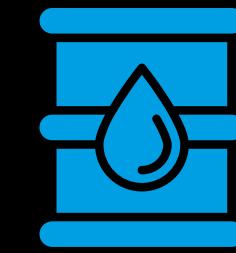
Having a wait for non filtered water be less than 5 minutes

Have at least one liter of water per day per patient



Medical staff training

-Periodical trials to better prepare the staff in dealing with the MCI situations



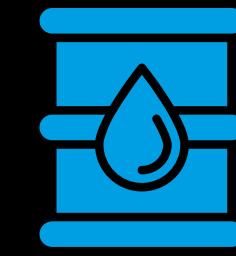
Water storage tank

-Water tank that can hold one day's worth of water



Maintenance of the well

-Making sure well water is not contaminated and the amount of water in the well is not below critical amount



Large tank

-A place to store waste water that currently can be processed by the hospital

What if a fire happens ?



Needs

Identification of fires

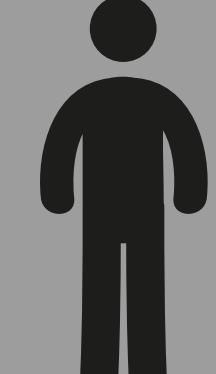
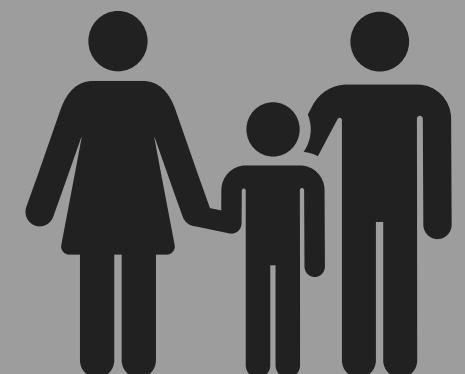


Requirements

Recognize fire in < 3 minutes

Structural precaution to avoid
flame diffusion

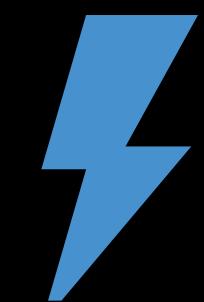
Evacuation time < 10 minutes





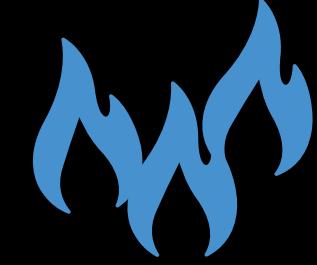
Guarantee an efficient and effective reaction in case of fire

- Medical staff training
- Clear idea on how to react



Rapidly identify the fire

- Alarms help in the task
- Automated system that makes the problem evident



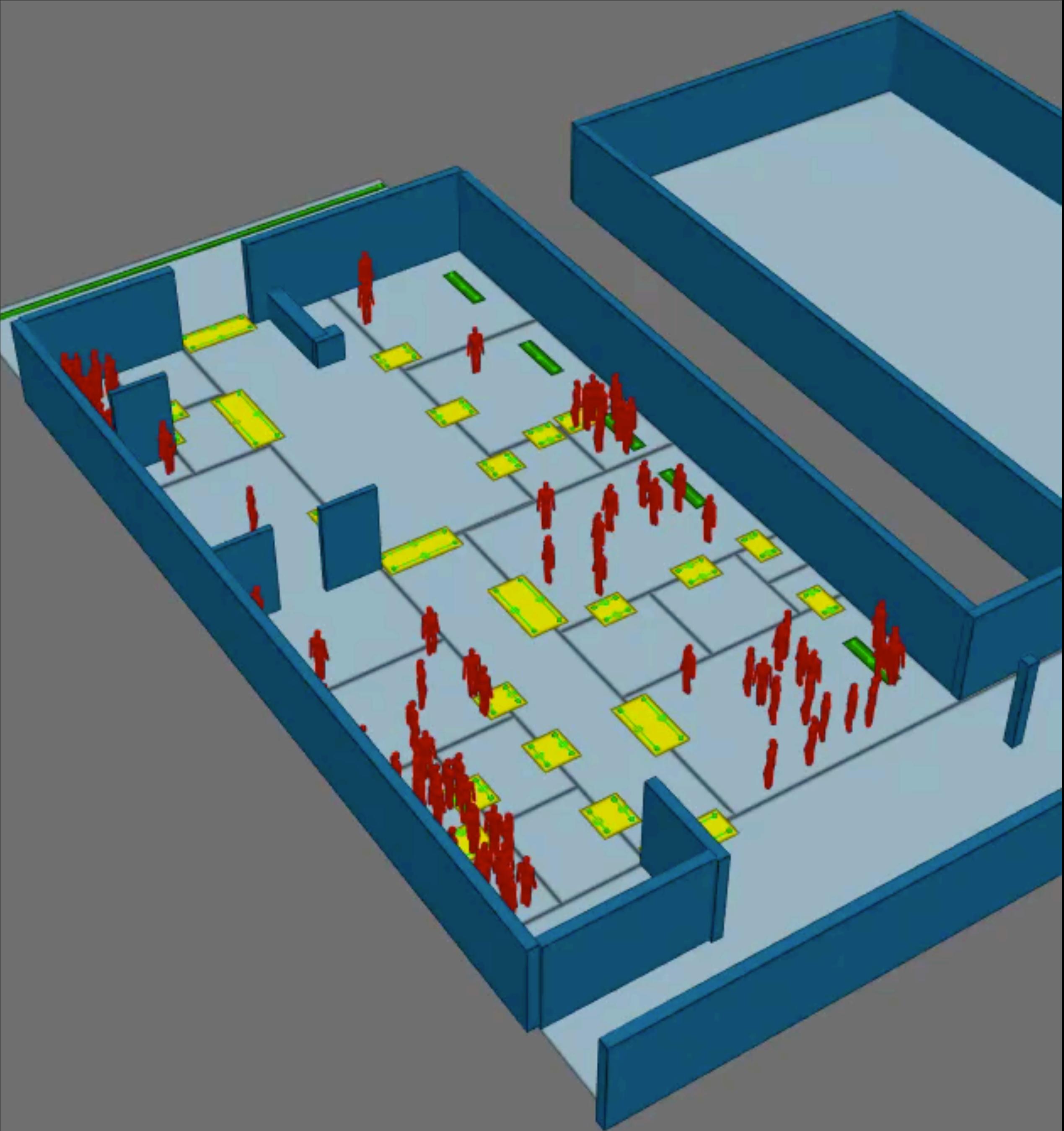
Communicate the existance of a fire

- Local interphones with the ER reception and dedicated phone lines
- No interferences on the line

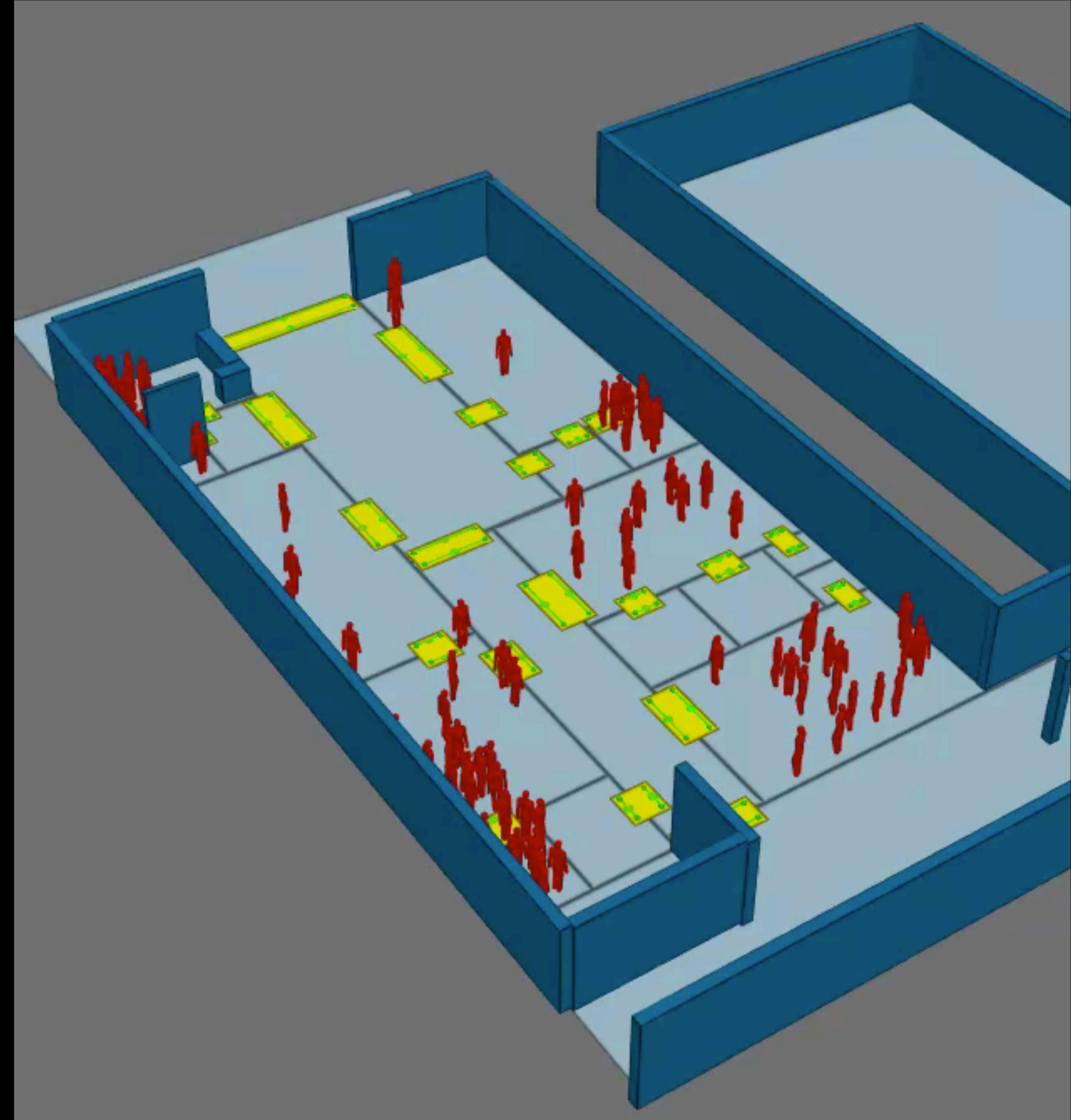


Know that people have evacuated

- 2-way radio communica-
tion between controllers
and patients tracking devi-
ces

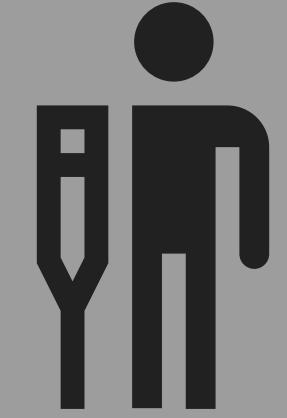


Population: 100
Time: 00:00:00



Population: 100
Time: 00:00:00

How to get the staff prepared to an MCI ?



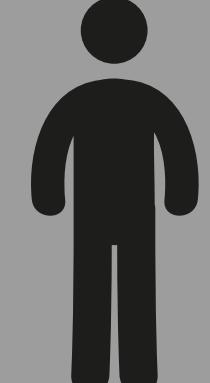
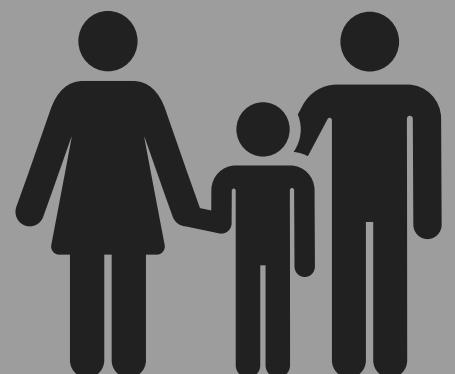
Relatives want to know the conditions of the patients

Centralized information request

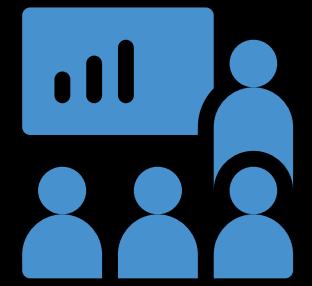


Requirements

Allow patients to meet with relatives at least 1 hour a day

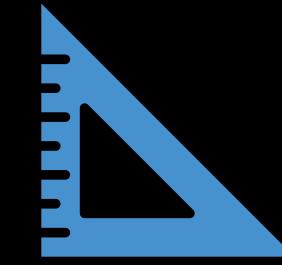


Update relatives about patients' health status in 1 hour



Training courses

- Periodic training courses to prepare medical staff to deal with MCI
- Courses will fit the personnel role



Risk measurement

- Development of a proper contingency plan for the hospital
- Risk assessed in a formal way using a risk matrix

Thanks.