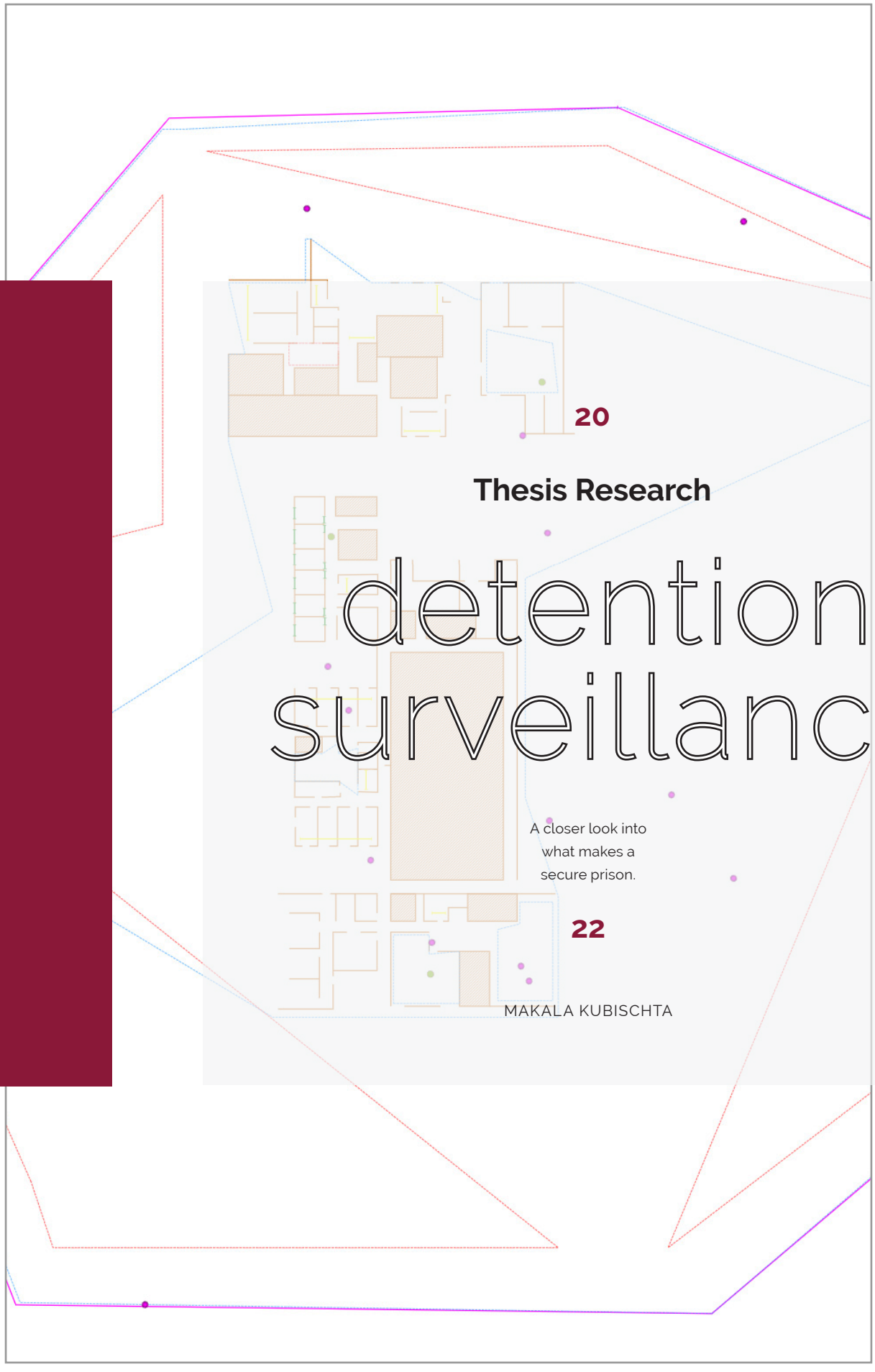


20

Thesis Research

detention surveillance

A closer look into what makes a secure prison.

22

MAKALA KUBISCHTA

Proposed Research

This research will look into case studies to determine what types of floor plans have the best security and safety elements for a prison. By using simulation software, a conclusion can be made for which prison is the most secure of the chosen case studies. The software used is AnyLogic. These simulations will show the congested areas in the floor plans and where the guards should be stationed to control the space.

This proposed research is being done so that the security of prisons can be maintained less through the prison staff and more by the prison walls themselves. Additional peace of mind will be found for the inmates, staff and visitors of the prison.

01. What configuration suits the needs of **the inmates?**

02. What configuration suits the needs of **the staff?**

03. What configuration suits the needs of **the visitors?**

04. What configuration suits the needs of **the surrounding community?**

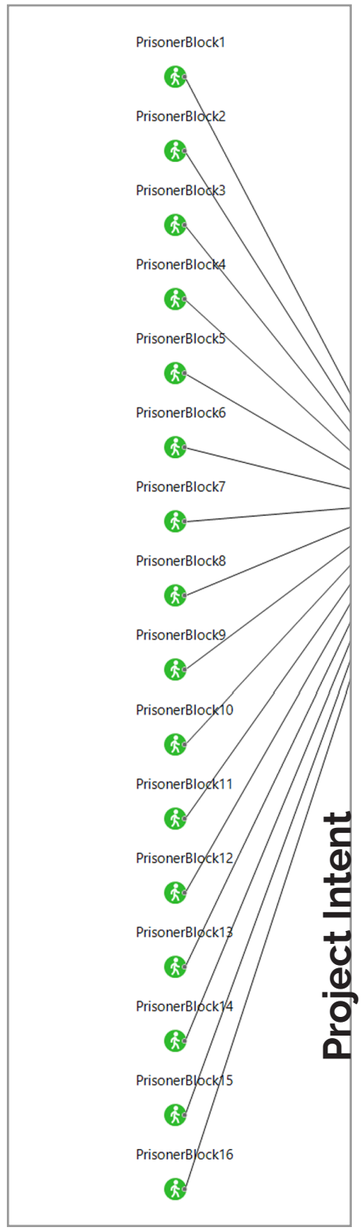
3
CASE STUDIES

3
SIMULATIONS

∞
FUTURE APPLICATIONS

The purpose of this research project is to enhance the quality of life within the prison system while, for the inmates, continuing to maintain their desire to be released.

ENGAGE, RELIEVE, BREATHE



Engage the surrounding community with a suitable prison.

Having visitors is an import aspect for inmates. The detention center should not be a stale and unwelcoming environment. It should be a place where community members would be comfortable to approach and enter.

Relieve prison guards of strenuous security duties.

The prison must reduce time and effort required by guards to keeps inmates in check and be flexible to meet staff availability. It is important that the detention center is secure in itself.

Breathe life into the prison culture.

While being imprisoned, I would like to have little reminders of what inmates are working towards. Some inmates will be in here for life and I would like to bring parts of the natural world outside into this prison.

01. Knowledge of prison architecture.

02. Awareness of the philosophical depths it takes to arrange spaces for a secure and functional facility.

Research Methods

How do institutions create secure environments?

For the defensive study of this thesis, I plan to conduct simulation research on my chosen case studies using programs that show the circulation patterns of inmates within the prison and of obstructions from perspective view points.

With the circulation program AnyLogic, I plan to research where in the plans that inmates become condensed and clustered throughout the day. This will also be informative of what portions of the institution are accessible by inmates. I will simulate virtual camera views from the guards' perspectives of the prison. The program will identify the possible obstructions the guards would have from their stations in the space. This research combined with the above program's results will pinpoint the inmate's possible escape routes.

From here, I will conclude which case study has the least possible escape routes in their design. This will highlight which design is the most successful for prison design.

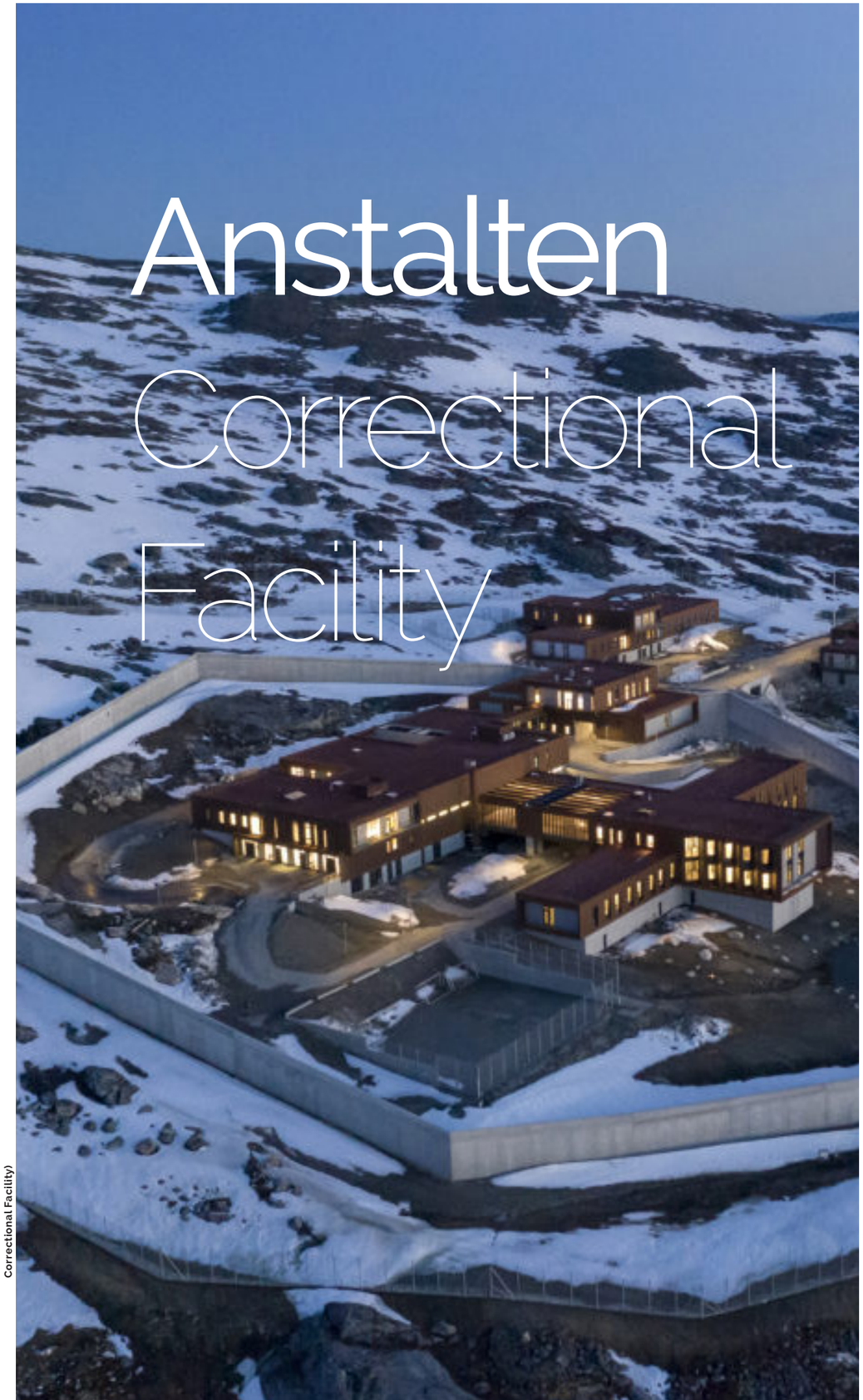
01. Do they most rely on their guards, inmate integrity or security cameras... etc.? These connections between different prison layouts and type of security make determine the allowance of escape and prison breaks.

Expected Result

The expected results of this research project are to learn which case study surveillance layout best fits prison needs today.

The results will enhance the design process of prison design. They will showcase what methods of prison design have the greatest results today for security and safety. These can easily be implemented into future projects.

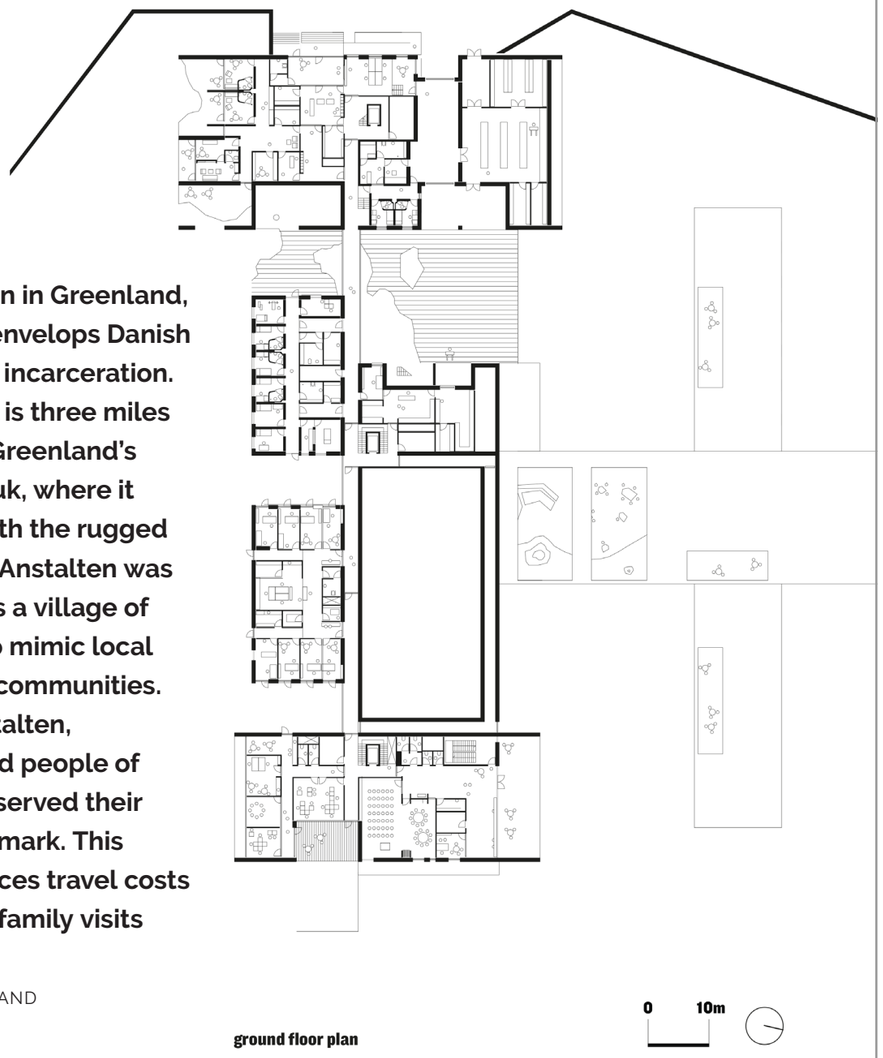
Anstalten Correctional Facility



Anstalten Aerial View (from SHL Anstalten Correctional Facility)

A new prison in Greenland, Anstalten, envelops Danish methods of incarceration. The project is three miles outside of Greenland's capital, Nuuk, where it engages with the rugged landscape. Anstalten was designed as a village of buildings to mimic local Greenland communities. Before Anstalten, incarcerated people of Greenland served their time in Denmark. This prison reduces travel costs and makes family visits easier.

NUUK, GREENLAND



Anstalten Floor Plan (from The Architectural Review)

Architect
Friis & Moltke Architects, Schmidt Hammer Lassen (SHL)

Client
Danish Ministry of Justice/ Danish Prison and Probation Service

Year
2019 (2013 Competition)

Program
76 male and female prisoners in 5 residential blocks

Building Area
86,000 Sq. ft.

Awards
2017, WAN Future Projects Civic Award

Major Materials
Poured-concrete structures clad with weathering-steel panels

Surrounded by a perimeter wall, Anstalten houses minimum, medium and maximum security prisoners. Their rooms are 130 Sq. ft. with their own bedroom, bathroom and desk. The rooms are placed in units of four to eight, with these sharing living, cooking and dining spaces. Each residential room has angled windows for unrestricted views to the sea and to provide privacy from the other rooms. Staff have key access to every room, but inmates are able to lock their own rooms from the inside. The common areas in the three clusters have video surveillance systems and an observation room adjacent to provide views to staff into each unit. These are rarely used, as the staff are often in the common area with the prisoners.

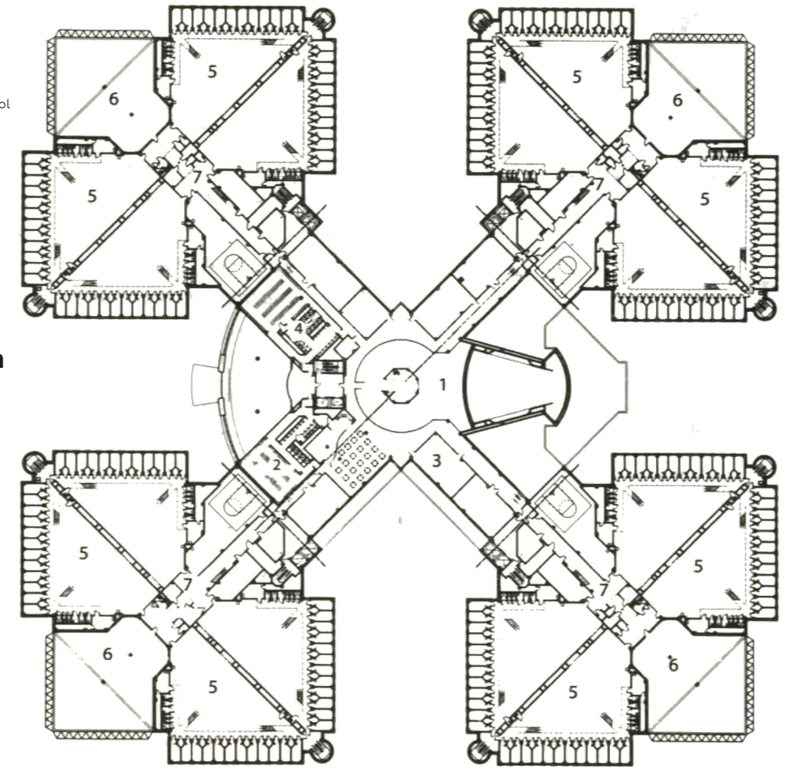
01. A few buildings beyond the wall are for staff and prisoners whom are close to release that may work or attend classes in town and return in the evening.

Anstalten Perspective (from SHL Anstalten Correctional Facility)

Cook County Maximum Security Facility

Cook County Maximum Security Prison (from ABC Chicago)

01. Master Control
02. Women's Lockers
03. Training
04. Men's Lockers
05. Day-room
06. Yard
07. Pod Control



The Cook County Maximum Security Facility Division XI is home to 1,600 inmates grouped into 4 pods of 400 inmates each. These are broken down into two floor tiers with 48 inmates in each. It has a central core that connects with each pod that hosts centralized activities and holds the central control system. The design is modular that lends to the decentralization of daily routine, creating centralized inmate functions that efficiently regulate inmate schedules, resulting in reduced staffing.

2700 S CALIFORNIA AVE

CHICAGO, IL 60608

Cook County Floor Plan (from Plans: Prison Facilities)

Architect
Roula Associates Architects, Chtd. Chicago

Client
Cook County Board of Capital Development

Year
1995

Program
1,600 bed, male, maximum security institution

Building Area
685,000 Sq. ft. on a 17.5 acre site

Cost
$92 million construction cost, $134 per Sq. ft.

Major Materials
Pre-cast concrete skin on steel framing, CMU interior, epoxy floors

Compared to the other case studies, Chicago's Cook County facility may have too much control over their establishment, which is causing its inmates to rebel more frequently.

Here, the inmates know how closely guarded they are, they are able to learn the patters of the guards and predict openings/ shift changes. These together provide predictable openings to cause a commotion.

Each tier has access to the two ground levels of their pod, where daily inmate activities relating to their housing pods are held. Each pod has its own access to a separate visitors wing for secure, authorized visitation. The pods create closer connections between the inmates and staff assigned to the pod.

01. The core of the facility is where the centralized services for all the prison are. It is used by the staff, inmates and the public. Their activities are separated by floors so that they are not mixing with each other.

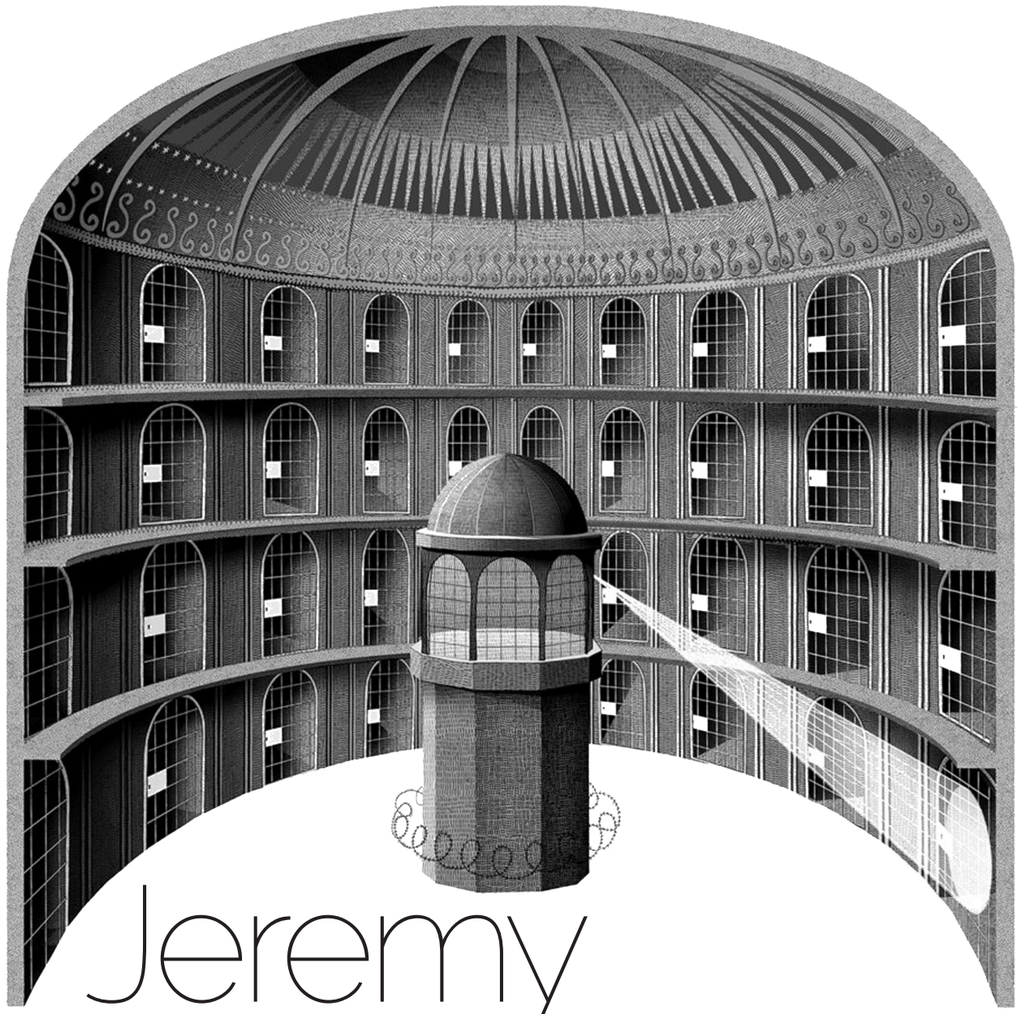
01. Pods allow for close relationships with other prisoners and guards

02. Pods allow for a larger prison population

03. Controlled/ regulated inmate schedules and functions

Cook County
Aerial View (from Inmate Aid)

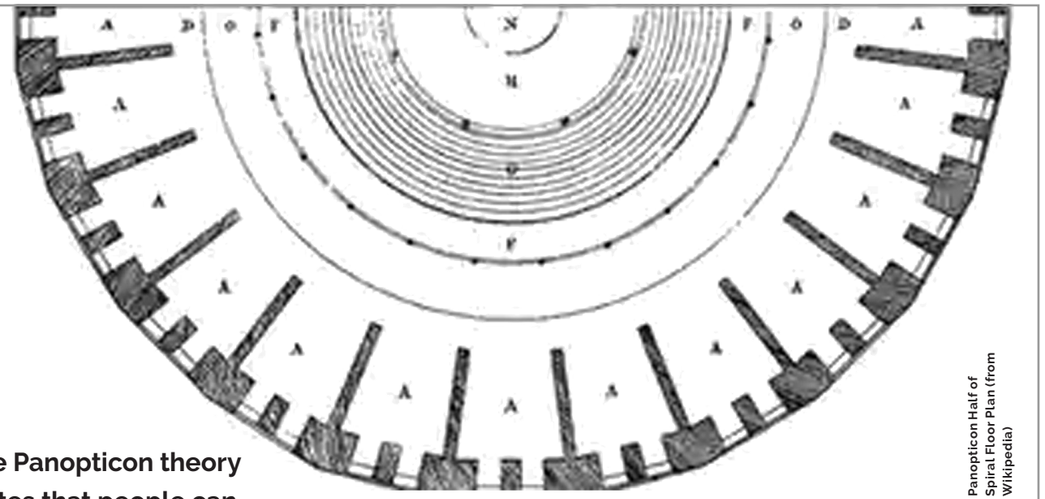
Life in Pods



Panopticon by Jenni Fagan (from New York Times)

Jeremy Bentham's Panopticon Prison

"Morals reformed - health preserved - industry invigorated - instruction diffused - public burthens lightened - economy seated, as it were, upon a rock - the gordian knot of the poor laws are not cut, but united all by a simple idea in architecture!" Jeremy Bentham 1971.



Panopticon Half of Spiral Floor Plan (from Wikipedia)

The Panopticon theory states that people can be controlled when they believe themselves to be under constant surveillance even if no one is watching.

Architect
Jeremy Bentham

Year
1791 (Not built)

Program
5 floors each with 93 cells

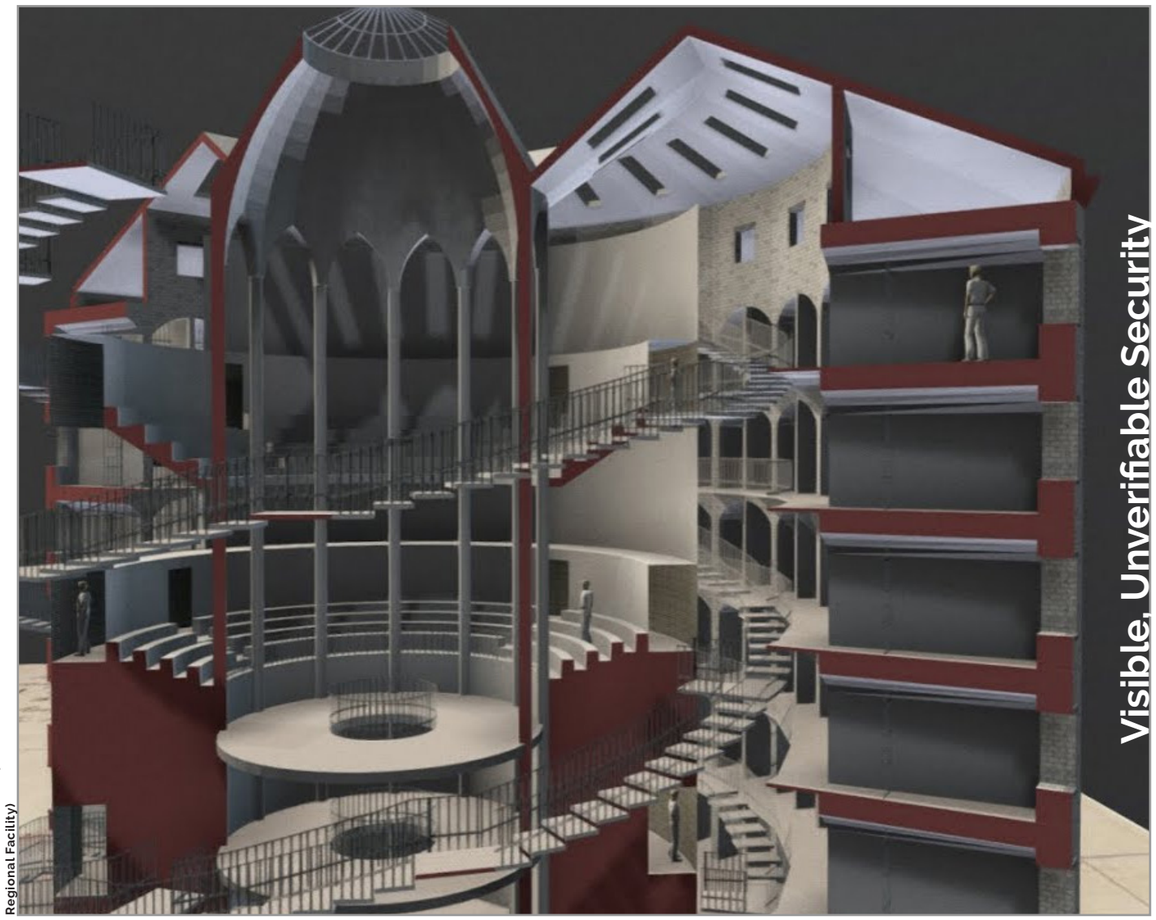
Major Materials
Circular, glass-roofed, with cells along the external that face a central rotunda

Not only are there blinds on the windows of the central observation hall but, on the inside, partitions that intersected the hall at the right angles. In order to pass from one quarter to the other zigzag openings instead of doors to block the slightest noise, gleam of light and brightness in a half opened door, so the presence of the guard would not be betrayed.

THE ARCHITECTURE APPARATUS IS A MACHINE THAT CREATES AND SUSTAINS POWER RELATION INDEPENDENT OF THE PERSON WHO EXERCISES IT.

Bentham conceived the basic plan as being equally applicable to hospitals, schools, sanatoriums and asylums, but he devoted most of his efforts to developing a design for a panopticon prison.

01. Bentham expected that his new mode of obtaining power of mind over mind would ensure that the prisoners would modify their behavior and work hard in order to avoid punishment.



Kimberley Housing Building 2 (from West Kimberley Regional Facility)

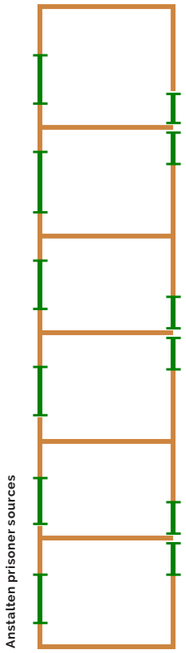
THESIS RESEARCH / VISIBILITY OF A DETENTION CENTER

FALL 2022

Evaluating the Simulations

THE PURPOSE IS TO LEARN WHICH CASE STUDY SURVEILLANCE LAYOUT BEST FITS PRISON NEEDS TODAY.

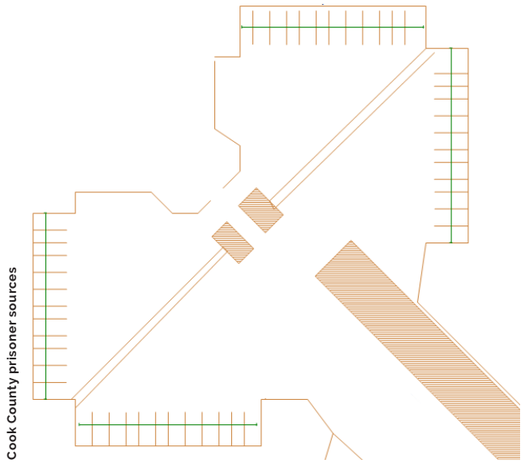
I used the program Any Logic to simulate surveillance zones to determine which layout captured the most escaped prisoners. I began with three case studies and used their floor plans as the initial set-up to this simulation. After recreating the initial boundaries in Any Logic, I created the prisoner and custodian paths using the pedestrian library.



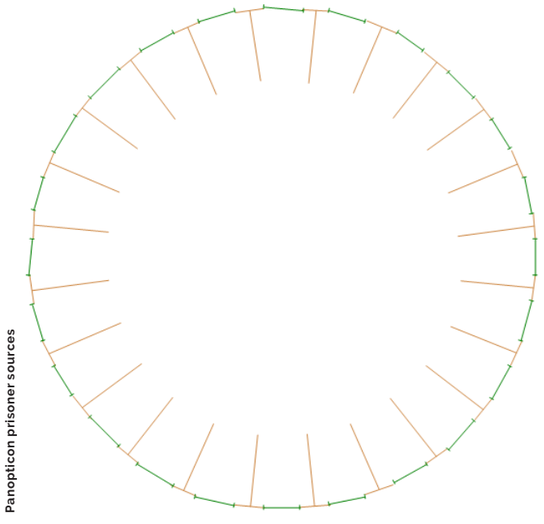
The prisoners start in their cell doors and windows to mimic an escape from the cell. The perimeter around the prison is a set line that signifies a successful escape. Each of the prisoners are set to go to this perimeter line.

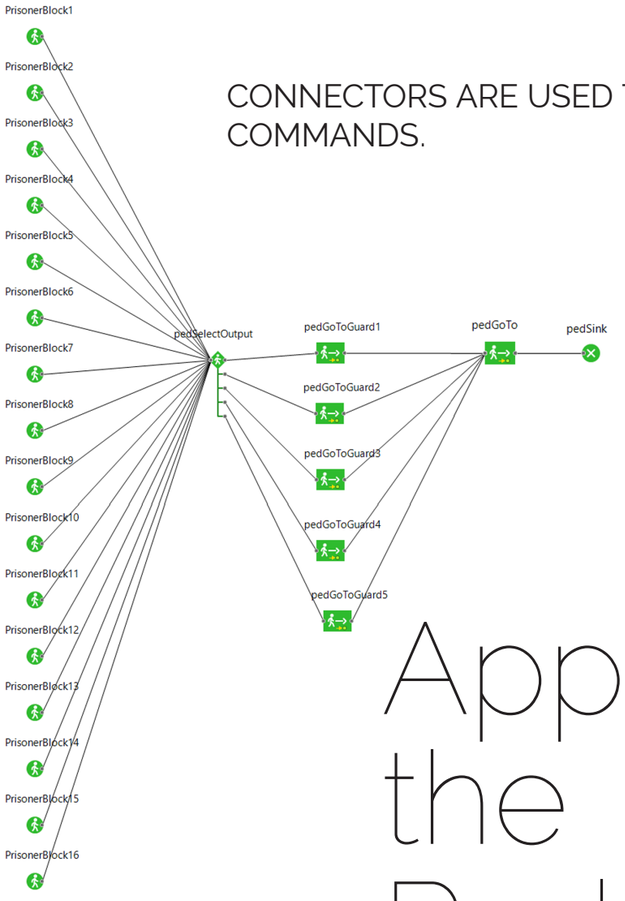
Prisoner target line

The custodians are set to emerge from the janitorial closets and either travel to the prisoner cells or to the cafeteria and back to their closets. Which station they go to is set randomly.



The Cook County simulation's target line passes through a group of cells. The prisoners have a random chance of starting at any point along the line. Therefor, they equally appear from any cell.



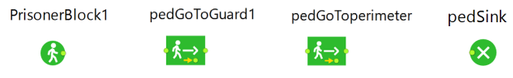


Cook County prisoner pedestrian map

CONNECTORS ARE USED TO LINK PEDESTRIAN COMMANDS.

Applying the Pedestrian Library

The simulations each start with a pedestrian source that generates the prisoners. It is then connected to a pedestrian go to where the prisoners make their way to a guard. Each prisoner source sends out 3 prisoners a day to attempt an escape. After the guards, the prisoners head to the perimeter to escape. Once to the perimeter, the pedestrian sink removes the prisoner from the simulation.



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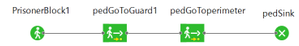
Cook County custodian pedestrian map

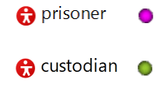
CONNECTED PEDESTRIAN MAP



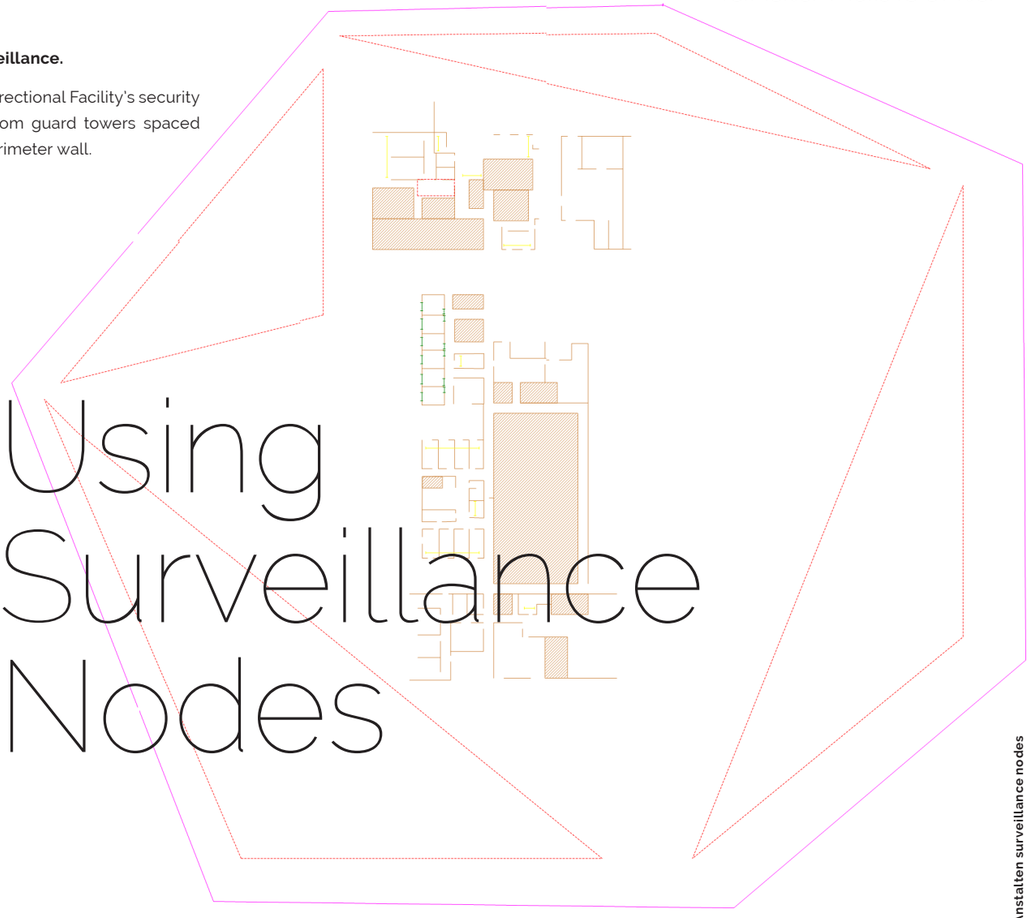
[redacted]

The custodian pedestrian map has the custodians generate in the janitor closets. The pedestrian select output uses equal ratios to distribute the custodians to cell blocks. They then return to a random janitor closet and the simulation ends.

In these simulations, the prisoners are portrayed by hot pink spheres and the custodians by lime green spheres.



Using Surveillance Nodes



Anstalten surveillance nodes

Exterior surveillance.

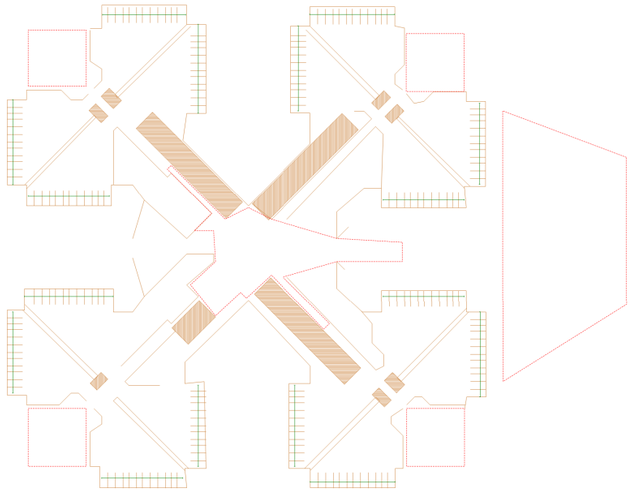
Anstalten Correctional Facility's security is primarily from guard towers spaced across the perimeter wall.

SURVEILLANCE NODES CAPTURE THE ESCAPING PRISONERS

Next, came the surveillance nodes. Without these, all the prisoners would make their way to the perimeter and escape. The surveillance nodes capture prisoners when they cross through the boundaries of the nodes. This research project determined which surveillance layout best captured prisoners. Each surveillance layout was supplemented by the original case study.

01. The red dashed triangles in the Anstalten simulation represent the views from the guard towers. Since this prison's primary surveillance is from the exterior of the building, the surveillance nodes are placed around the prison.

02. The solid pink line indicated the perimeter wall around the prison, which is used as the prisoner escape boundary in the simulation.



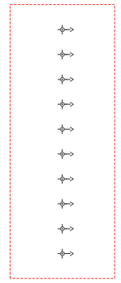
Cook County surveillance nodes

Interior surveillance.

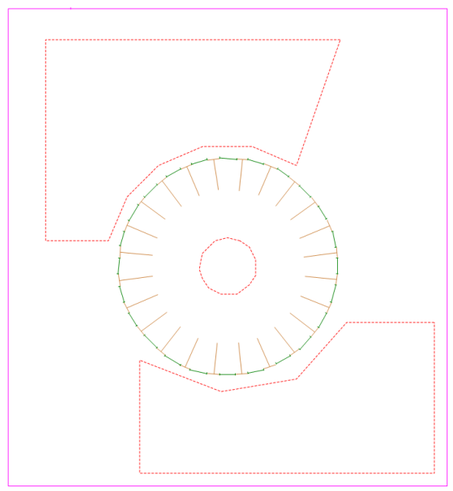
Cook County Maximum Security Facility initiates security primarily from the interior of their prison. They have surveillance cameras and guards throughout the prison to keep the prisoners and themselves safe.

PRISONER.SETLEVEL(HOLDINGPEN);PRISONER.MOVETO(PEN)

These surveillance nodes were coded to send the prisoners that crossed their boundary to a holding node. Each surveillance node has a capacity of 10 prisoners because it is unreasonable to assume that more than 10 can be caught at one time at each node/ guard tower.



Holding pen surveillance node



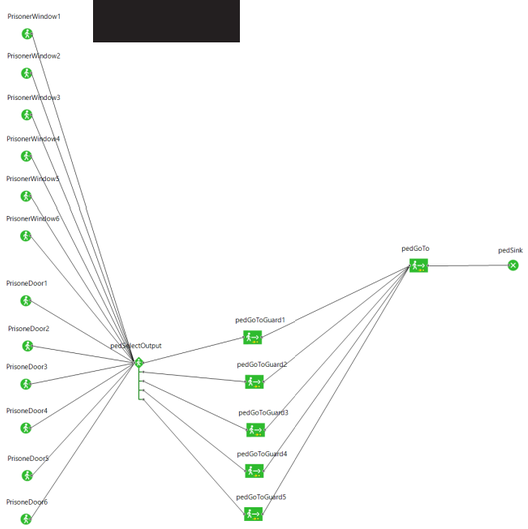
Panopticon surveillance nodes

Mixed surveillance.

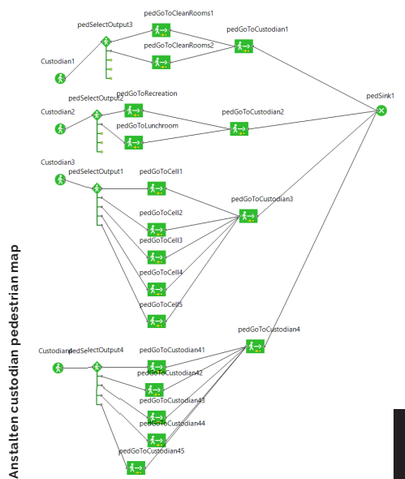
The panopticon primarily uses interior surveillance. Since it was designed before surveillance cameras, the surveillance is only from the guards stationed in the center of the prison. Guards are added around the exterior of the prison to capture prisons that try to escape through the windows of the lower levels of the prison.

[redacted]

Anstalten prisoner pedestrian map



Anstalten custodian pedestrian map



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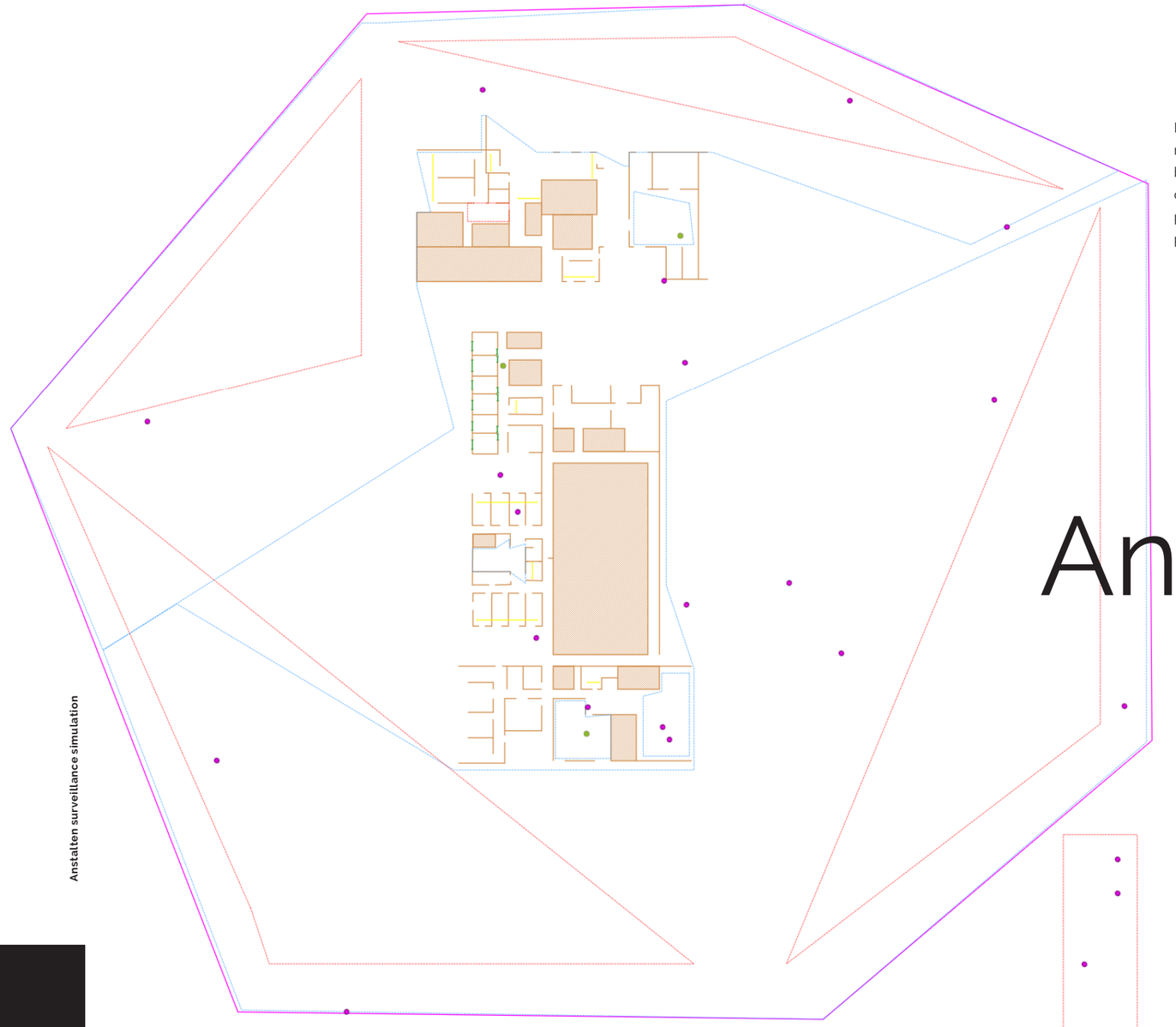
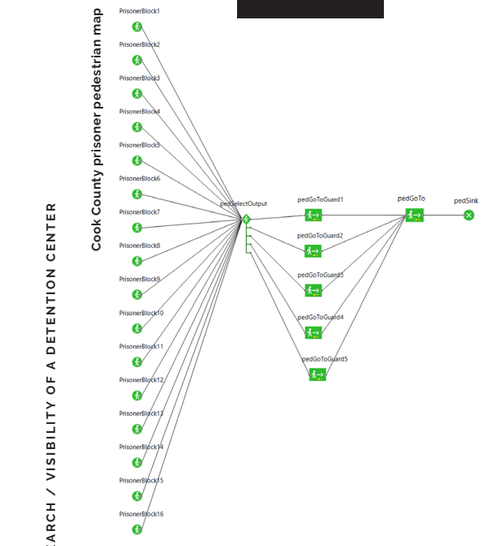
Anstalten surveillance simulation



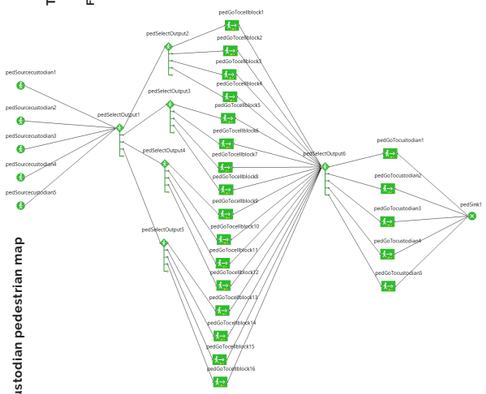
Prisoners in the Anstalten simulation can freely move throughout the prison. They are captured just before making a successful escape. This method does capture most of the prisoners, but at a cost. The prisoners are able to cause disruptions while unsupervised in the prison.

Anstalten

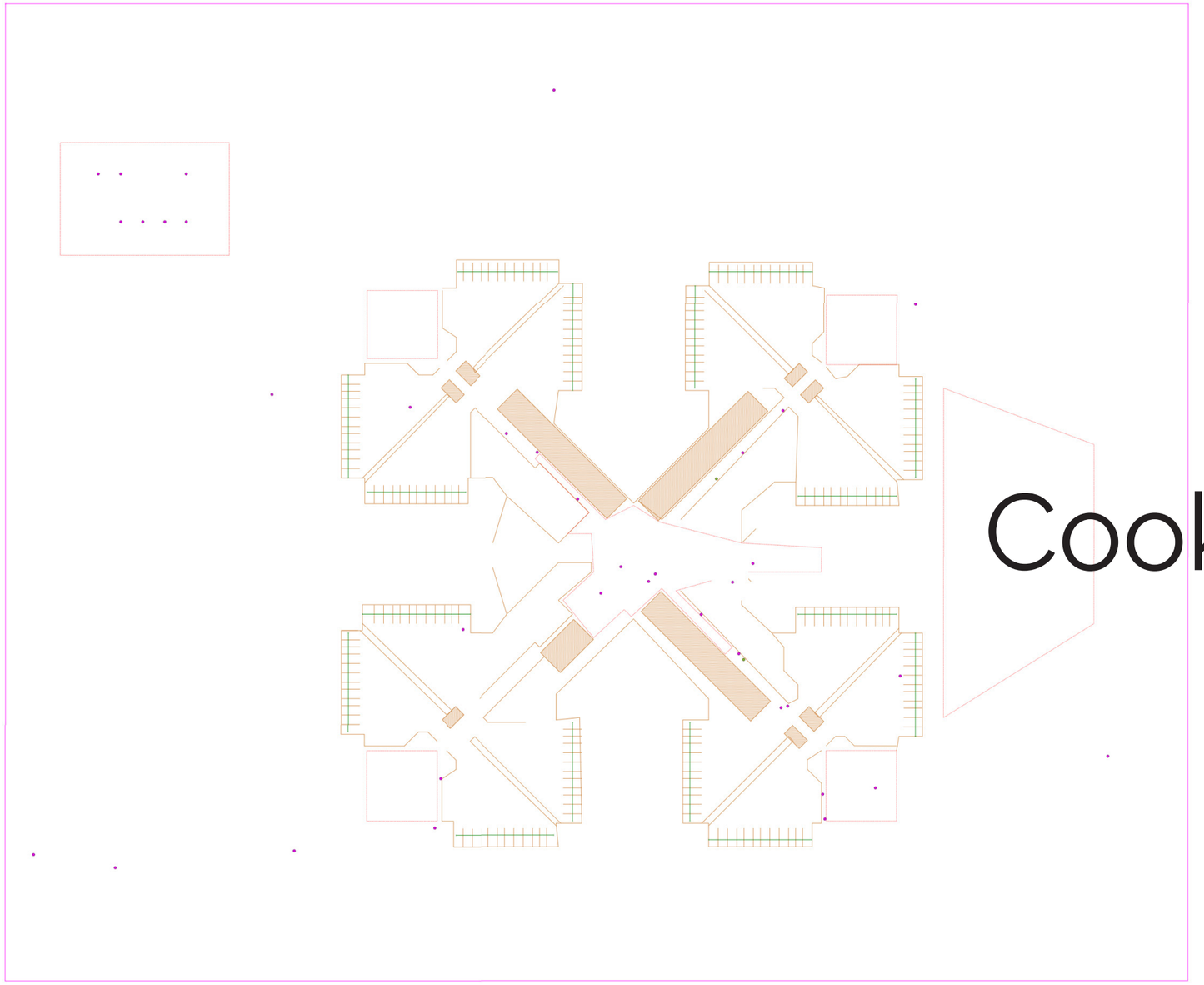
In Anstalten, the guard towers capture most all the attempting escapees. There are only a few points of access to the perimeter, so few prisoners escape.



Cook County prisoner pedestrian map



Cook County custodian pedestrian map



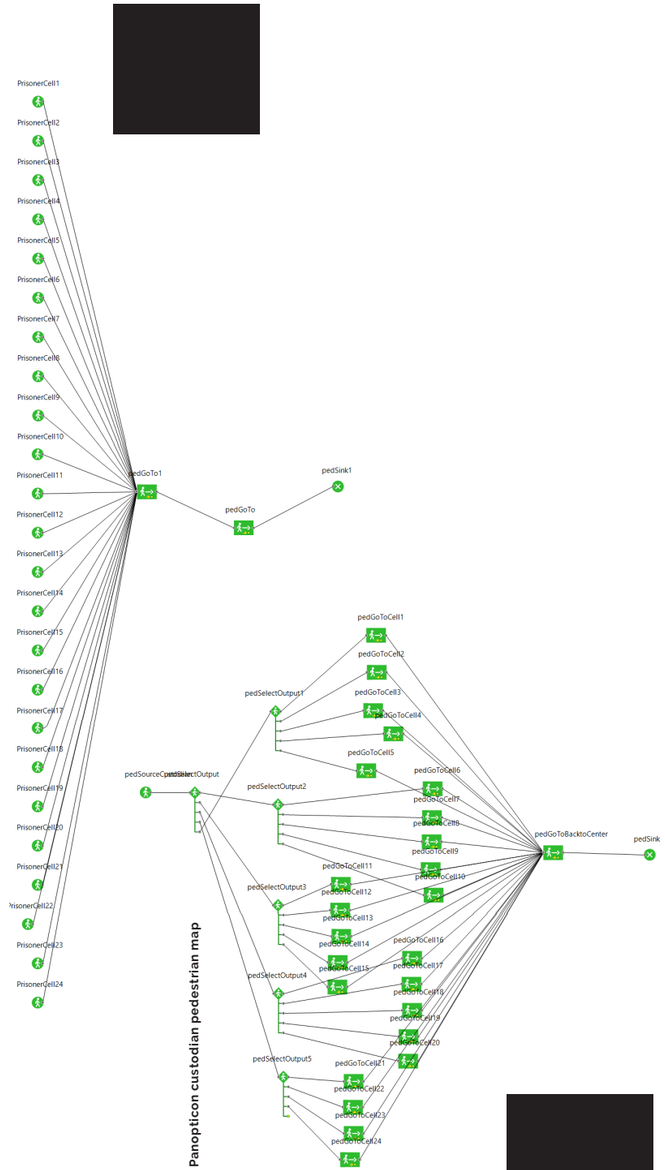
Cook County surveillance simulation

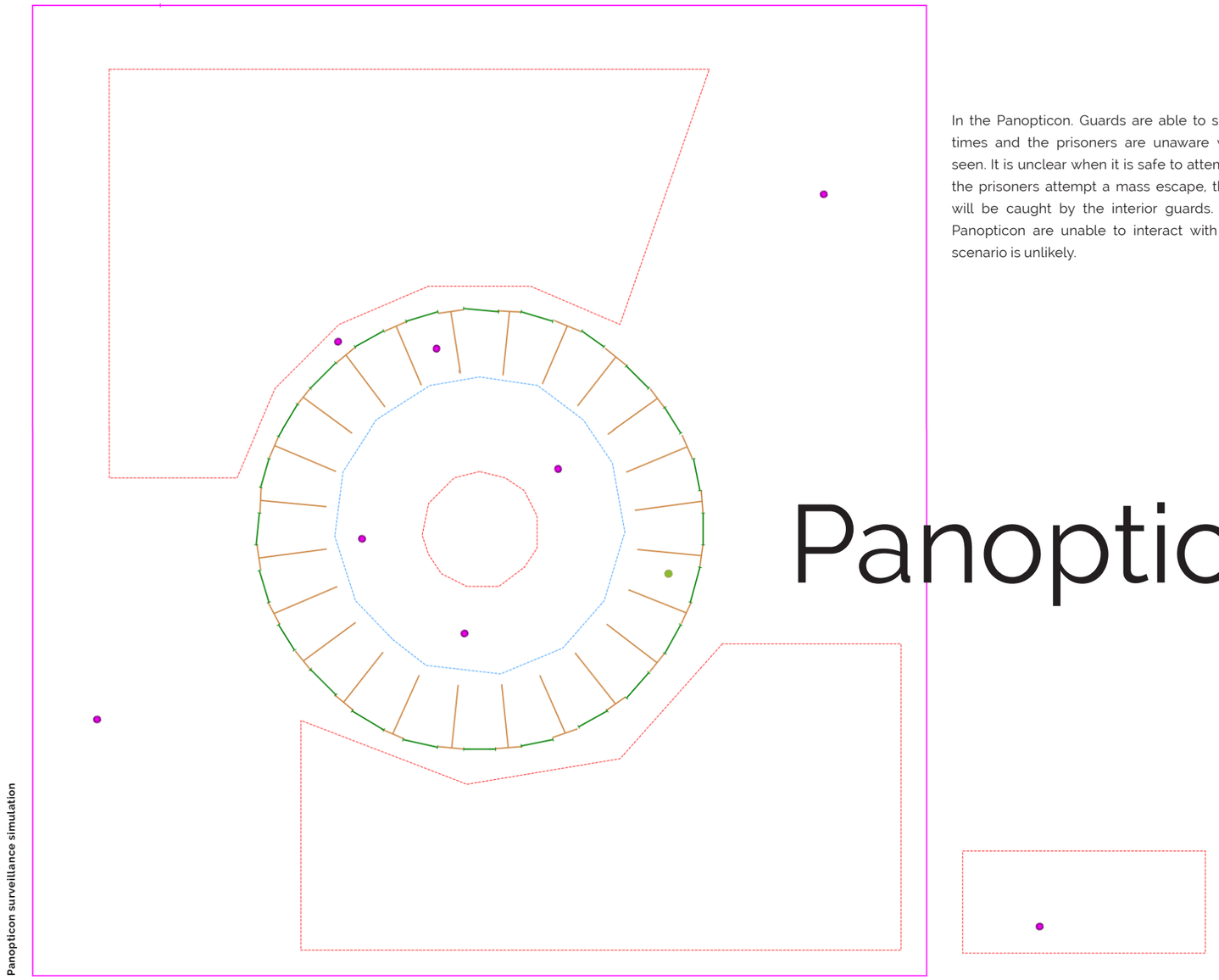
Cook County

This simulation has six surveillance nodes and at times each may find its self understaffed and allow a few prisoners to slip through the cracks. Having additional surveillance nodes distributed through the interior of the prison would reduce stress on the other nodes, which would capture more prisoners.

The control center surveillance node quickly reaches its capacity of escaped prisoners. After the capacity is filled, prisoners freely cross this node without being captured.

Prisoners in the Cook County simulation can find avenues around the interior surveillance nodes. There are places in the prison that allow prisoners to freely escape. The center surveillance nodes receive the majority of the traffic and therefor it quickly reaches its capturing capacity.





Panopticon

In the Panopticon. Guards are able to see all prisoners at all times and the prisoners are unaware when they are being seen. It is unclear when it is safe to attempt an escape. Unless the prisoners attempt a mass escape, the individual escapes will be caught by the interior guards. The prisoners in the Panopticon are unable to interact with one another, so this scenario is unlikely.

The prisoner source rate is set lower in the Panopticon because of the prisoner's unawareness of surveillance. Without knowing when it is safe to attempt an escape, fewer attempts will be made.

Since the prisoners in the Panopticon are initially drawn to the inner guard, many are captured in the center red surveillance node.

Conclusion

The methods of surveillance each have their own advantages and disadvantages. Despite guard towers capturing most prisoners, what happens inside prisons remains unprotected. When the interior of the prison is monitored, prisoners are controlled until they make it outside the prison. It ensures that no unwanted activity happens in the prison, where violent acts are under constant surveillance.

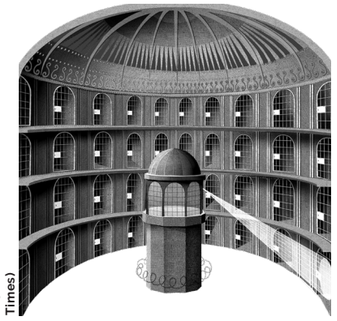
The perimeter of the prison and its interior are both secure when these two methods are combined.

There is still a possibility that corners and hallways will be unpredictable. Being unable to see around a corner allows dangerous activities to go unnoticed. Hallways that are long make it difficult for guards to reach prisoners quickly. If not dealt with quickly, a disruption could become a major problem. It is important that the gaps in the surveillance are small or nonexistent. This is safer for both prisoners and guards because it reduces the chances of prisoners threatening and attacking other prisoners or guards.

Surveillance strategies determine the future of a prison. It results in how well maintained the prison is and whether there is room for uproar. Preventing inmates from getting out is the first priority of a correctional facility. A facility lacking in surveillance can cause serious danger to a facility.

Anstalten Aerial View (from SHL Anstalten Correctional Facility)

Cook County Aerial View (from Inmate Aid)



Panopticon by Jenni Fagan (from New York Times)

GUARD TOWERS CAPTURE THE MOST PRISONERS, BUT ALLOW FOR DISRUPTIONS INSIDE AN UNSUPERVISED PRISON.

SURVEILLANCE IS STRAINED WHEN THERE ARE TOO FEW METHODS OF SURVEILLANCE.

SURVEILLANCE THAT COVERS THE INTERIOR AND EXTERIOR OF THE PRISON CAPTURES PRISONERS BEFORE DISRUPTIONS CAN BE MADE.

Notes

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