IP Surveillance System Solution for Shopping Mall

1. Requirements:

This is a five floors shopping mall building in the capital of Mongolia, Ulaanbaatar. It need to use 1080P high definition IP camera to monitor all building. The floor plan is below:

B2-Floor:

Monitoring Point:

- 7 pieces outdoor waterproof IR camera with heater;
- 7 pieces outdoor waterproof IR camera without heater;
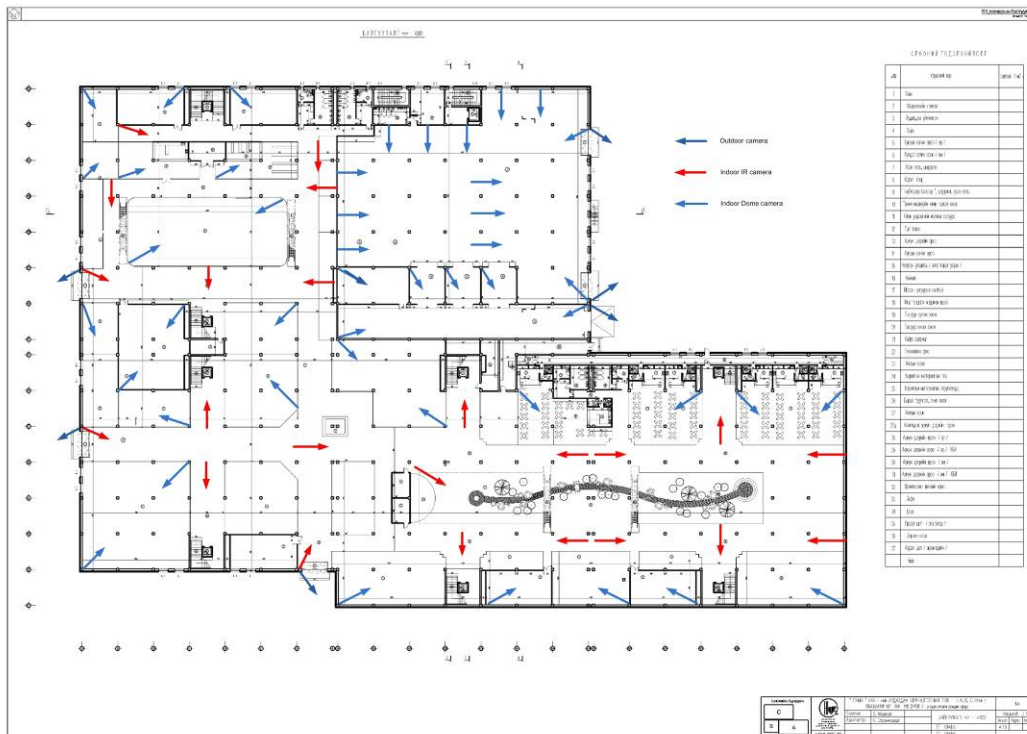- 12 pieces indoor IR dome camera with built-in PoE;

Total: 36.
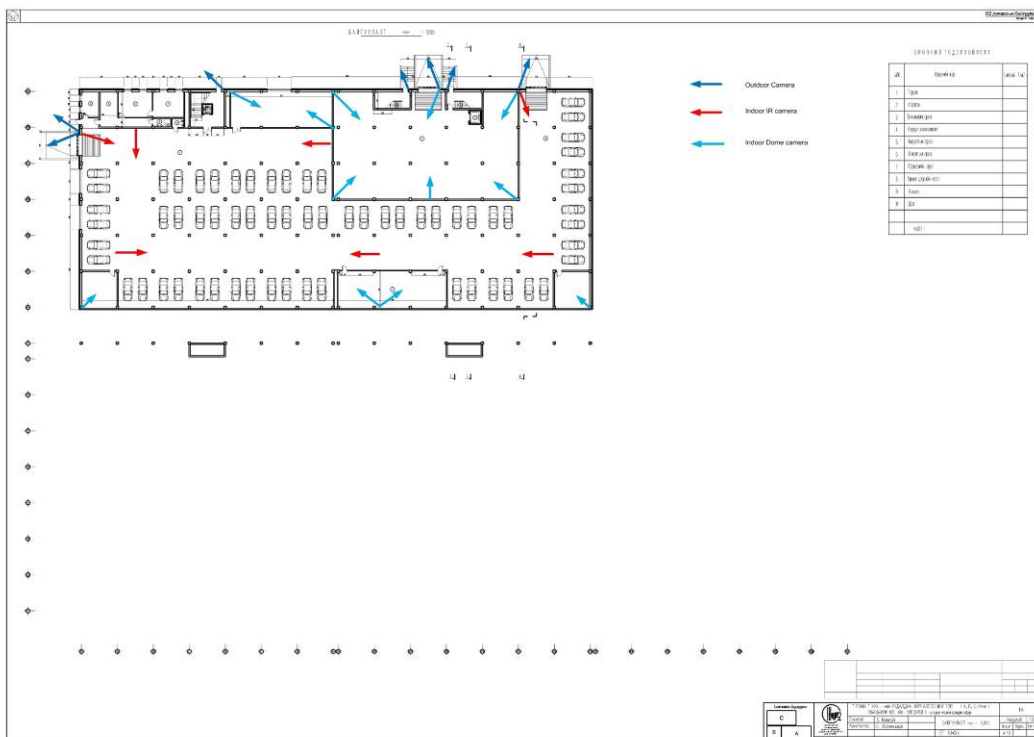
B1-Floor:

Monitoring Point :

- 6 pieces outdoor waterproof IR camera with heater;
- 31 pieces outdoor waterproof IR camera without heater;
- 31 pieces indoor IR dome camera with built-in PoE;
- 7 pieces indoor IR box camera.

Total: 75

1-Floor:

Monitoring Point:

- 5 pieces outdoor waterproof IR camera with heater;
- 46 pieces outdoor waterproof IR camera without heater;
- 41 pieces indoor IR dome camera with built-in PoE;
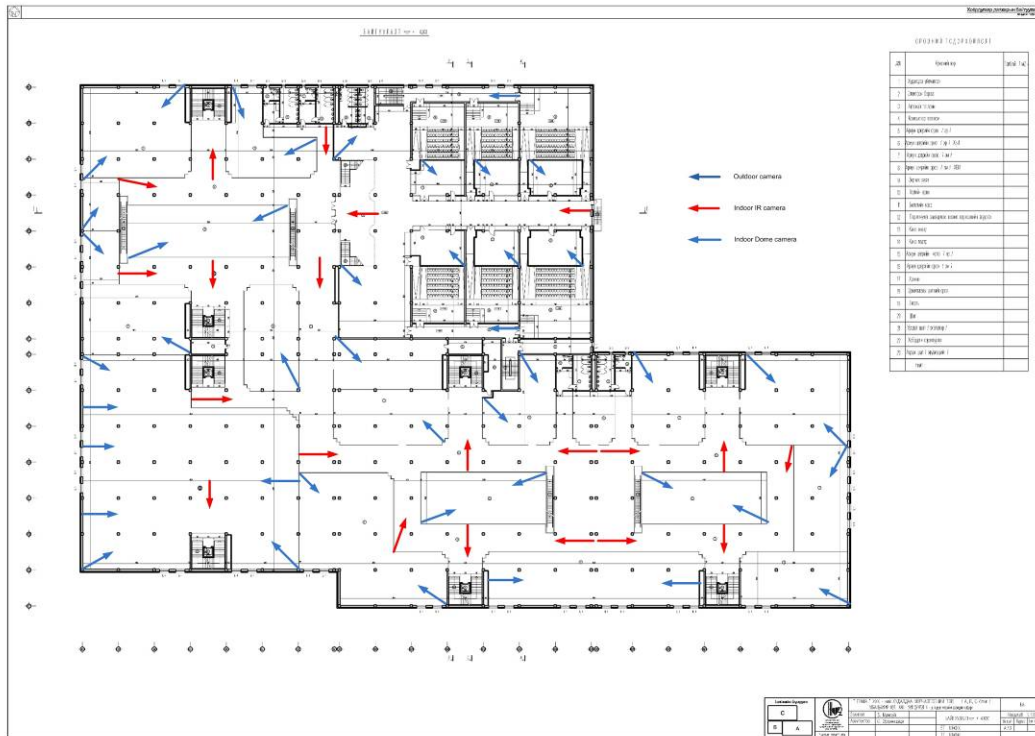- 3 pieces indoor IR box camera.

Total: 95

2-Floor:

Monitoring Point:

- 20 pieces outdoor waterproof IR camera without heater;
- 31 pieces indoor IR dome camera with built-in PoE;
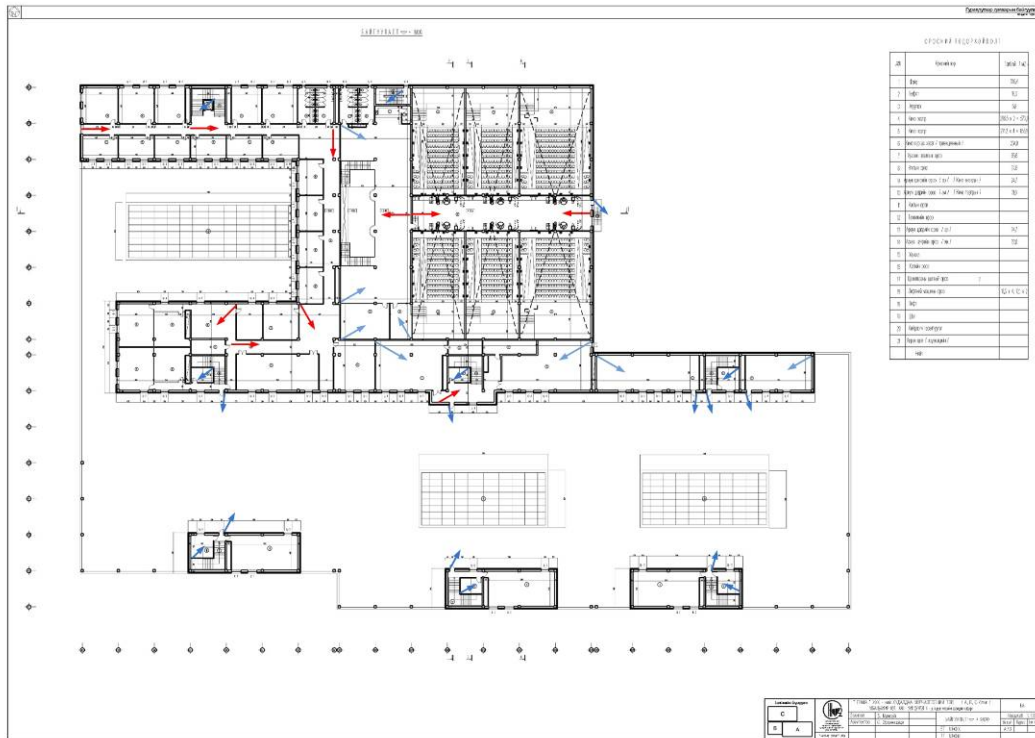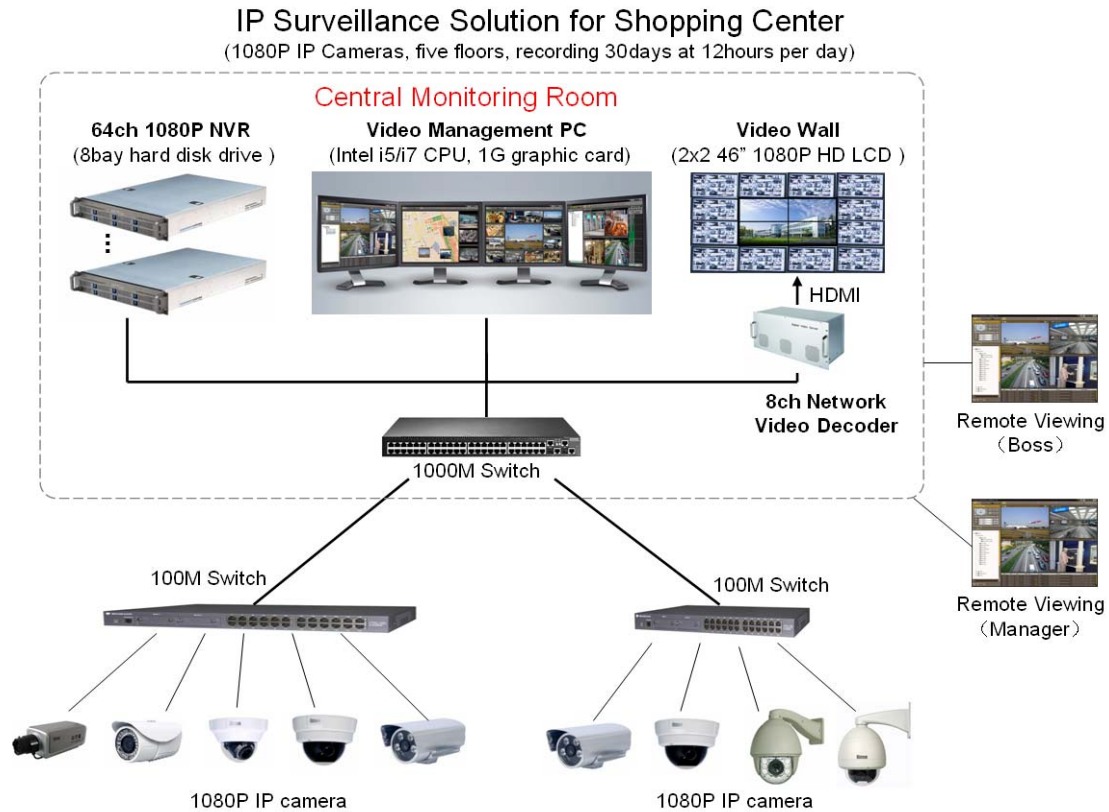- 14 pieces indoor IR box camera.

Total: 65

3-Floor:

Monitoring Point:

- 17 pieces outdoor waterproof IR camera with heater;
- 5 pieces outdoor waterproof IR camera without heater;
- 8 pieces indoor IR dome camera with built-in PoE;
- 4 pieces indoor IR box camera.

Total: 34

2. System Topology Diagram

3. IP Cameras

Depending on the user's requirement, the systems use 1080P (1920*1080) full high definition IP camera, the image is very clear:

Every 1080P IP camera use fixed 4Mbit/s bit rate, that will get good image quality with low bandwidth.

Total cameras are below:

No.	Item	Description	Amount
1	Indoor IR Dome	2.1 Megapixel Low-light 1080P CMOS Indoor Dome IP Camera, 2 axis (vertical & horizontal) adjustable, built-in POE,15pcs IR LED lights, 8m. IR-Corrected Lens	123
2	Indoor IR Box	2.1 Megapixel Low-light 1080P CMOS IR Box IP Camera, 36 pcs IR LED lights, built-in 2.8-12 mm varifocal lens	28
3	Outdoor Waterproof IR Box	2.1 Megapixel CMOS IR Box IP Camera, 4 pcs the 3rd generation IR LED lights, built-in 5-15 mm varifocal lens. **With heater.**	55
4	Outdoor Waterproof IR Box	2.1 Megapixel CMOS IR Box IP Camera, 4 pcs the 3rd generation IR LED lights, built-in 5-15 mm varifocal lens. **Without heater.**	99
	Total	Floor: B2-Floor: 36pcs; B1-Floor: 75pcs; 1-Floor: 95pcs 2-Floor: 65pcs; 3-Floor: 34pcs	305

4. Network Devices (Switch):

According to the IP camera amount, every floor install 2-4 sets S2226G 24 port 10/100M access switch, these 10/100M switch be connected to 1000M core switch on Central Control Room, then the data be transmitted to NVR and, decoders, management software

In the central control room, we need to use 2 set 24 port 1000M Ethernet core switch (two switches mutual backup).

All switches are below:

No.	Floor	Item	Description	Amount
1	B2-floor		24 port PoE 10/100M, 2 1000M Ethernet ports	2
2	B1-floor		24 port PoE 10/100M, 2 1000M Ethernet ports	4
3	1-floor		24 port PoE 10/100M, 2 1000M Ethernet ports	4
4	2-floor		24 port PoE 10/100M, 2 1000M Ethernet ports	3
5	3-floor		24 port PoE 10/100M, 2 1000M Ethernet ports	2
6	Central Control Room	S5700-28C-EI-24S	24 10/100/1000Base-T ports	1 + 1
7		Total		17

5. Storage Device: Network Video Recorder (NVR)

The system use PC-based 64ch D1 / 50ch 720P / 25ch 1080P NVR, it's a high performance storage device.

- Video format: 1080P, 25fps

- Bit rate: 4Mbps

- Recording hours per day: 12 hours

- Recording days: 30days

- Cameras amount: 305 pieces

- Storage space (TB) : = bit rate / 8 * 3600s * hours * days * cameras / 1024

$$= \quad GB /1024= \quad TB$$

=4Msbps / 8 * 3600s/hour * 12hours * 30days * 305 / 1024 /1024 = 188 TB

● Every hard disk capacity: 3TB

The formatting will waste 10% space, the 3TB hard disk's useful space is 2.7TB.

● Total disk amount: 188TB / 2.7TB = 70 (pieces)

This solution use 8 bay SATA hard disk driver NVR which support RAID5, RAID5 need one redundant hard disk, so every NVR can provide 7 pieces useful hard disk.

● Total NVR amount = 70 / 7 = 10 (sets)

But every NVR only can support max 25ch 1080P, 305 / 25= 12.3 >10, so we need 12 sets NVR.

6. Management & Monitoring Systems


Management system:

The system use 2 set high performances PC to manage all cameras. The PC configuration at least is Intel Dual Core i5 / i7 CPU, 2G RAM, 2G Graphic Card, 1000M Ethernet Interface. The video software management software on the computer can add, grouping, edit, delete, monitor, update all cameras and NVRs, use can monitor the 1/4/9/16/25/36ch video on the one screen, and also can divide all camera into many groups, for example 16ch per group, then can switch it one by one.

If using big TV wall matrix, user can output the image to the big display via HDMI, therefore, every user can clearly watch the image.

Monitoring System:

If we want to display the video on the monitor, we need to use network video decoder convert digital video from IP camera to analog video then output to monitor, Histream's central decoder can support 8 piece decoder boards, every decoder board can support 1ch 1080P / 2ch 720P / 4ch D1 video, so one central decoder can decode 8ch 1080P / 16ch 720P / 32ch D1 video and output eight channels 1080P high definition video to eight monitors. This solution plan to use 2 set central decoders and 16 set 42" 1080P LCD monitor. We have a TV Wall virtual matrix management software, it can manage, group, switch video decoder to decode different cameras. We will divide 300 pieces camera into 5 group, every group include 64 pieces cameras, every group display for 12 second, so it will spend for 1 minute to display all cameras.

Matrix TV Wall Software   Central Video Decoder   42" 1080P LCD
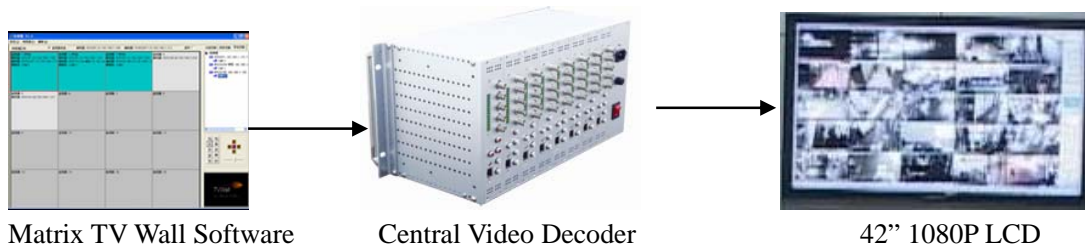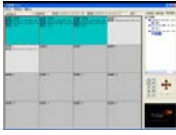
In addition, we advise to use 4x4 46" big TV wall matrix, it can combine 4 channel 1080P HD display.

7. Total Device List

No.	Item	Description	Amount	Price	Total
1	Indoor IR Dome	2.1 Megapixel Low-light 1080P CMOS Indoor Dome IP Camera, 2 axis (vertical & horizontal) adjustable, built-in POE,15pcs IR LED lights, 8m. IR-Corrected Lens	116		
2	Indoor IR Box	2.1 Megapixel Low-light 1080P CMOS IR Box IP Camera, 36 pcs IR LED lights, built-in 2.8-12 mm varifocal lens	22		
3	Camera Mount	For indoor IR box camera	22		

4	\nOutdoor Waterproof IR Box	2.1 Megapixel CMOS IR Box IP Camera, 4 pcs the 3rd generation IR LED lights, built-in 5-15 mm varifocal lens.\nBuilt-in Heater	55		
5	\nOutdoor Waterproof IR Box	2.1 Megapixel CMOS IR Box IP Camera, 4 pcs the 3rd generation IR LED lights, built-in 5-15 mm varifocal lens.\nWithout Heater	111		
6	\nHeavy Camera Mount	For outdoor IR box camera	166		
7	\n24 Port PoE Ethernet Switch	24 10/100M, 2 1000M Ethernet ports\nPoE (IEEE 802.3af 15.4W)	15		
8	\n24 Port Ethernet Switch	24 10/100/1000Base-T ports	2		
9	\nNVR: NVR-64	● 64ch D1 / 50ch 720P / 25ch 1080P\n● 8 Bay Hot swappable(Max 24TB)\n● RAID0/1/5/JBOD\n● Intel® Xeon® Quad Core Process	12		
10	\nHard Disk: ST3000DM001	7200.14, Drive Only, 3TB, SATA 6Gb/s, 64MB,	80		
11	\nDecoder: HH5B08-MP	● 8ch 1080P HDMI/VGA/YPbPr output\n● 8 piece 1080P decoding board, max support 32ch D1 / 16ch 720P /1080P\n● 19 inches standard 5U Chassis	2		
12	\n42" 1080P HD Monitor	1920X1080,42" LCD, HDMI,DVI,VGA input	16		
13	\nBig TV Wall Display	● LG 47" TFT LCD video wall display ,\n● Industrial grade A+ LCD panel, higher performance,\n● Support multi-windows, PIP &POP	1		

14	HP Compaq 8280 Elite MT(BX384AV))	Intel Core i7 2600 | 3.4GHz | 4GB | 500GB	2		
15	VideoManagement Software	Free	2	0	0
16	Virtual TV Wall Software	free	1	0	0
17	UPS	Integrator buy it from local market	0	0	0
18	Installation Charges		0	0	0
	Total				162,935