



# **"Smart Street Light Operation System" Street Light Power Supply And Wireless Transmission System and Network Management System Design**

## **Foreword**

In the past 10 years, the topic of "Smart Street Light Operation System" has become a lot of concern and favor of many domestic and foreign technology manufacturers and operating system vendors and system erectors. Many ideas about the creative application and future development of the "Smart Street Light Operation System" have been put forward.

In the past five years, we have owned "Outdoor Street Light DC Uninterruptible Power System" and "Outdoor Multi-point Relay Jumper Wireless Transmission System" and "Multiple Integrated Power Supply Equipment around Power Supply System" that have been in operation for many years. Many manufacturers who want to invest in the "Smart streetlight operation system" have come, but after countless conferences and test and display applications over the past few years, they have finally ended. Exploring the reasons, personal recognition is as follows:

1. There are a lot of creative ideas in the sky, and the feasibility of system operation is very low.
2. Say a good "Smart streetlight operating system", but it is empty-handed, without any actual product and actual combat experience.
3. A highly viable creative system, but they didn't know that their pocket is not deep enough.
4. If the pocket is deep enough, but the professional system of the project manager is insufficiently understood, the dominant direction is wrong; or it is considered that it can dominate everything, resulting in failure of the project execution.
5. There is still a chance for pocket depth, and the creative system is also right, but the construction requirements of low price and low cost are introduced, and the wrong product technology and low-cost unstable system are introduced.
6. Everything is well prepared, and it still owes "mature profitable business model", "support from government



regulations", "find the long-term partner of the right", "the cooperation of owners of street lamp property rights or management operators", "the cooperation of the owner or manager of the power source" etc.

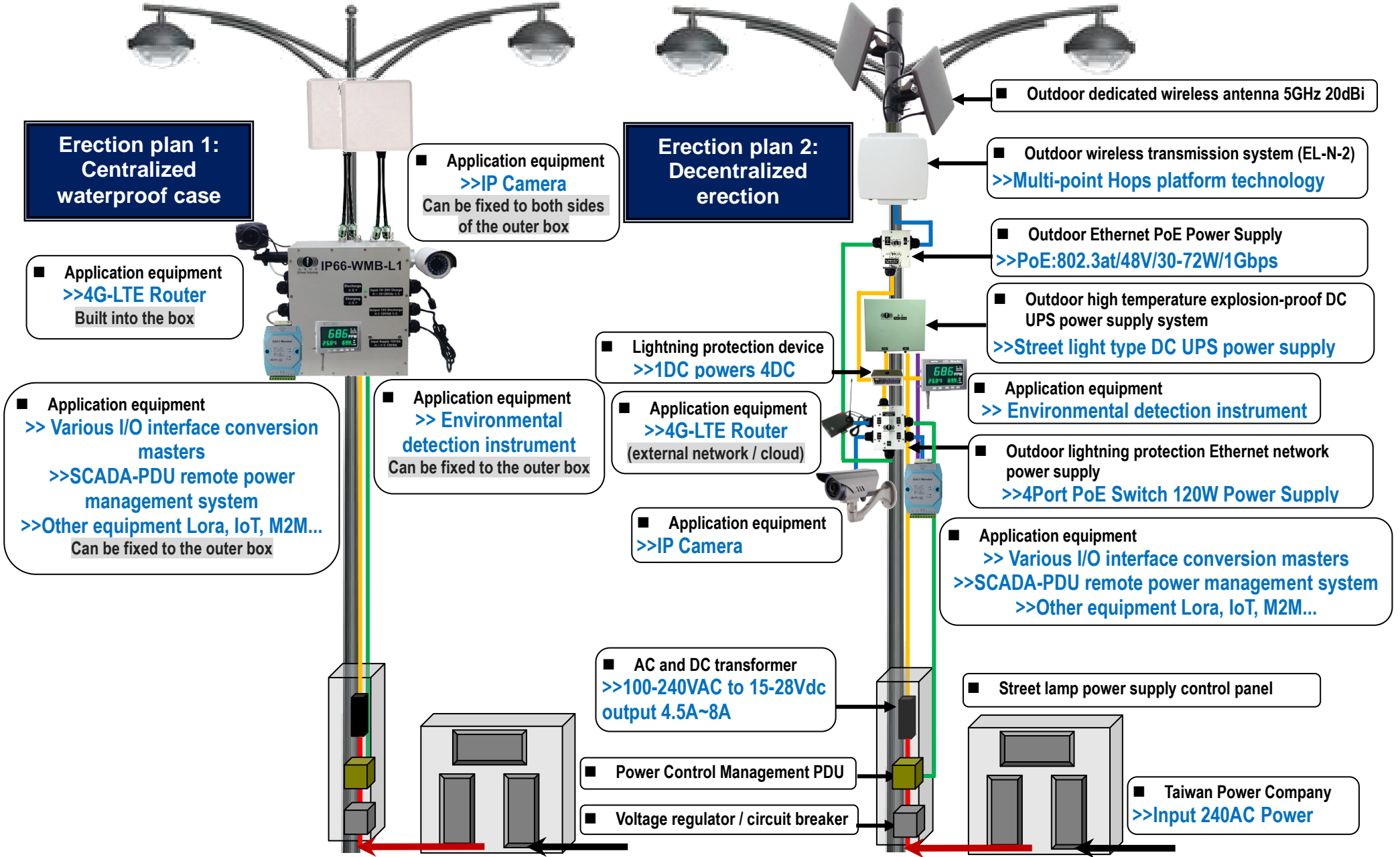
So far, we have only seen thunder and heavy rain, and have not seen the "Smart streetlight operation system" that is truly successful. However, we still believe that the "Smart streetlight operation system" is the right direction, the inevitable development trend in the future, and the industry that has the opportunity to operate for a long time, and the success or failure will inevitably occur in the next 10 years.

How to cut into the best business operation mode of "Smart Street Light Operation System"? How to introduce a pragmatic, system-feasible "Smart Street Light Operation System"? How to use it in the last 5 years in "Smart Street Light Operation System"? It is the manufacturers who want to invest in this industry to think deeply and make decisions.

In the exhibition hall of "Taoyuan Agricultural Expo" in April 2018, our Multi-technology team introduced the prototype of "Smart Street Light Operation System" - "SCADA-PDU Remote Power Management System", After all the problems caused by the operation of more than six months, identifying problems, solving problems, preventing problems, and planning for the future, let us feel that the actual success of the "Smart streetlight operation system" has seen a little bit of success, and then It is a step-by-step implementation of planning and thorough implementation and the introduction of more long-term operational profit-making models, which will inevitably lead to the successful profit-making business model of the "Smart street lighting operation system".

The following is a brief introduction to the various technologies that have been "actually operated" and the orientation of the erection; when the business platform of the "Smart Street Light Operation System" is set up, how to play and introduce long-term profit-making mode, and wait for the intelligent right person appear to be "everything is ready"!!

# Preliminary definition of integrated system and erection scheme for "Smart Street Light Operation System"



# "Smart Street Light Operation System" outdoor high temperature DC UPS power supply estimation design

## Estimation of "Integrated System Power Consumption and Power Supply"

### ■ Integrated system "power consumption" estimate (defined by actual power consumption)

1. Outdoor wireless transmission system (EL-N-2): 8W/H
2. Outdoor Ethernet PoE Power Supply (DPOE-PSP1248-OA): 0.5W/H
3. Outdoor high temperature explosion-proof DC power supply system (charge and discharge control board): 1W/H
4. Lightning protection device (LPDC-4D10KA-C): 0.2W/H
5. Outdoor lightning protection Ethernet power supply (DPOE-OSW1248-4): 2W/H
6. 4G wireless router (R200L): 4.3W/H
7. Digital IP camera (including 20 meters IR): 5W/H (9W/H) => 7W/H
8. Environmental detection instrument (estimated power consumption): 4W/H
9. Various I/O interface conversion main control terminals (estimated power consumption): 5W/H

**Total estimated power consumption per hour of the integrated system: 32W/H**

### ■ Outdoor DC UPS "power supply" estimation design

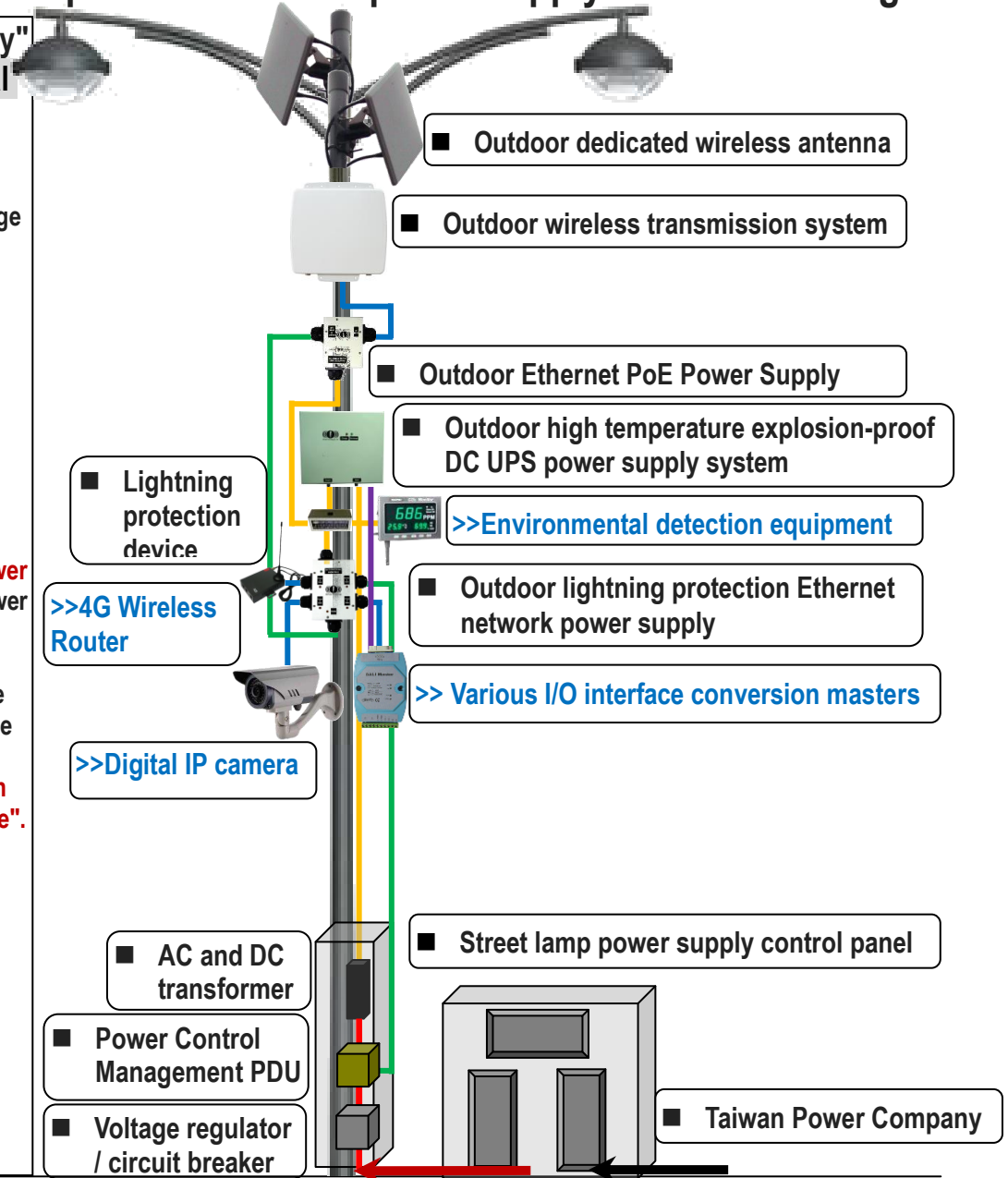
1. Taiwan's streetlight control system's four season power supply hours, "the minimum power supply time is about 10 hours", so it is estimated that the design of street lamp DC UPS power supply to the integrated system operating power, it is recommended to "power supply 14 hours or more" design is better.
2. If it is necessary to consider the temporary increase in power supply hours caused by the temporary power outage or the need to maintain operational requirements in response to the power outage, it is recommended to design the operating capacity of "more 3 hours".
3. Consider the lithium iron phosphate battery "Use of 5 years of power capacity attenuation of about 20%", it is recommended to design the battery capacity of "more than 25% increase".

**Recommended battery power capacity: (32W/H X (14H+2H)) X125% = 680W**

**Suitable product model: USSP-1256-10B 716WH (56Ah @ 12.8V)**

### ■ Estimation of "charging time" for simultaneous operation of street lamp power supply DC UPS

1. Maximum daily power consumption: 32W/H X 14H = 448W
2. Outdoor DC UPS maximum charging wattage per hour: 14.4V X 5.4A = 77W/H
3. Estimation of charging time: 448W / (77-32)W/H = 9.95H; can be fully charged within 10H
4. It is recommended that the total power consumption of the integrated system should be controlled below 32W/H; if it exceeds 32W/H, it is recommended to design 2 sets of system to distribute power.



# Introduction of outdoor high temperature explosion-proof DC UPS power supply system of "Smart Street Light Operation System"

## ■ IOP- USSP-1256-10B model introduction

>>Aluminum shell built-in lithium iron phosphate battery power capacity:

**716 WH (56Ah @ 12.8V)**

>>UPS marked capacity (DC power factor is 1):

**4296VA (4.3KVA)**

>> Emergency power supply time ( by 36W/H):

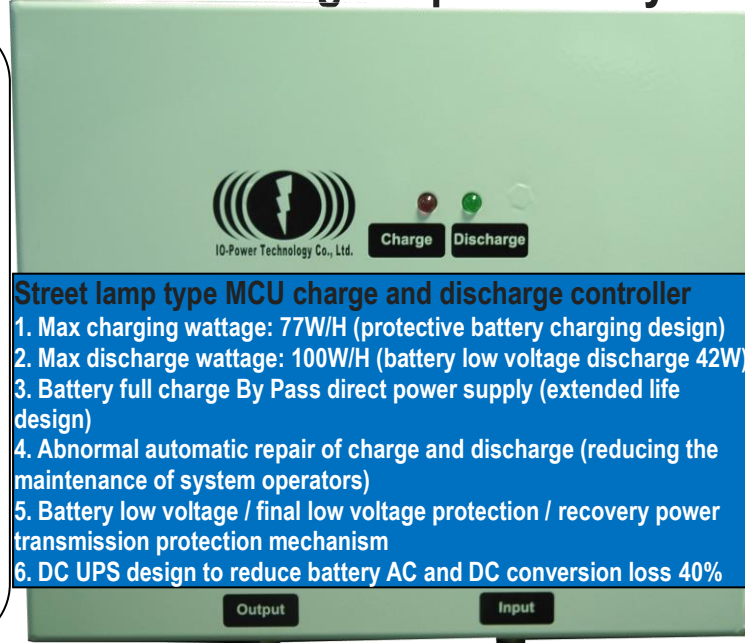
**About 18 hours**

>> Fully powerless DC UPS battery time:

**11.5 hours @ 5A charging**

>> Product cycle life time:

**More than 6 years**



## Street lamp type MCU charge and discharge controller

1. Max charging wattage: 77W/H (protective battery charging design)
2. Max discharge wattage: 100W/H (battery low voltage discharge 42W)
3. Battery full charge By Pass direct power supply (extended life design)
4. Abnormal automatic repair of charge and discharge (reducing the maintenance of system operators)
5. Battery low voltage / final low voltage protection / recovery power transmission protection mechanism
6. DC UPS design to reduce battery AC and DC conversion loss 40%

## ■ Hardware and mechanism and interface characteristics

>>Lightweight design of aluminum shell mechanism

>>Small volume design 21(L) x20(W) x19.5 cm(H)

>> Weight 7.7kg, only about 50% weight of lead-acid battery

>>Outdoor IP66 sealed dustproof and waterproof grade

>>Safety mechanism with low temperature (@ -35°C) and excessive temperature (@ +75°C)

>>With RS-485 output input interface control management

>>Support industrial-grade MODBUS communication development agreement

>>M12/DC head can be expanded with series and parallel power supply equipment

## ■ DC 11.5-14.4Vdc output power supply

>>Battery full output 100W maximum

>>Battery low voltage (12.8V) Minimum output 42W

>>Low voltage protection 11.5-12Vdc (within 5% of power remaining)

>>Output power supply protection mechanism after low voltage protection

>>Output short circuit protection

>>Output polarity reverse protection

>>Output over voltage protection

>>Output over current protection

>>The output end protection against lightning or power surges up to 1300W

## ■ 100-240VAC AC to DC input charging

>>15-28Vdc/4.5-8A/14.4V @5A 72W charging

>>Input short circuit protection

>>Input polarity reverse protection

>>Input overvoltage protection

>>Input over current protection

>> Input protection against lightning or power surges up to 1300W

**Special note: The street lamp power supply line is used under the wet ground for a long time. The line itself is affected by the rust and mold, which is very likely to cause serious problems such as stability, glitch and noise in the power supply. It is necessary to strengthen the protection especially at the input end.**

# The outdoor DC UPS of the "Smart Street Light Operation System" can be combined with other peripheral equipment expansion functions.

## 1 to 4 parallel power supply: 1DC to 4DC power supply lightning and surge protection device application diagram

1 input power is turned on into 4 output power supplies  
 Independent lightning protection for each DC power supply

1 input power supply is connected in series to 7 output power supplies  
 Independent lightning protection for each DC power supply

Input power supply total power wattage required  
 Greater than >  
 Output power supply total wattage or more



**Special reminder: 1 to 4 parallel power supply, can be used for 60Vdc DC system power supply; AC system can only be used for 24VAC power supply**

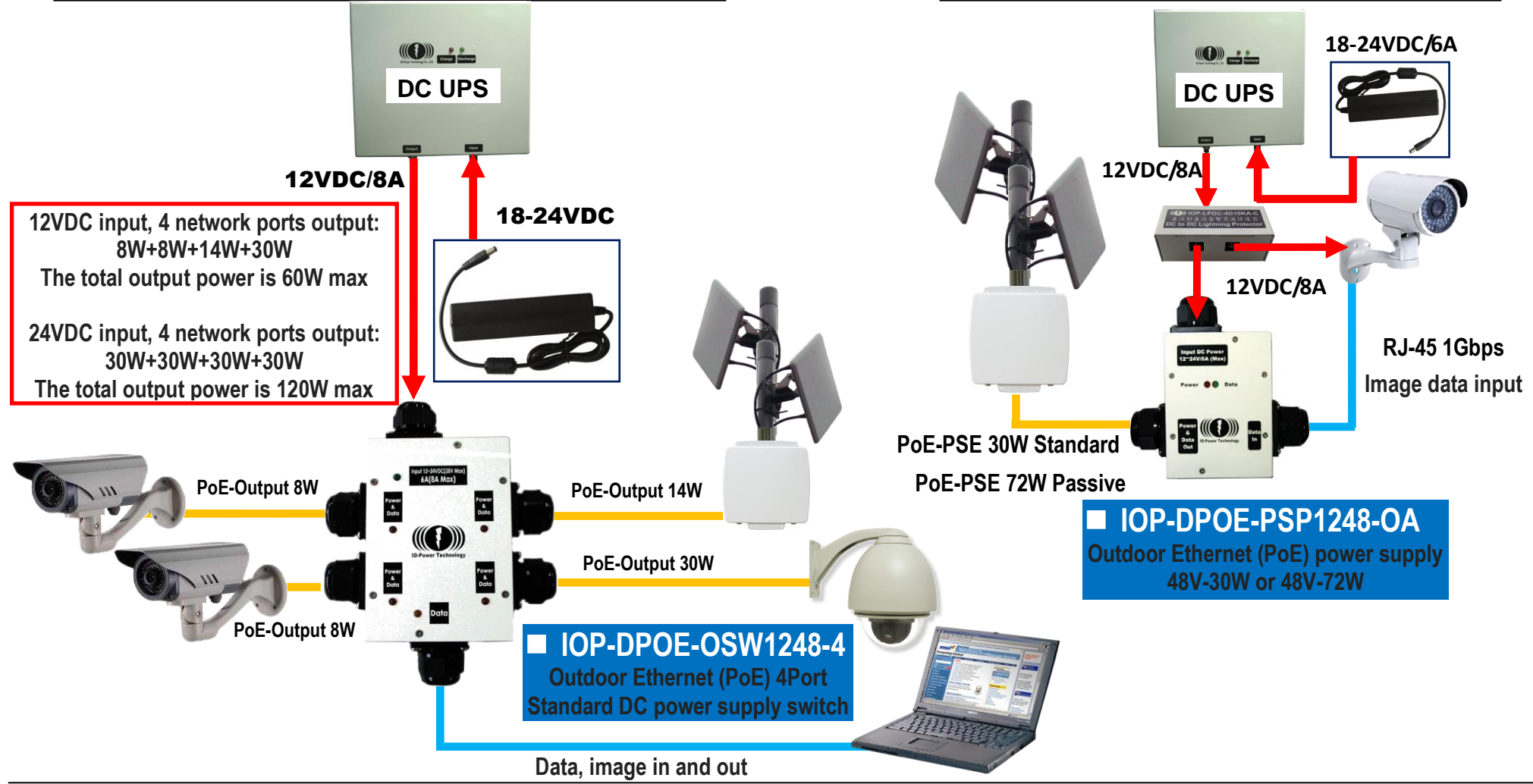
# Ethernet power supply:

## 1. Outdoor 4 Port PoE Ethernet power supply switch 60W system diagram

## 2. Outdoor PoE Ethernet power supply (standard and high power type)

■ Outdoor lightning protection surge shock 4 Port PoE power supply switch

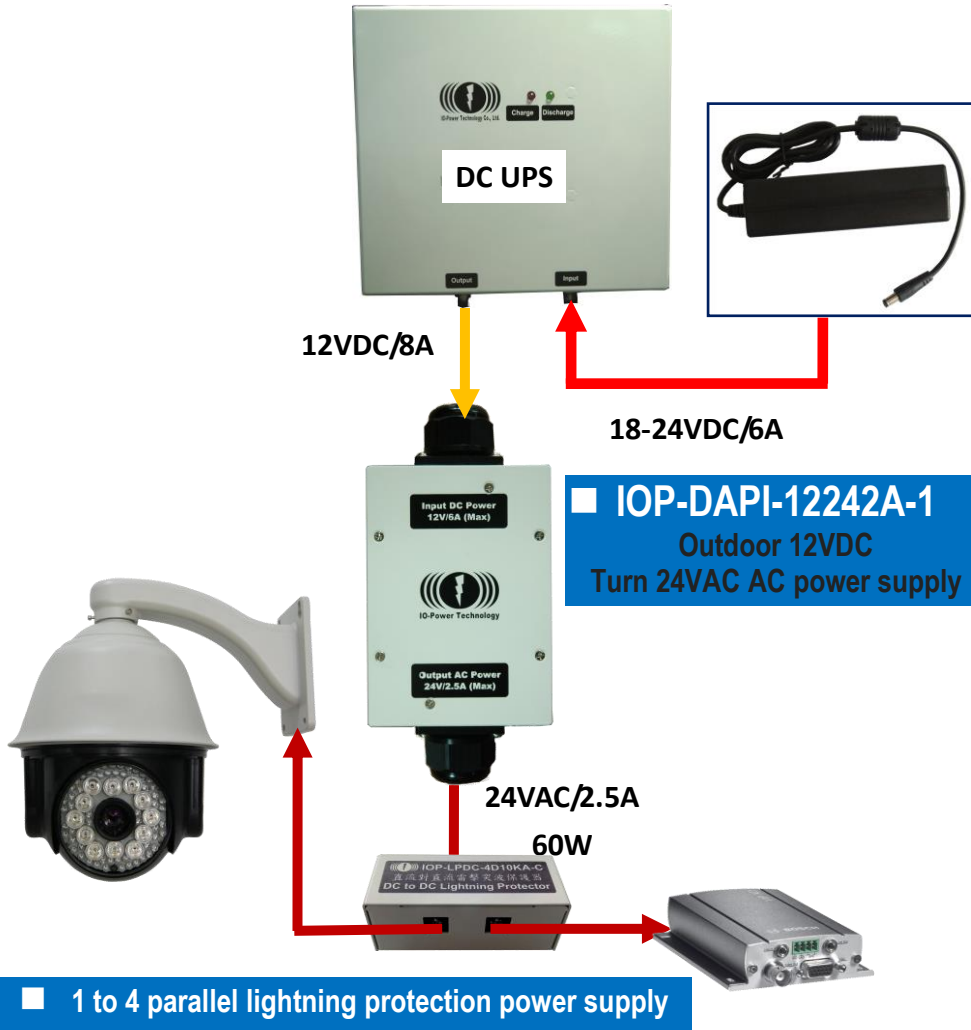
■ Outdoor dual mode PoE Ethernet power supply



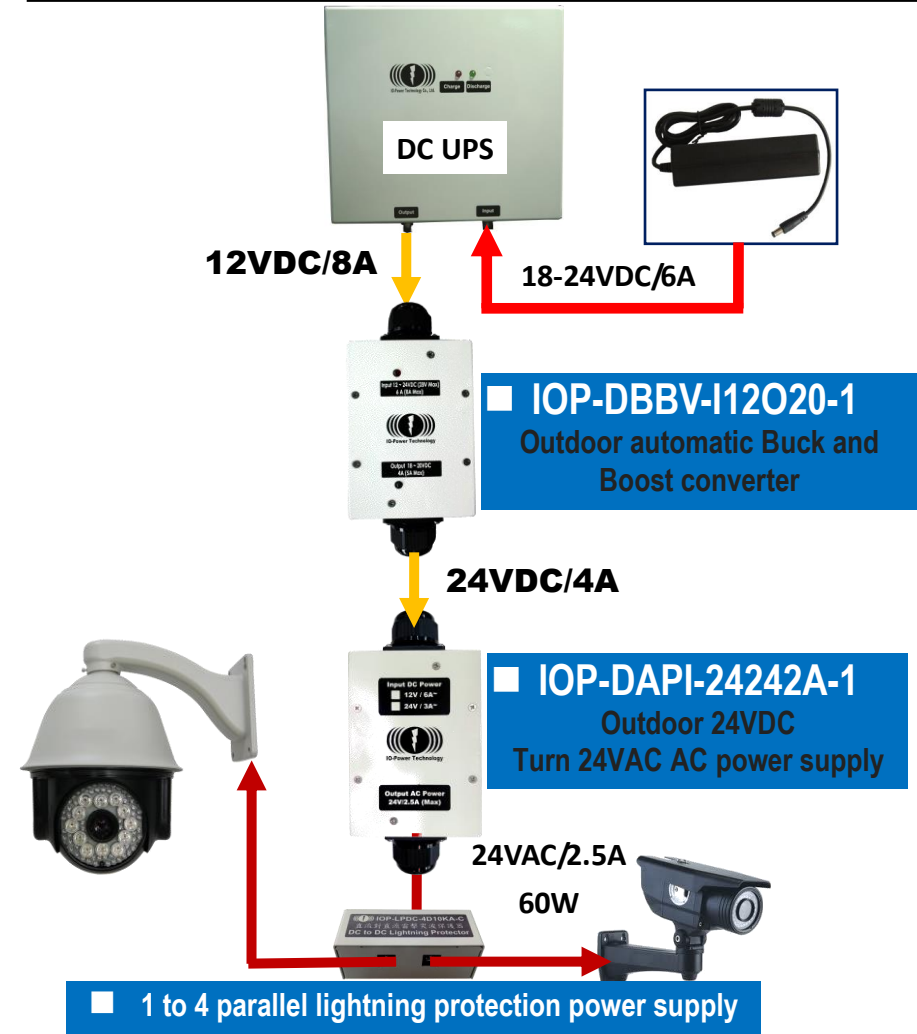
## DC to AC power supply to the camera:

1. Input 12Vdc to output 24VAC, power supply to the Speed Dome
2. Input 24Vdc to output 24VAC, power to 24VAC AC equipment

### Outdoor input 12Vdc to output 24VAC transformer

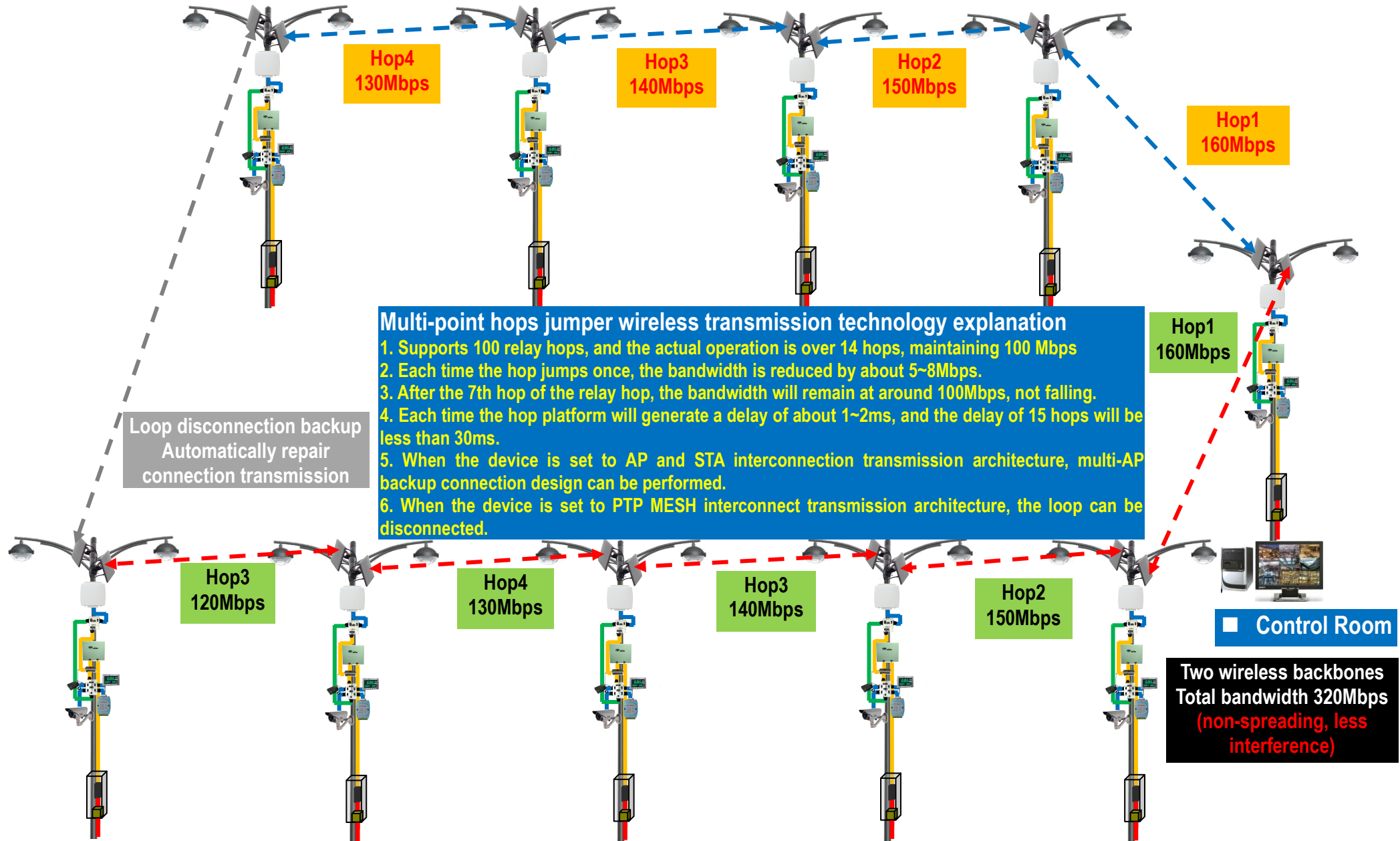


### Outdoor input 24Vdc to output 24VAC transformer

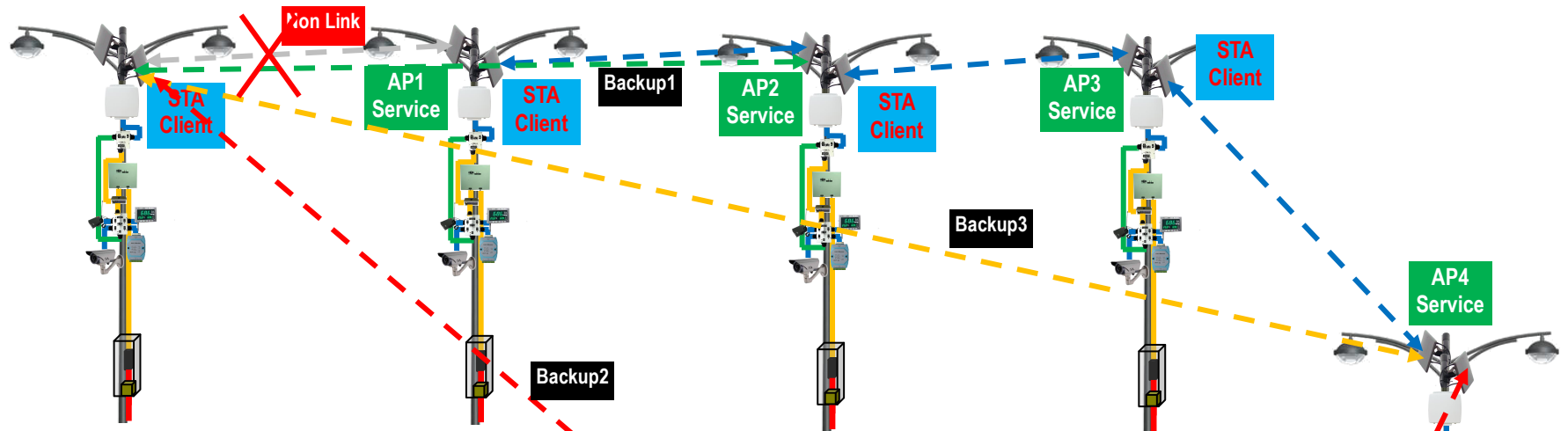




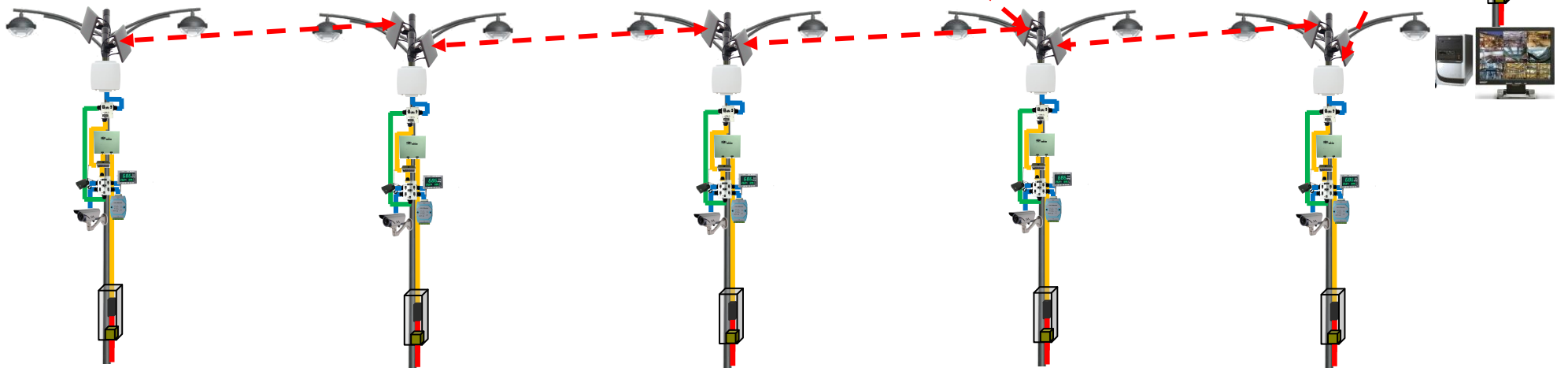
## "Smart Street Light Operation System" wireless transmission system uses "multi-point hops" technology to explain



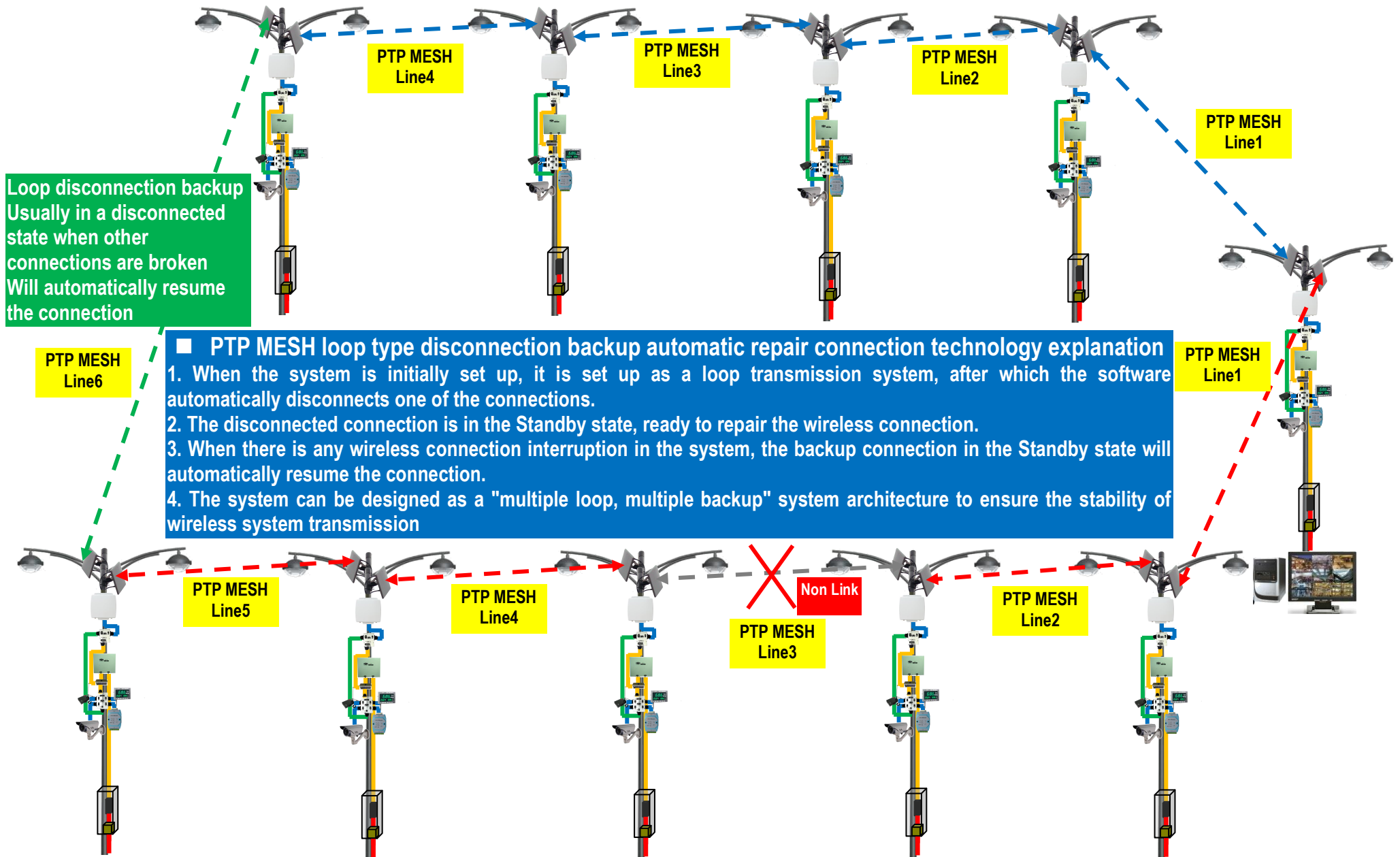
## "Smart Street Light Operation System" wireless transmission system adopts "Hops Multi-AP Backup Connection" technology



- Multiple hops wireless multi-AP backup connection design technical explanation
1. The STA client can be repaired according to the "Startup backup connection after disconnection" Or according to the "preset signal change value, forcibly perform backup connection search in advance".
  2. The number of backup connection APs supports the SSID (AP name) backup of up to 3 AP devices.
  3. The pre-device assists the AP device, which can set the sequential scan connection and switch scan time function.
  4. Pre-device assistance AP device, can set preset channel or preset encryption password function

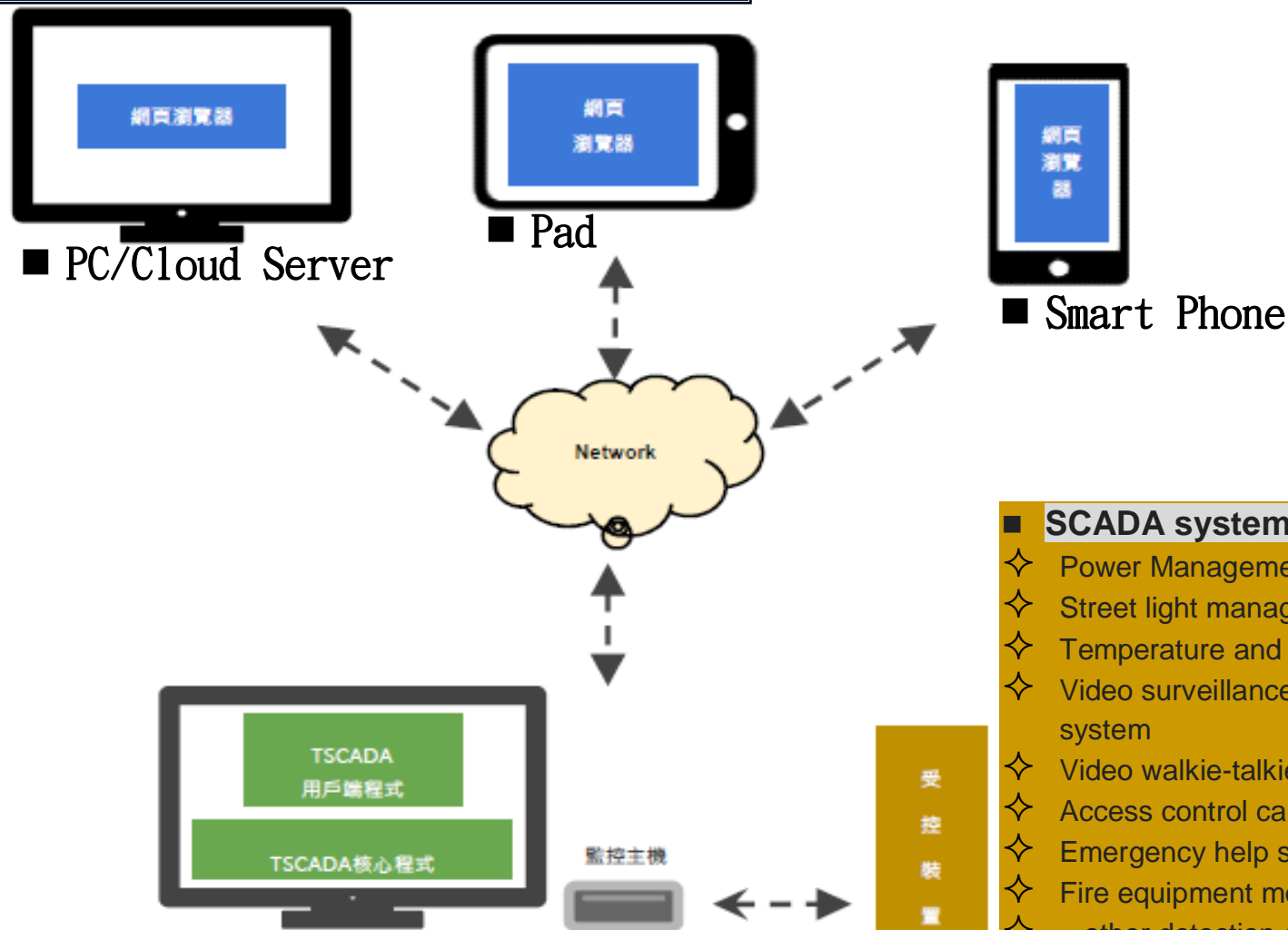


## "Smart Street Light Operation System" wireless transmission system adopts "Hops Multi-AP Backup Connection" technology



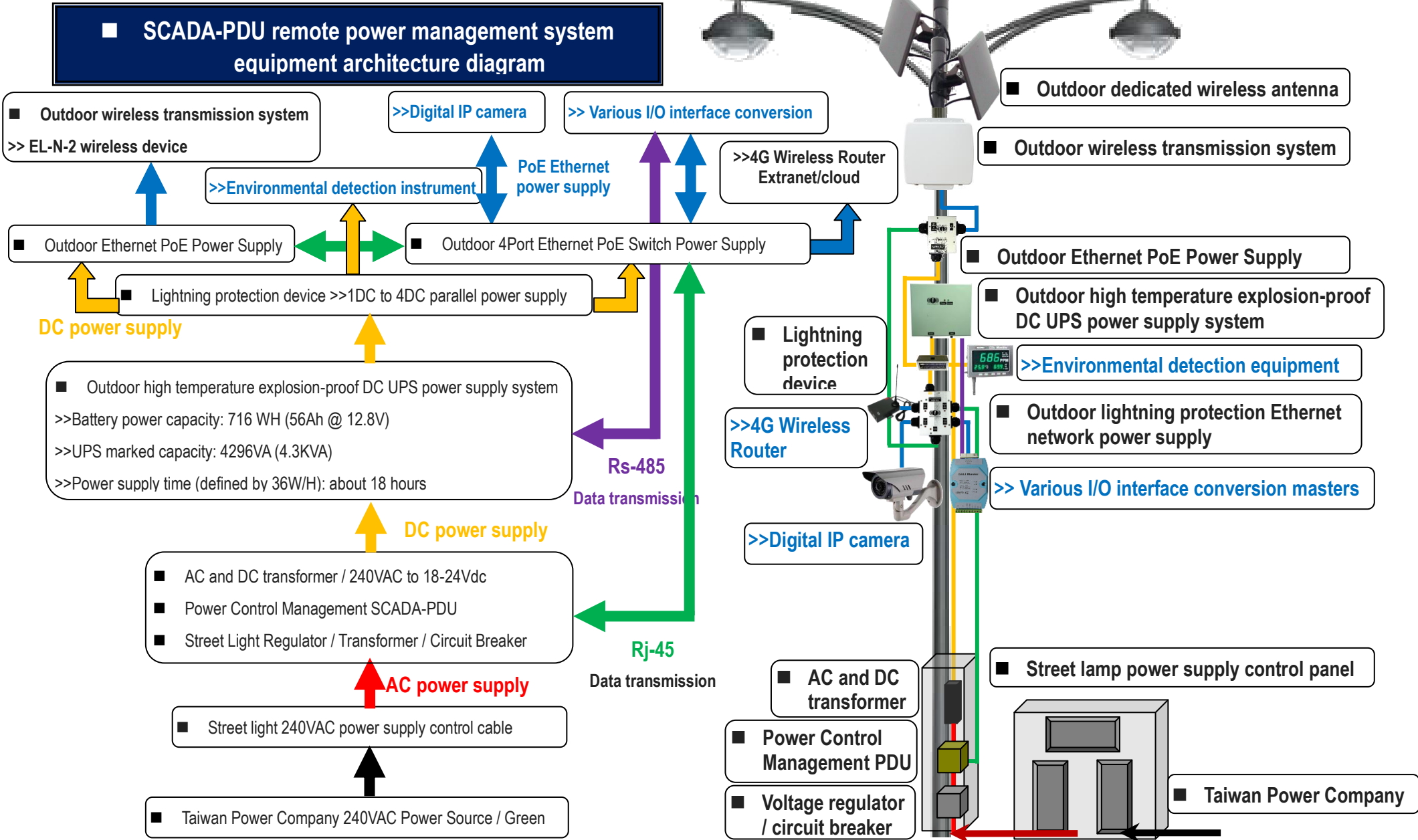
## ◆ Taoyuan Agricultural Expo "SCADA-PDU Remote Power Management System" Operation Case Description

### ■ SCADA-PDU remote power management system



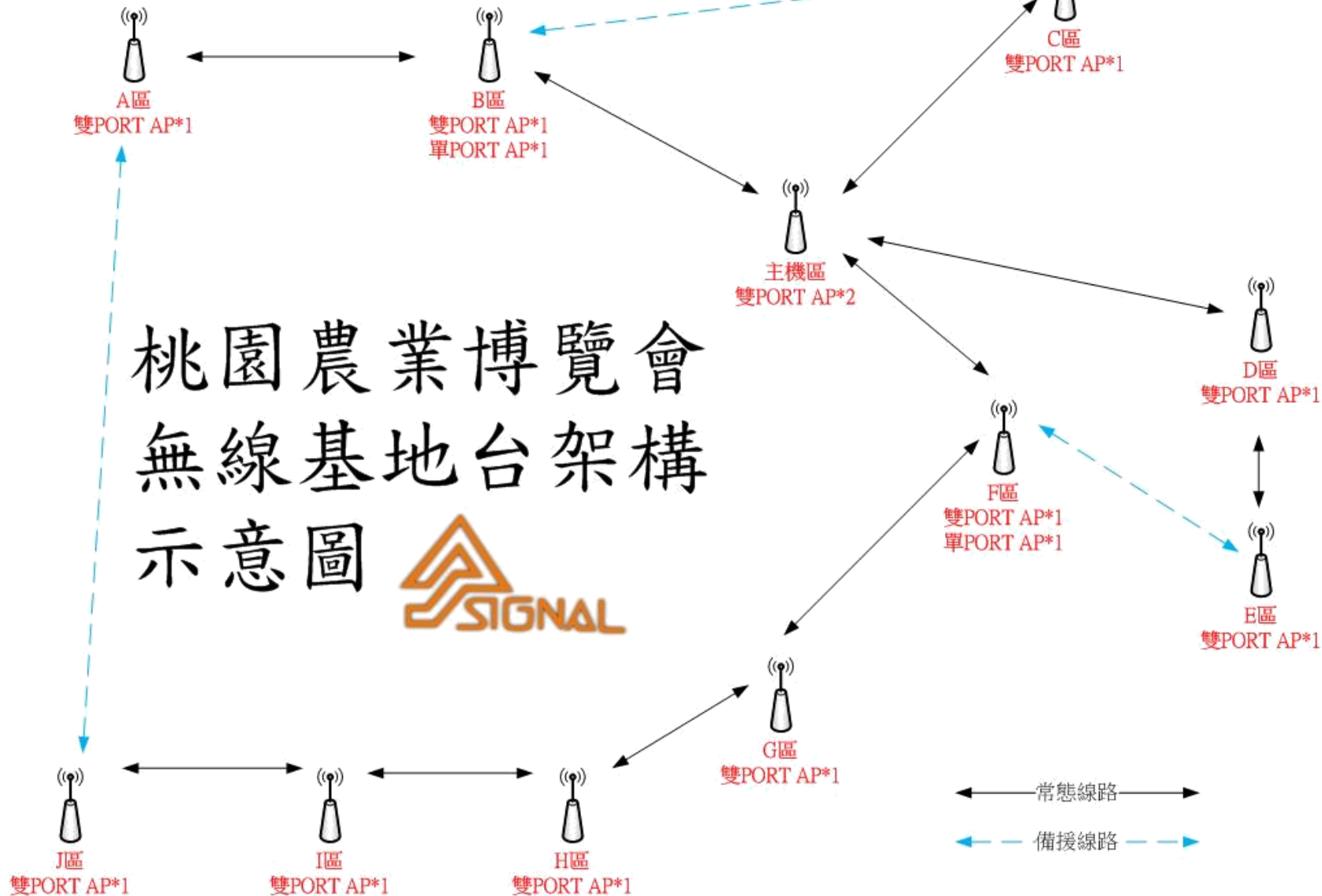
- **SCADA system controlled device group**
  - ◇ Power Management (PDU) System
  - ◇ Street light management control system
  - ◇ Temperature and humidity sensing system
  - ◇ Video surveillance system and graphic control system
  - ◇ Video walkie-talkie system
  - ◇ Access control card machine control system
  - ◇ Emergency help system
  - ◇ Fire equipment monitoring system
  - ◇ ...other detection devices or systems

## ◆ Taoyuan Agricultural Expo "SCADA-PDU Remote Power Management System" Operation Case Description



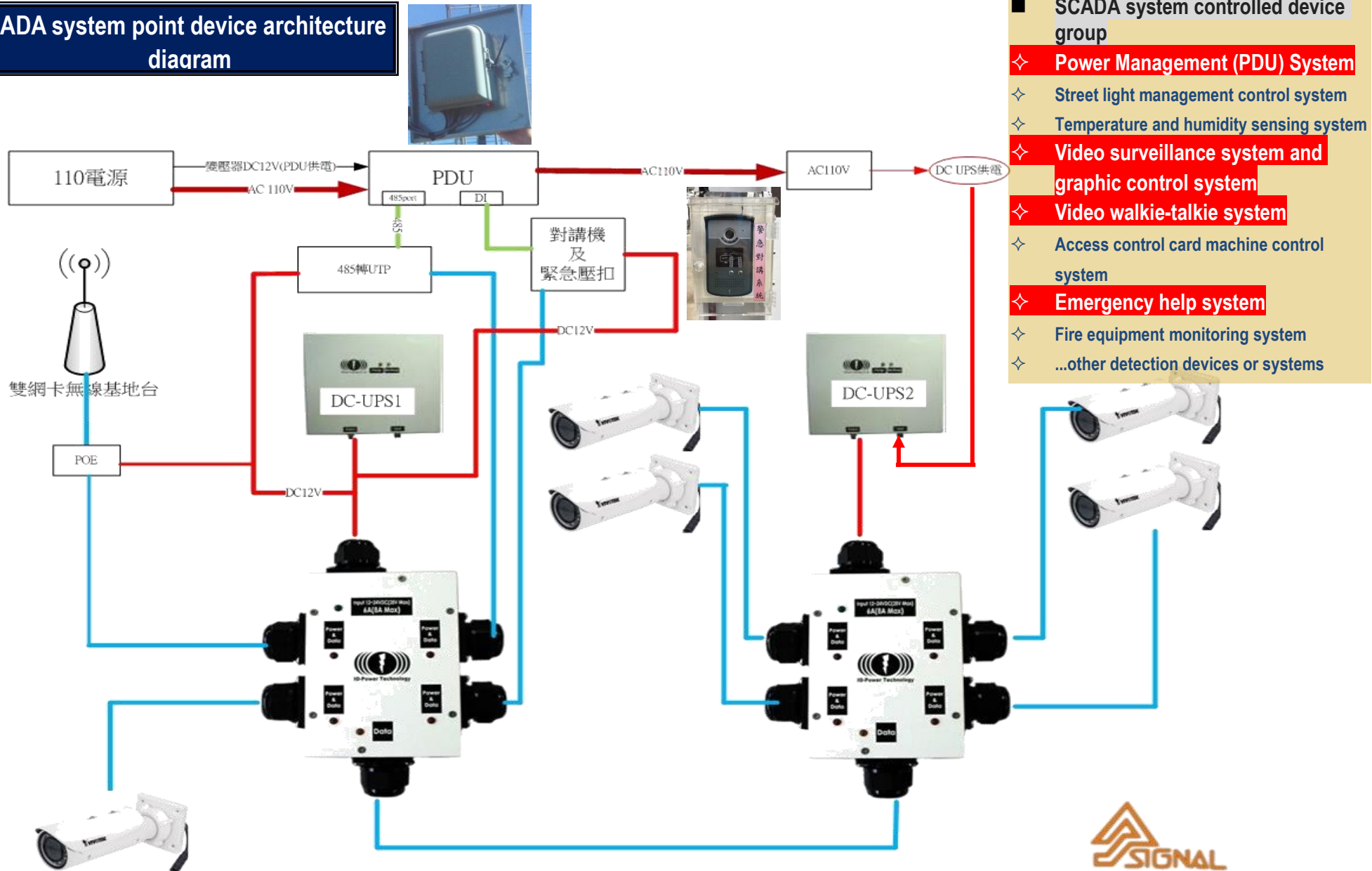
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### ■ PTP MESH wireless multi-point relay jumper circuit backup transmission system



## ◆ Taoyuan Agricultural Expo "SCADA-PDU Remote Power Management System" Operation Case Description

### ■ SCADA system point device architecture diagram

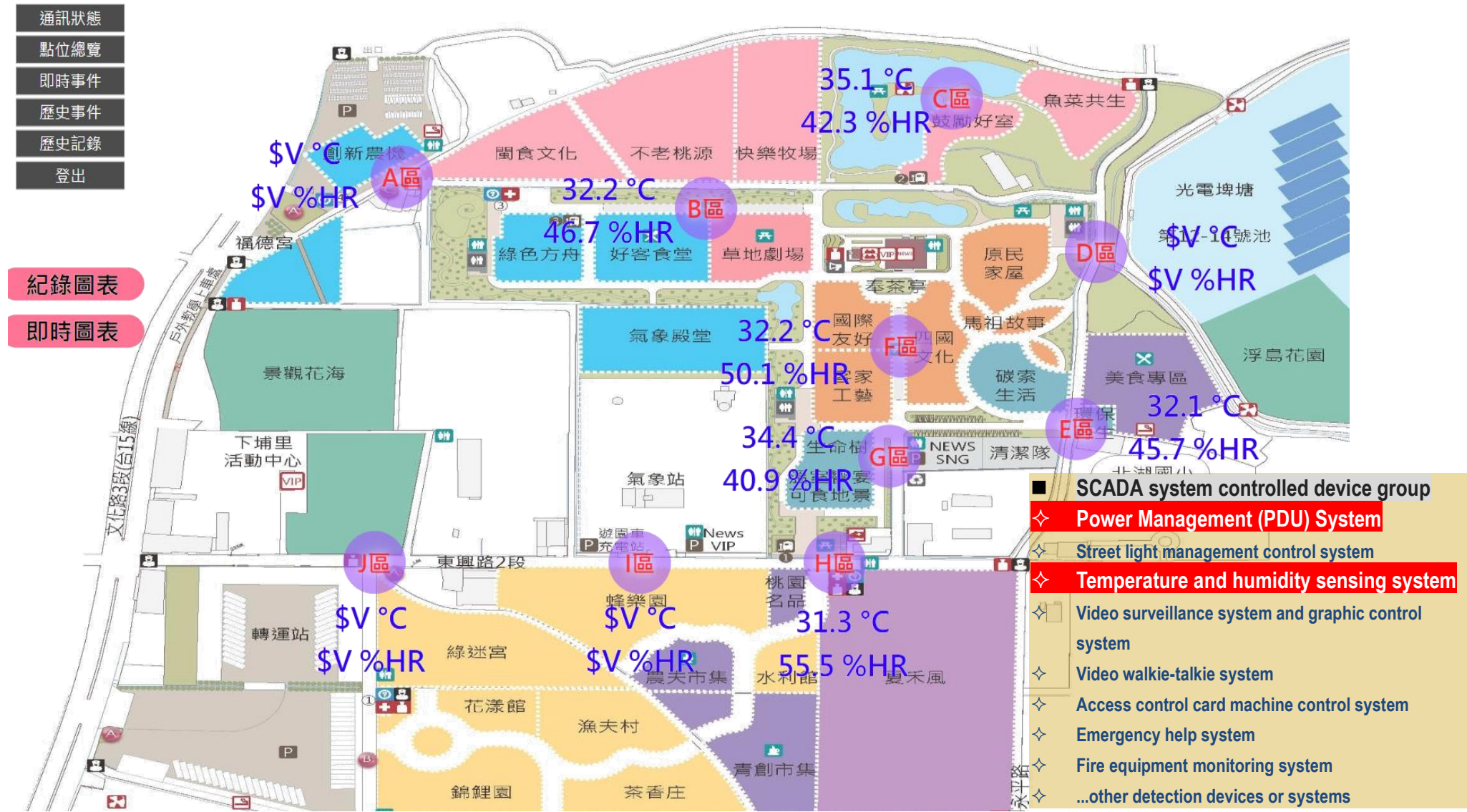


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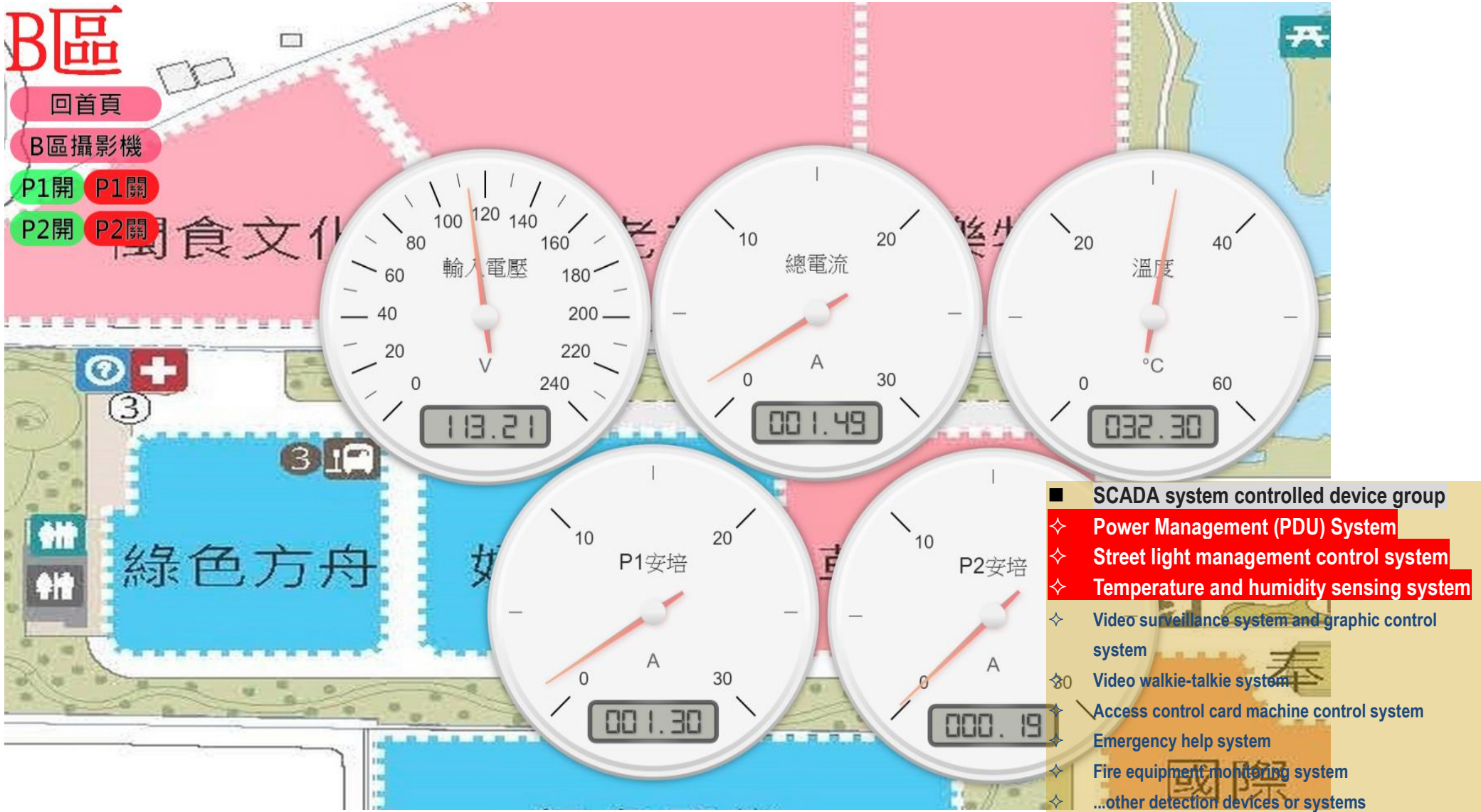
### ■ SCADA system operation status map





## ◆ Taoyuan Agricultural Expo "SCADA-PDU Remote Power Management System" Operation Case Description

### ■ Detailed information on each point of operation of the SCADA system



## ◆ Taoyuan Agricultural Expo "SCADA-PDU Remote Power Management System" Operation Case Description

### ■ Monitor display during operation of SCADA system (graphic control system)

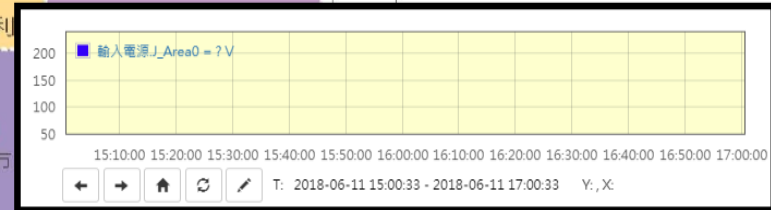
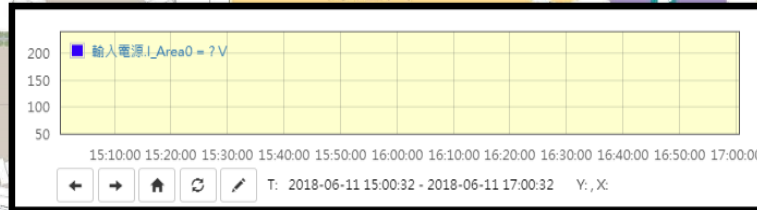
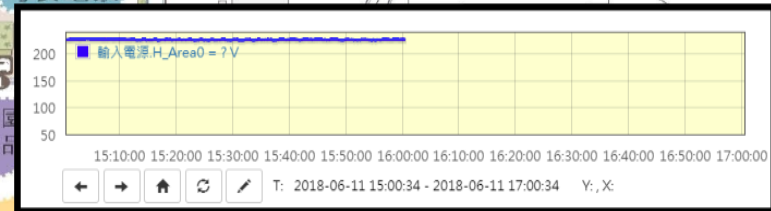
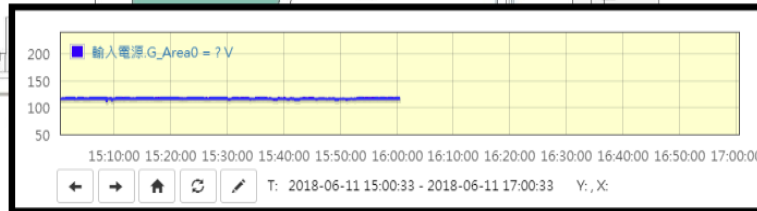
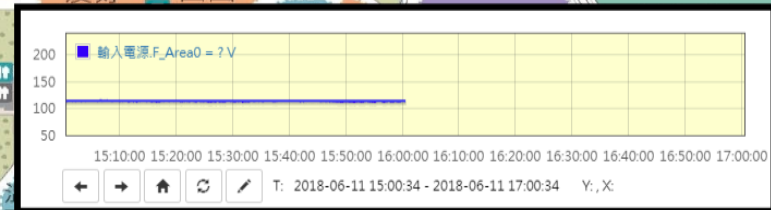
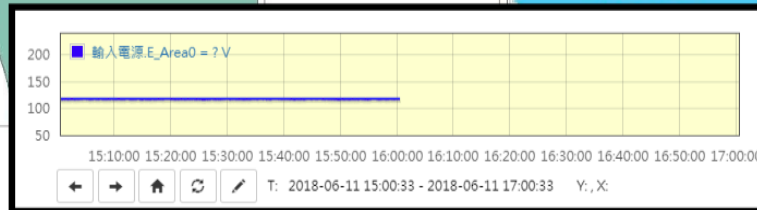
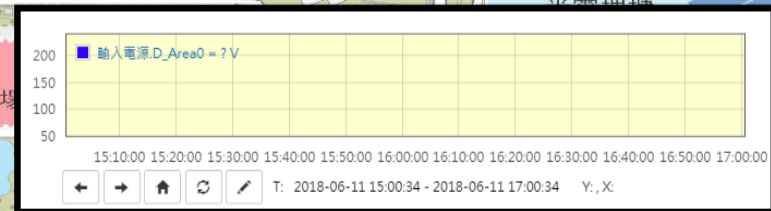
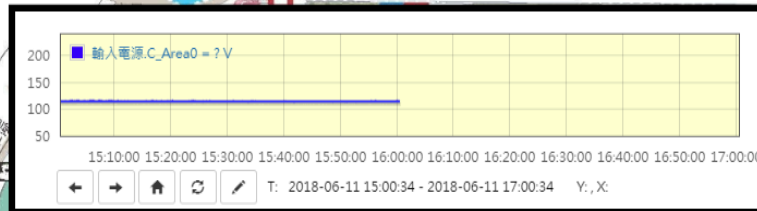
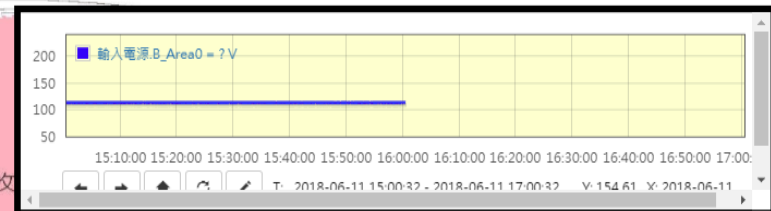
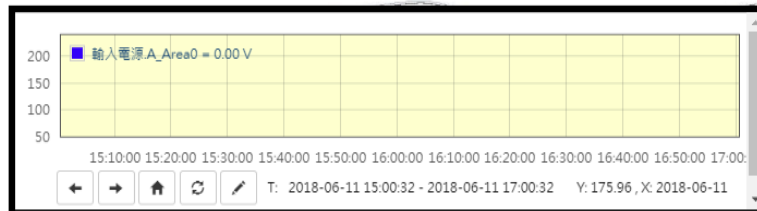


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## ◆ Taoyuan Agricultural Expo "SCADA-PDU Remote Power Management System" Operation Case Description

### Instant information chart for SCADA system operation

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## ◆ Taoyuan Agricultural Expo "SCADA-PDU Remote Power Management System" Operation Case Description

### ■ Data history of SCADA system operations

資料記錄查詢

起始時間  結束時間

記錄表  查詢 匯出結果

\* 起始及結束時間必須同時指定或者都不指定!!

找到 2392762 筆記錄

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記錄時間	A_Area0	B_Area0	C_Area0	D_Area0	E_Area0	F_Area0	G_Area0	H_Area0	I_Area0	J_Area0
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2018-05-05 00:00:01	116.9	112.5	114.4	117.7	117.3	112.1	191.9	226.6	0.0	0.0
2018-05-05 00:00:02	116.9	112.5	114.4	117.7	117.3	112.1	191.9	226.6	0.0	0.0
2018-05-05 00:00:03	116.9	112.5	114.4	117.6	117.3	112.3	191.9	226.6	0.0	0.0
2018-05-05 00:00:04	116.9	112.5	114.4	117.5	117.3	112.3	191.9	226.6	0.0	0.0
2018-05-05 00:00:05	116.9	112.4	114.4	117.5	117.3	112.2	191.9	226.6	0.0	0.0
2018-05-05 00:00:06	117.0	112.5	114.4	117.5	117.3	112.2	191.9	226.5	0.0	0.0
2018-05-05 00:00:07	117.0	112.5	114.4	117.5	117.3	112.2	191.9	226.5	0.0	0.0
2018-05-05 00:00:08	117.0	112.6	114.4	117.5	117.3	112.2	191.9	226.6	0.0	0.0
2018-05-05 00:00:09	117.0	112.6	114.5	117.5	117.3	112.2	191.9	226.7	0.0	0.0
2018-05-05 00:00:10	116.9	112.6	114.5	117.5	117.3	112.2	191.9	226.7	0.0	0.0

關閉

事件記錄查詢

起始時間  結束時間

限定點位  查詢

事件名稱  查詢 匯出結果

\* 起始及結束時間必須同時指定或者都不指定!!

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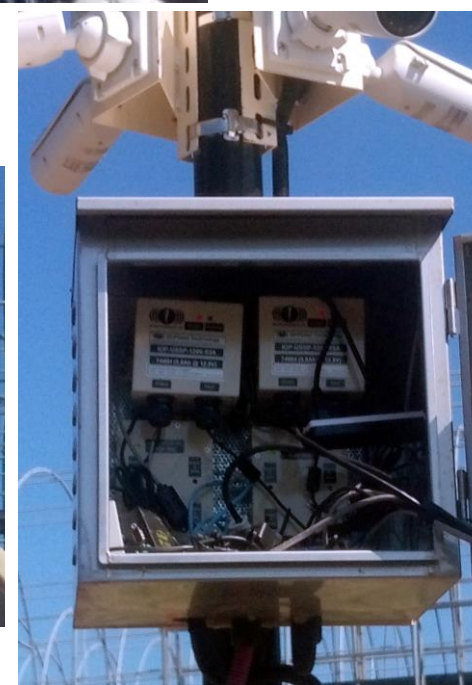
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觸發點位	事件名稱	觸發時間	確認時間	復歸時間	觸發條件	觸發值	記錄值	復歸值	確認人員	狀態
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F_Area0	F區低電壓	2018-05-15 08:48:05	2018-05-15 08:48:05		小於	90	0.0			確認 細節
F_Area8	F區緊急按鈕觸發	2018-05-15 08:48:05	2018-05-16 09:01:33	2018-05-15 08:48:09	0變1	0	1	0	user	確認 細節
F_Area0	F區低電壓	2018-05-15 08:43:30	2018-05-15 08:43:30		小於	90	0.0			確認 細節
H_Area8	H區緊急按鈕觸發	2018-05-15 08:40:22	2018-05-16 09:01:33	2018-05-15 08:40:26	0變1	0	1	0	user	確認 細節
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F_Area8	F區緊急按鈕觸發	2018-05-15 08:36:54	2018-05-16 09:01:33	2018-05-15 08:36:58	0變1	0	1	0	user	確認 細節
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F_Area0	F區低電壓	2018-05-15 08:00:32	2018-05-15 08:00:32		小於	90	0.0			確認 細節

關閉

## ◆ Taoyuan Agricultural Expo "SCADA-PDU Remote Power Management System" Operation Case Description

- Graphical diagram of DC UPS power supply system for wireless devices and IP cameras and emergency video intercoms operated by SCADA system



## ◆ Taoyuan Agricultural Expo "SCADA-PDU Remote Power Management System" System Operation Photo Description

- Zone A: 192.168.X.31 – EL-N-2 Loop Backup – 5 2MP IR IP Cam Cameras + Image Emergency Intercom + Power and Temperature Detection Management System



- Zone B: 192.168.X.32–EL-N-2–12 2MP IR IP Cam Camera +192.168.X.33–EL-N-1 Circuit Backup + Power and Temperature Detection Management System



■ Zone C: 192.168.X.34 – EL-N-2 – 4 2MP IR IP Cam Camera + Image Emergency Intercom + Power and Temperature Detection Management System



■ Zone D: 192.168.X.35 – EL-N-2 – 5 2MP IR IP Cam Camera + Image Emergency Intercom + Power and Temperature Detection Management System



■ Zone E: 192.168.X.36 – EL-N-2 – 4 2MP IR IP Cam Cameras + Image Emergency Intercom + Power and Temperature Detection Management System

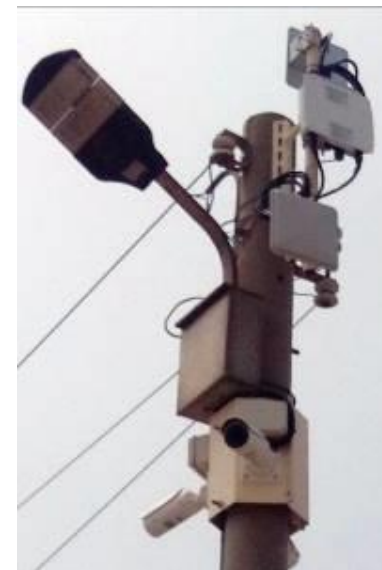


■ Zone F: 192.168.X.37–EL-N-2–6 2MP IR IP Cam Camera +192.168.X.38–EL-N-1 Loop Backup + Power and Temperature Detection Management System





■ **Zone G: 192.168.X.39 – EL-N-2 – 3 2MP IR IP Cam Cameras + Image Emergency Intercom + Power and Temperature Detection Management System**



■ **Zone H: 192.168.X.40 – EL-N-2 – 5 2MP IR IP Cam Camera + Image Emergency Intercom + Power and Temperature Detection Management System**



■ **Zone I: 192.168.X.41 – EL-N-2 – 3 2MP IR IP Cam Cameras + Image Emergency Intercom + Power and Temperature Detection Management System**



■ **Zone J: 192.168.X.42 –EL-N-2 Loop Backup – 3 2MP IR IP Cam Cameras + Image Emergency Intercom + Power and Temperature Detection Management System**





■ Zone ER: 192.168.X.51-EL-N-2 & 192.168.X.52-EL-N-2 – wireless monitoring transmission 4 backbone for 50 cameras



# Taoyuan Agricultural Expo "SCADA-PDU remote power management system" wireless surveillance transmission backbone system collection operation pages

EL\_ML\_Utility(x64) v1.1

Interface : Network adapter 'Realtek PCIe GBE Family Controller' on local host-c8:d3:ff:d3:fc:ce

Init NIC START STOP

Sta	Update	MAC	IP	Model	Firmware	CPU%	MEM%	PPS	UP Time	Seq.
●	10:57:48	34:4f:3f:5f:01:ae	192.168.51	EL-N-2	1.3.1_z	30	34	7531	16:48:30.986	278
●	10:57:48	34:4f:3f:5f:01:c2	192.168.52	EL-N-2	1.3.1_z	30	35	10556	59:40:04.717	278
●	10:57:48	34:4f:3f:5f:01:da	192.168.32	EL-N-2	1.3.1_z	34	38	5854	85:46:25.249	278
●	10:57:48	34:4f:3f:5f:01:b6	192.168.34	EL-N-2	1.3.1_z	9	35	1760	23:34:09.842	278
●	10:57:48	34:4f:3f:5f:01:ce	192.168.37	EL-N-2	1.3.1_z	34	37	6635	111:50:08.792	278
●	10:57:48	34:4f:3f:5f:01:3e	192.168.33	EL-N-1	1.3.1_z	1	30	13	85:46:09.663	278
●	10:57:48	34:4f:3f:5f:01:9a	192.168.31	EL-N-2	1.3.1_z	9	36	1743	21:01:58.065	278
●	10:57:48	34:4f:3f:5f:01:c6	192.168.35	EL-N-2	1.3.1_z	18	36	3563	24:18:30.136	278
●	10:57:48	34:4f:3f:5f:01:a2	192.168.39	EL-N-2	1.3.1_z	30	35	5440	72:33:13.789	278
●	10:57:48	34:4f:3f:5f:01:8a	192.168.38	EL-N-1	1.3.1_z	0	32	9	144:43:15.030	278
●	10:57:48	34:4f:3f:5f:01:b2	192.168.36	EL-N-2	1.3.1_z	6	36	1371	20:26:24.209	278
●	10:57:48	34:4f:3f:5f:01:ba	192.168.40	EL-N-2	1.3.1_z	22	37	3534	140:16:06.995	278
●	10:57:48	34:4f:3f:5f:01:d2	192.168.41	EL-N-2	1.3.1_z	14	35	1869	139:19:35.008	278
●	10:57:48	34:4f:3f:5f:01:ca	192.168.42	EL-N-2	1.3.1_z	4	35	1042	62:17:01.443	278

Node Status : Query Seq. : 278

Status	Counts
●	14
●	0
●	0
●	0
Total	14

Time : 00

F/W Upgrade : 5 Minutes to Reboot

FTP Server IP : . . .

EL f/w name :

ML RSU f/w :

ML OBU f/w :

Notes :

Steps :

1. Select Correct Interface.
2. Press Init NIC Button to initialize NIC.
3. Set Check Level Number @ GreenYellow fields.
4. Set Query Interval @ Time GreenYellow field.
5. Press START Button to discover network.
6. Press STOP Button to stop discovering.

Msg : Init NIC...  
 Msg : Init NIC Success!!  
 Msg : Start discovering...



# Taoyuan Agricultural Expo "SCADA-PDU remote power management system" wireless surveillance transmission backbone system collection operation pages




- The wireless surveillance transmission system have four backbone and 50 cameras is combined with a total bandwidth of more than 100 Mbps (system design total traffic bandwidth is 500 Mbps)




## Taoyuan Agricultural Expo "SCADA-PDU Remote Power Management System"

### List of equipment for outdoor wireless surveillance transmission system and outdoor DC UPS power supply system

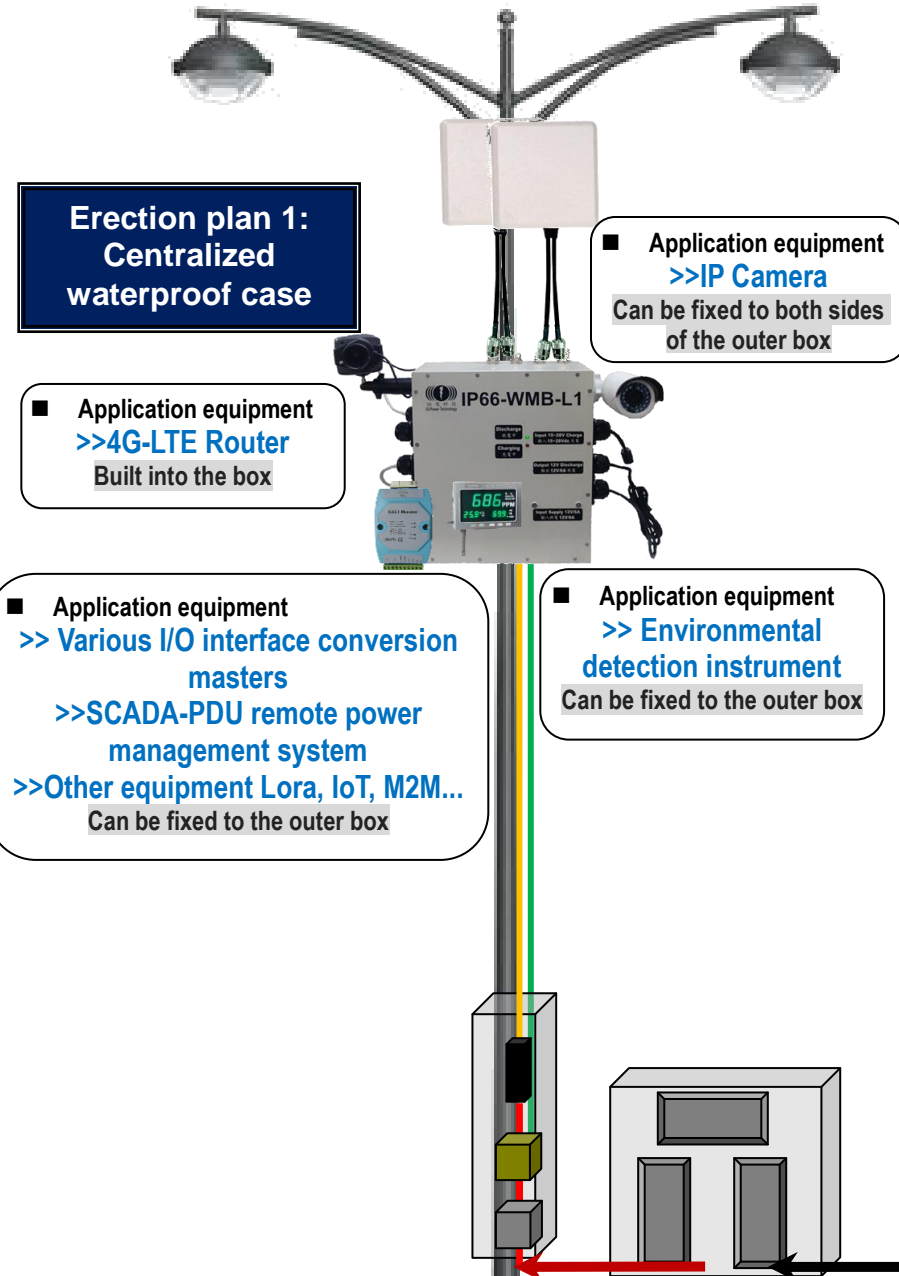
No.	Device Name	Product Model	Main Spec	amount	Remark
1	Point-to-point wireless PTP Mesh network base station	EL-N-1 (1RF Module) 	<ol style="list-style-type: none"> <li>1 * WiFi MIMO 2*2 RF Module (802.11a/g/n)</li> <li>Support Frequency 2.3~2.7GHz/4.9~6.1GHz or Single 4.9~6.1GHz</li> <li>System Support PTP Mesh network wireless transmission</li> <li>RF output power 23dBm or 26dBm (Max) single Band</li> <li>Support PTP &amp; Ethernet Jump Docking Extend Features</li> <li>Support 10 hops has low latency in reply under 15ms</li> <li>Extension to build the wireless Mesh network structure wireless backbone system applications</li> <li>Support backhaul bandwidth 200Mbps (40MHz)</li> <li>Deployment Wireless Mesh Structure in &gt;= 8hops have over 150 Mbps TCP Throughput</li> <li>Outdoor Waterproof and Dusty support IP68</li> </ol>	2	
2	Point-to-point wireless PTP Mesh network base station	EL-N-2 (2 RF Modules) 	<ol style="list-style-type: none"> <li>2 * WiFi MIMO 2*2 RF Module (802.11a/g/n)</li> <li>Support Frequency 2.3~2.7GHz/4.9~6.1GHz or Single 4.9~6.1GHz</li> <li>System Support PTP Mesh network wireless transmission</li> <li>RF output power 23dBm or 26dBm (Max) single Band</li> <li>Support PTP &amp; Ethernet Jump Docking Extend Features</li> <li>Support 10 hops has low latency in reply under 15ms</li> <li>Support multi-point interface module PTP Mesh multipath network backup system set up</li> <li>Extension to build the wireless Mesh network structure wireless backbone system applications</li> <li>Support backhaul bandwidth 300Mbps (40MHz)</li> <li>Deployment Wireless Mesh Structure in &gt;= 8hops have over 150 Mbps TCP Throughput</li> <li>Outdoor Waterproof and Dusty support IP68</li> </ol>	12	

3	Outdoor WiFi MIMO 5GHz 16dBi Dual Linear Panel Antenna	<p>IOP-PANJO-5M1602422</p> 	<p>1.Frequence:5150 - 5875 MHz 2.Gain: 16dBi 3.Polarization : Dual Linear +- 90° 4.H:15-19° / V:17-21° 5.Connector: N-Jack RG233, 70cm Cable *2 6.Weight: 0.8Kg 7.Dimensions: 210 x 210 x 73 mm 8.IPX5 9.Survival wind speed: 216Km/hr</p>	28	
4	Indoor and outdoor DC UPS power system	<p>IOP-USSP-1206-03A</p> 	<p>1.Product type: in/outdoor ultra long-term UPS power system/IP66 resistance to fire beam head/iron shell 2.Supported battery type: Explosion-proof Relief-type C-LiFePO4 Lithium Batteries 3.Built in battery power capacity: 74WH (5.8Ah @12.8V) 4.Load voltage/current: DC 11.7~14.2V+-3% 6A Max 5.Battery charging voltage: 14.4V+-3% 6.Operation Temperature : - 35℃ ~ + 75℃ 7. Charge &amp; Discharge Life Cycle: 2000 times (around 6 years) 8.Outdoor Waterproof and Dustproof Rating: IP66</p>	20	
5	Outdoor DC12V to 48VDC 4 Port PoE Switch (OSW1248)	<p>IOP-DPOE-OSW1248-4</p> 	<p>1.Input DC Voltage : 12~24VDC (28V Max) 2.Input DC Current : 12VDC 6A (8A Max) / 24VDC 6A (8A Max) 3.Output PoE DC Voltage : 48VDC (56VDC Max) 4.Output DC Current &amp; Watts : 0.62A Max / 30W Max 5.12VDC Input, 4 Port Output : 15W+15W+15W+15W or 30W+15W+7W+7W 6.24VDC Input, 4 Port Output : 30W+30W+30W+30W 7.Support Each Ethernet Bandwidth :10/100/1000Mbps (1Gbps) Bandwidth 8.Ethernet Cable SPEC : Cate 5 ~ 5e support 100Mbps, Cate 6 ~ support 1Gbps</p>	22	

			<p>9.Compatible with IEEE802.3 / 802.3u / 802.3af / 802.3at PoE Standard</p> <p>10.Transform Efficiency : 90%</p> <p>11.Operating Temperature : -40°C ~ +80°C</p> <p>12.Dust &amp; Waterproof Rate : IP67</p>		
6	Outdoor 12~24VDC Auto Power Selector Output 8A Max (DAPS)	<p>IOP-DAPS-I3O18A-1</p> 	<p>1.Input DC Voltage : 12~24VDC (28V Max)</p> <p>2.Input DC Current : 12VDC 6A (8A Max) / 24VDC 6A (8A Max)</p> <p>3.Output DC Voltage : Same Input highest DC Voltage</p> <p>4.Output DC Current : 6A (8A Max)</p> <p>5.Support Multiple Input Power Source -- Solar / Wind Power / AC to DC Adapter Power / Others Green Power ...</p> <p>6.Support Parallel Connection Mode &amp; Redundant Power Back up</p> <p>7.Support Independent Charging &amp; Discharge Circuit Protection</p> <p>8.Support Independent battery Charging &amp; Discharge Protection</p> <p>9.Support Multi System Stack Function</p> <p>10.Transform Efficiency : 90%</p> <p>11.Operating Temperature : -40°C ~ +70°C</p> <p>12.Dust &amp; Waterproof Rate : IP67</p>	1	



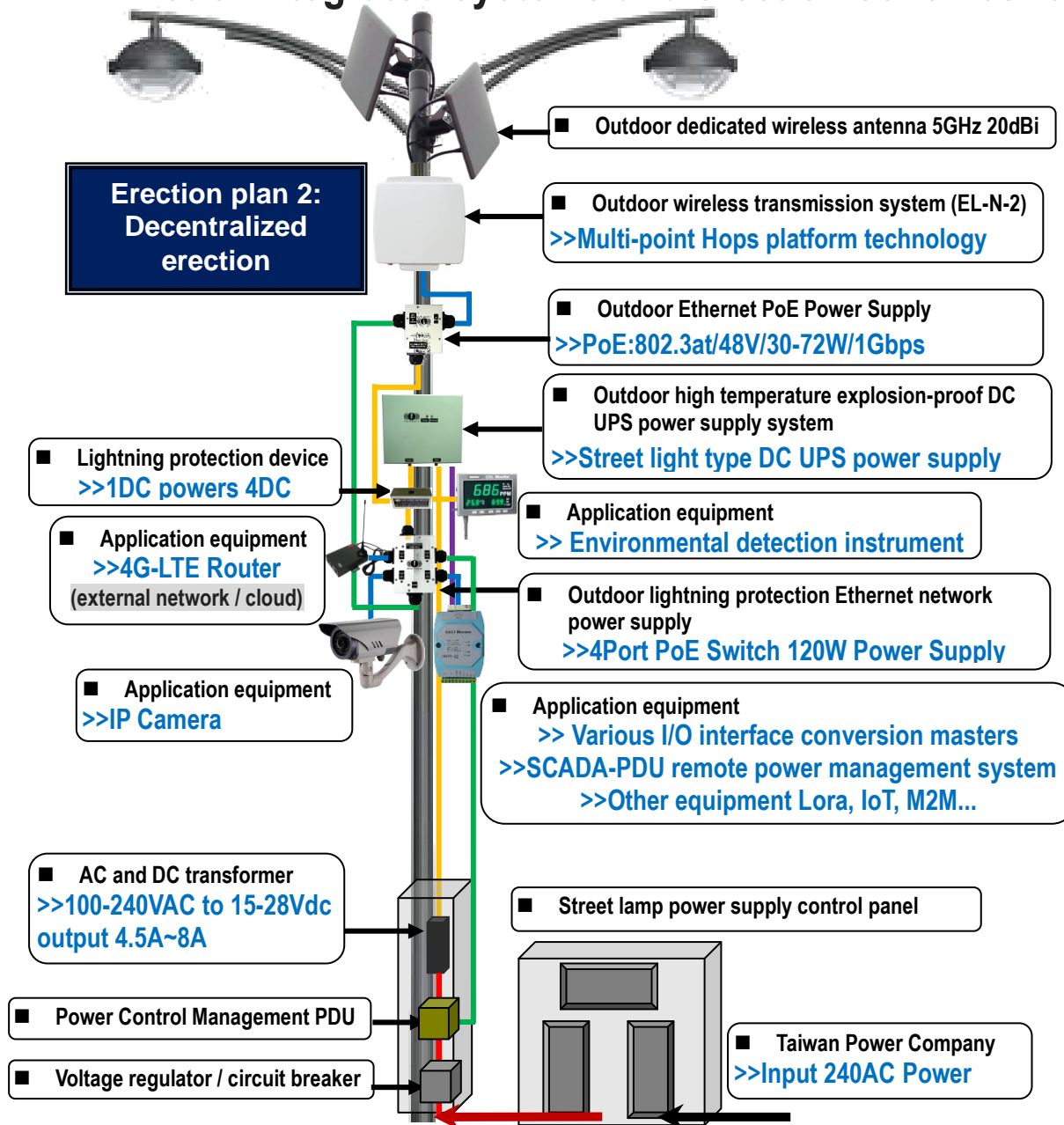
# List of integrated systems and erection schemes for "Smart Street Light Operation System"



Product Model: IOP-E2XB-SP29-STEP-540			
No.	Device / Model	Amount	Remark
1	Base station dedicated MIMO antenna -- Plate-oriented medium-sized gain antenna <b>IOP-PANJO-5M1602422</b>	2	Transmission distance up to 2.5Km Full speed 160Mbps
2	Point-to-point wireless PTP Mesh network base station <b>IOP-EL-N-2 (2RF Modules)</b>	1	2RF double backbone Total bandwidth 300Mbps
3	Outdoor Ethernet PoE Power Supply <b>IOP-DPOE-PSP1248-OA</b>	1	Support standard 30W and Support high power 72W
4	Outdoor high temperature resistant explosion-proof DC UPS power supply system <b>IOP-USSP-1256-10B (for street lamps)</b>	1	716 WH is approximately equal to 4296VA (4.3KVA)
5	Lightning protection device -1DC powers 4DC <b>IOP-LPDC-4D10KA-C</b>	1	Parallel backup power supply 10KA @ 8/20µs
6	Outdoor lightning protection Ethernet 4P power supply <b>IOP-DPOE-OSW1248-4</b>	1	30W per port Total power supply 60-120W
7	4G wireless router (external network / cloud) <b>IOP-R200LC (R200LC-W)</b>	1	R200LC-W supports WiFi Internet access
8	SCADA-PDU remote power management system <b>\$\$</b>	1	Defined according to actual needs
9	Digital IP camera	1	Defined according to actual needs
10	Environmental detection instrument	1	Defined according to actual needs
11	Various I/O interface conversion masters	1	Defined according to actual needs
12	Other equipment Lora, IoT, M2M...		Defined according to actual needs

&& Built into the protective isolation case / ## Built-in fixed point inside the box / @@@ Built into the cabinet + External expansion battery / \$\$ Externally attached to the outside of the cabinet

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