WIRELESS MESH NETWORK EMERGENCY COMMUNICATION SYSTEM

Shenzhen Safe Guard Co., Ltd.
COFDM SPECIALIST
Mobile Video Data & Voice Wireless Communication

SFCT

TACTICAL COMMAND NODE

Wireless IP MESH Network Communication System

- ◆ Features of IP MESH
- ◆ Manpack IP MESH
- ◆ Handheld IP MESH
- ◆ Airborne/Vehicle-mounted IP mesh

IP MESH adopts Safe Guard's (SFGT) key technology of COFDM modulation and ad-hoc network as its core, allows a group of mesh nodes form a seamless and highly safe private centerless network in NLOS and moving conditions. The COFDM IP MESH network can be in chain network, star network, or random networks. The chain network is ideal for range extension to reach a maximum range. The star network is great for application in urban environment mission coverage. The random network allows mesh nodes to organize themselves in any shape.

Unlike other wireless solutions, the IP MESH has self-managing ability, up to 32 mesh nodes working simultaneously. The COFDM IP MESH keeps adjusting itself when node working in moving condition, to select the best route for range extension and signal communication between each mesh node. What's more, the IP MESH also has self-healing features, when one of the node stops working, the rest of the nodes can communicate with each other directly or through one or more intermediate nodes. With high flexibility in mesh topology, the data and video can be exchanged in poin-to-point, poin-to-multipoint or multipoint-to-multipoint.

The non-centralized IP MESH wireless communication system has the technical characteristics of rapid deployment, MIMO multi-hop networking, security and stability, and supports the transparent transmission of general IP data such as video, voice, and data. It is suitable for rescue, disaster relief, emergency and other scenarios application.

MOBILE IP MESH

Features of IP MESH

1. Adopting self-developed COFDM waveform, efficient channel coding and decoding, and multi-hop ad-hoc networking protocol.

2. Strong anti-interference ability to work stable in complex and harsh environment.

3. Without relying on telecom-base stations, it can efficiently and quickly form a centerless wireless broadband network.

4. All nodes can be used as information collection nodes, relay nodes or information output nodes at the same time.

5. Provide IP interface, which can realize interconnection with other IP devices.

6. With its own data and video output port, it can realize real-time storage and other functions.

7. Embedded Wi-Fi/Bluetooth/GPS/Beidou/4G (Mobile/Unicom) module can be customized.

8. Customized development can be provided according to customer requirements.

One MESH with multiple modes

Each MESH can be used as an information collection node, relay node or information output node at the same time. Realize video, voice, data transmission. Very flexible and easy to deploy.

Scene(TX)　　　　Repeater(TX-RX)　　　　Repeater(TX-RX)　　　　HQ
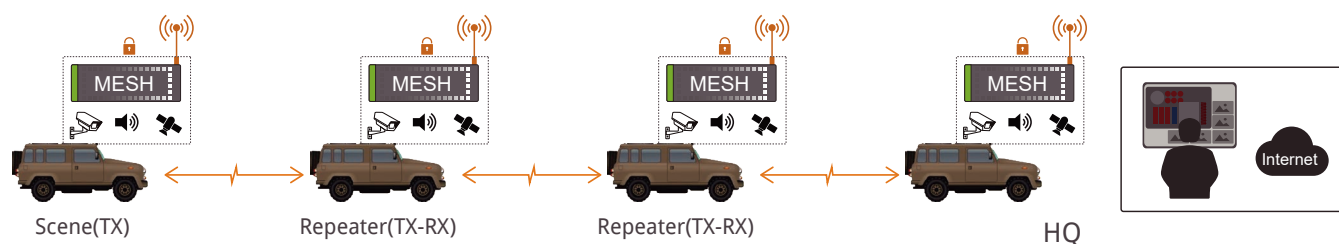
MESH self-organizing

It doesn't rely on signal base stations, and forms a centerless wireless network efficiently and quickly. Supports multi-hop relay, which can effectively expand the coverage radius of wireless networks.

The network has the characteristics of automatically selecting the best route, self-organizing, self-healing, and automatically implementing network topology such as chain and star.
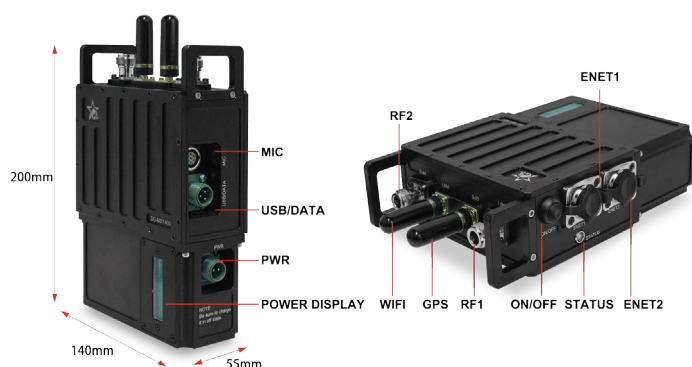
Scene(TX)

HQ
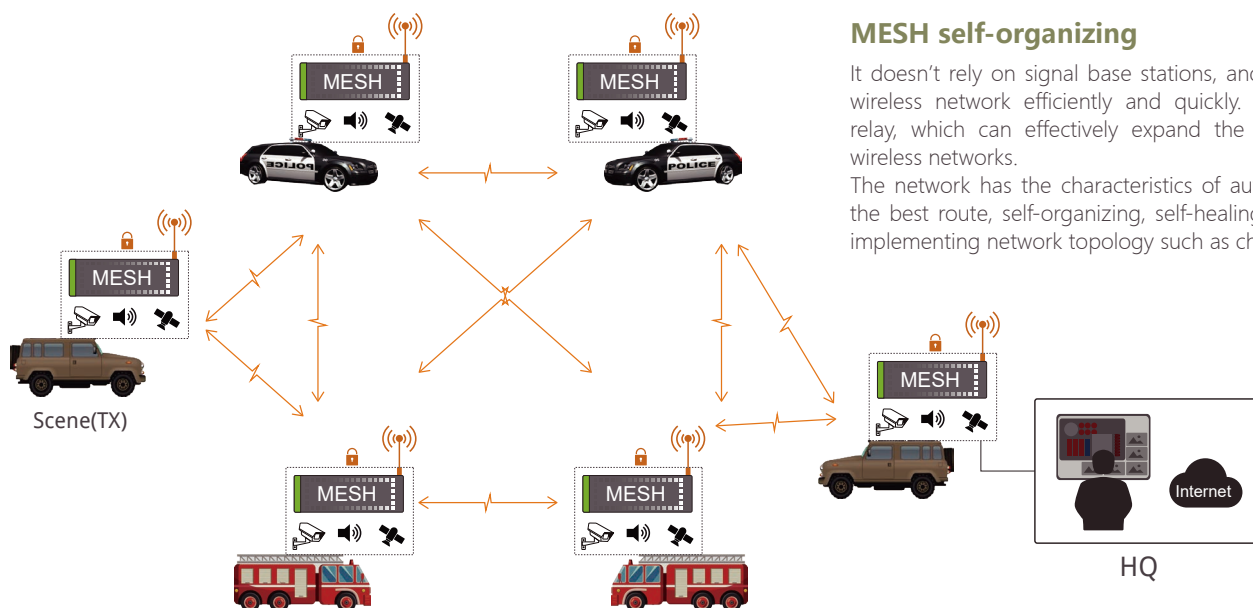
Manpack IP MESH

Model：SG-MS1400

The SG-MS1400 IP MESH is designed for tactical soldier manpack wireless video voice and data communication mission. It's in compact design with detachable battery, which is convenient for carrying to outdoor application.

The SG-MS1400 MESH can quickly build reliable wireless links for users in complex environments, and provide fast and flexible solutions for various requirements (such as: high-definition video transmission, voice intercom, IP data transmission, etc.).

It is suitable for public security, armed police, fire fighting, troops and other fields; it is also suitable for mobile vehicles, ship equipment, to realize uninterrupted communication between vehicles and vehicles, vehicles and individual soldiers, and individual soldiers and individual soldiers.

200mm

MIC

USB/DATA

PWR

POWER DISPLAY   WIFI   GPS   RF1   ON/OFF   STATUS   ENET2

RF2

ENET1

140mm

55mm

Accessory：

1   2   3   4   5   6

1、data cable   4、GPS antenna
2、Charger   5、 wifi antenna
3、RF antenna   6、microphone

Note:
The spec and accessories are for reference. Specific to detailed applications.

Parameters

Transmission

Frequency	300-6500MHz（customized）
RF power	2W x 2W（customized）
Modulation	COFDM
FEC	1/2 · 2/3 · 3/4 · 5/6（optional）
Transfer rate	Peak11Mbps@10MHz
Nodes network	32 nodes
RF bandwidth	5/10/20Mhz（adjustable）
Shoulder ratio	≥-45dBc @ 30dBm
Constellation	BPSK/QPSK/16QAM/64QAM（self-adaption）
Sensitivity	-93dBm@10MHz
Range	8km~10km（LOS）
Protocol	MAC level：CSMA carrier detect (sense) multiple access IP level：IEE802.11private mesh network protocol

Data information

Video input	RJ45 for IP camera; HDMI(customized)
Video bitrate	10Mbps（MAX）
Audio	MIC/PTT
Encryption	AES128/256bit or user-defined
Audio output	Standard aviation port

Physical feature

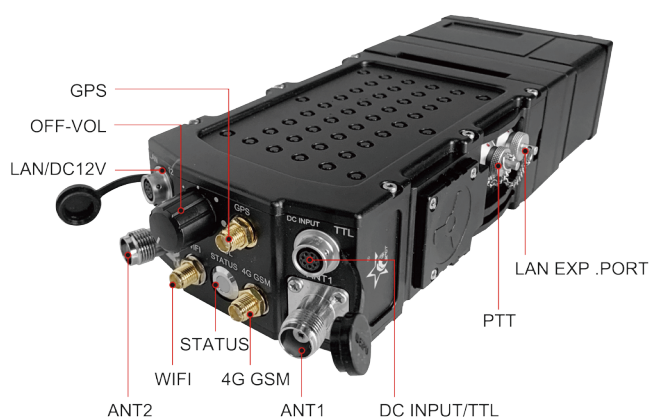|	
Protection degree	IP65
Operation temperature	-20℃ ~ +55℃
Storage temperature	-40℃ ~ +80℃
Dimension	200×130×55mm
Weight	2.2Kg（include battery）

Physical feature

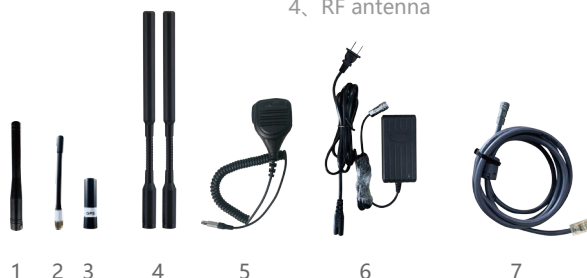|	
Operation voltage	DC16.5V
Operation current	≤1.2A
Consumption	≤20W

Handheld IP MESH

Model：SG-MESH-2

SG-MESH-2 is a handheld miniature IP MESH in military grade level with compact and small size, and low consumption. Designed with a detachable twist lock battery, and PTT (Push-to-Talk) function, the SG-MESH-2 is perfect for outdoor carrying mission for IP video surveillance feeding back to the command center and voice communication with other mission MESH carriers.

GPS
OFF-VOL
LAN/DC12V
GPS
DC INPUT
TTL
LAN EXP .PORT
STATUS 4G GSM
PTT
STATUS
WIFI 4G GSM
ANT2 ANT1 DC INPUT/TTL

Accessory：

1、4G antenna　5、microphone
2、wifi antenna　6、Charger
3、GPS antenna　7、Ethernet cable
4、RF antenna

1　2　3　　4　　5　　　6　　　　7

Note:
The spec and accessories are for reference. Specific to detailed applications.

Parameters

Transmission feature

Frequency	300MHz~6.5GHz(customized)
RF power	1W x 1W（customized)
Modulation	COFDM
Constellation	BPSK/QPSK/16QAM/64QAM(Self-adaption)
FEC	1/2, 2/3, 3/4, 5/6（optional)
Sensitivity	4Mbps-95dBm@10MHz
Transfer rate	Peak11Mbps@10MHz
Range	1~8KM LOS
Mesh network nodes	Up 32 nodes

Data Feature

Video input	RJ45 for ip camera；HDMI(customized)
Audio input	MIC/PTT
Encryption	AES128 or user-defined
Embedded module	Wi-Fi/Bluetooth/GPS/Bei Dou /4G

Electric feature

Operation voltage	DC16.8V
Operation current	1.2A
Consumption	≤21W@2.5W TX Power

Physical feature

Protection level	IP66
Operational temperature	-20℃~+55℃
Storage temperature	-50℃~+70℃
Weight	1.5kg
Dimension	210*85*50mm

Airborne/Vehicle–mounted IP mesh

Model：SG-MESH-3

SG-MESH-3 is a 2.5W X 2.5W MIMO IP MESH in ruggedized housing for rainproof and shockproof. SG-MESH-3 is perfect for the applications in fixed infrastructure, vehicle, vessel, and airborne, which requires long range and big volume data flow. Different rf power can be customized for those projects which need longer range, either between two mesh nodes or mesh group network.

RF1 RF2
GPS WIFI
DC12-24V LAN LED STA MIC ON/OFF

Accessory：

1、RF antenna 4、microphone
2、wifi antenna 5、Charger
3、GPS antenna 6、Ethernet cable

1 2 3 4 5 6

Note:
The spec and accessories are for reference. Specific to detailed applications.

Parameters

Transmission feature

Frequency	300MHz~6.5GHz（customized）
Modulation	COFDM
FEC	1/2 · 2/3 · 3/4 · 5/6（optional）
Transfer rate	Peak 70MBPS@20MHZ
Mesh network	Up to 32 nodes
RF power	2.5WX2.5W（larger power can be customized）
Constellation	BPSK/QPSK/16QAM/64QAM（self-adaption）
Sensitivity	-92dBm@5MHz
Range	＞10KM（LOS）

Electric feature

Operation voltage	DC16.8V
Consumption	≤29W
Operation current	1.7A

Data feature

Video input	IP camera
System setting	Software or web page operation
Embedded module	Wi-Fi/Bluetooth/GPS/BeiDou/4G（customized）
External ports	RJ45、HDMI（customized）
Encryption	AES128 or self-defined

Physical feature

Protection level	IP66
Storage temperature	-50℃ ~ +70℃
Weight	1.95kg
Operational temperature	-20℃ ~ +55℃
Dimension	200×133×58mm

IP mesh Command Station

Model：SG-MESH-4

SG-MESH-4 is the wireless IP MESH command center station, which is designed for outdoor application like in urban coverage, drones video surveillance, solider tactical mission deploy, etc.. The SG-MESH-4 COFDM IP MESH is integrated with 10.5" tablet computer for wireless mesh network system operation and video monitoring, and it can see the whole wireless MESH network topology.

Also, PPT(Push-to-Talk) for voice communication is available, that is convenient to chat with other people who carrying the IP MESH node. There are also built with a battery V lock for standard Sony Lithium battery mounting or other same type Lithium battery. Besides the external battery, there are also have an power charger input for battery charging after running out of the power. WIFI and GPS function are workable, which is easy for user to identify each front end matchable IP MESH node's location.

SG-MESH-4 is ruggedizedly designed in Pelican Suitcase, which is shockproof, waterproof, and dustproof.

Accessory：

1、RF antenna　5、data cable
2、wifi antenna　6、Ethernet cable
3、GPS antenna
4、microphone

1　2　3　4　5　6　7

Note:
The spec and accessories are for reference. Specific to detailed applications.

Parameters

Transmission feature

Frequency	300MHz~6.5GHz(customized)
RF power	3W*3W（customized）
Modulation	COFDM
Constellation	BPSK/QPSK/16QAM/64QAM(self-adaption)
FEC	1/2, 2/3, 3/4, 5/6（optional)
Sensitivity	-93dBm@10MHz
Transfer rate	Peak 70Mbps@10MHz
MESH network	Up to 32 Nodes

Electric feature

Operation voltage	AC220V/DC14V or
Operation current	customized
Consumption	2.5A

Data feature

Video input	Ip camera
Audio input	MIC/PTT
Encryption	AES128/256 or self-defined
Extra ports	HDMI, USB*2
Data ports	TTL*2
Embedded module	Wi-Fi/Bluetooth/GPS/BeiDou/4G

Physical feature

Protection level	IP67
LCD display	10.5 inch tablet computer
Operation temperature	-20℃~+55℃
Storage temperature	-50℃~+70℃
Weight	13.5KG
Dimension	535*437*213mm

I. Introduction of the software

1. Overview

MESH intelligent management terminal is a very powerful centralized control software, a super terminal integrating device discovery, device topology, one-key configuration, media video and other functions. The software comes with an extended library, compatible with multiple platforms to better plan and manage projects. This software is compatible with different types of equipment, but it is different for different versions.

II. Home page information

1. Device list

The device list displays the online status of the device.

The information displayed from top to bottom is

> **[upper right corner]**
> >communication protocol (tcp, udp) and connection quality (signal grid),
>
> **[first line]**
> > device name
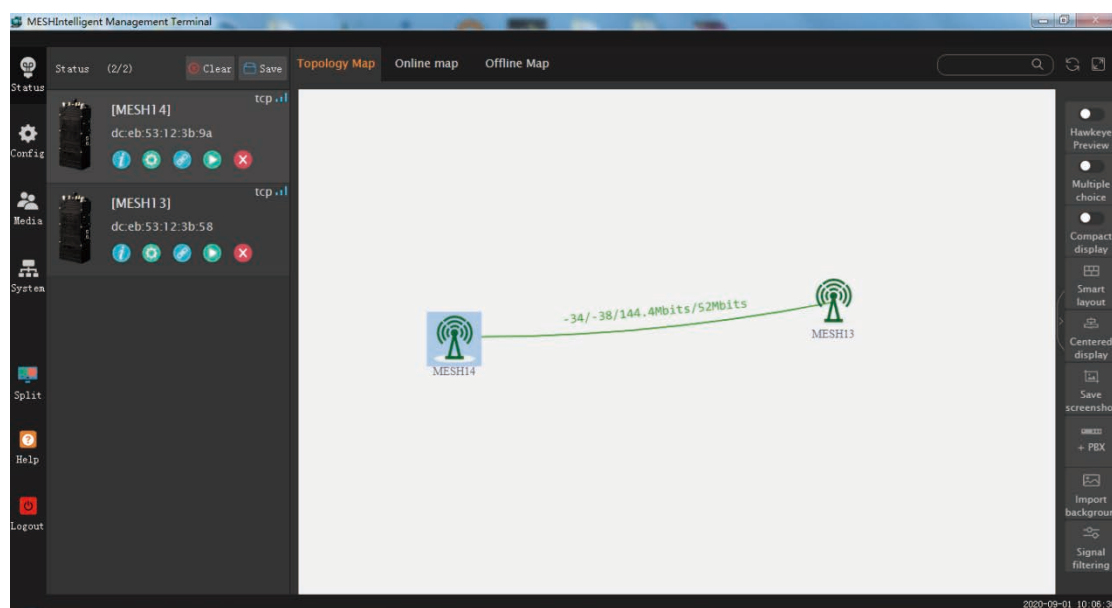>
> **[second Row]**
> > device MAC address
>
> **[third row]**
> > device function button

The device function buttons are as follows:

- click to check mesh basic information
- click to configure the mesh
- click to locate the current mesh into the topology
- click to voice communication or video monitoring
- click to delete the off line mesh

2. Topology map

The topology map shows the link connection status between devices. The icons are divided into three states: intelligent network, base station, and client. The link has three colors of green, yellow and red to indicate the quality of signal strength. Double-click the device icon to display the detailed information of the device.

III. MESH configuration

1. Basic information configuration
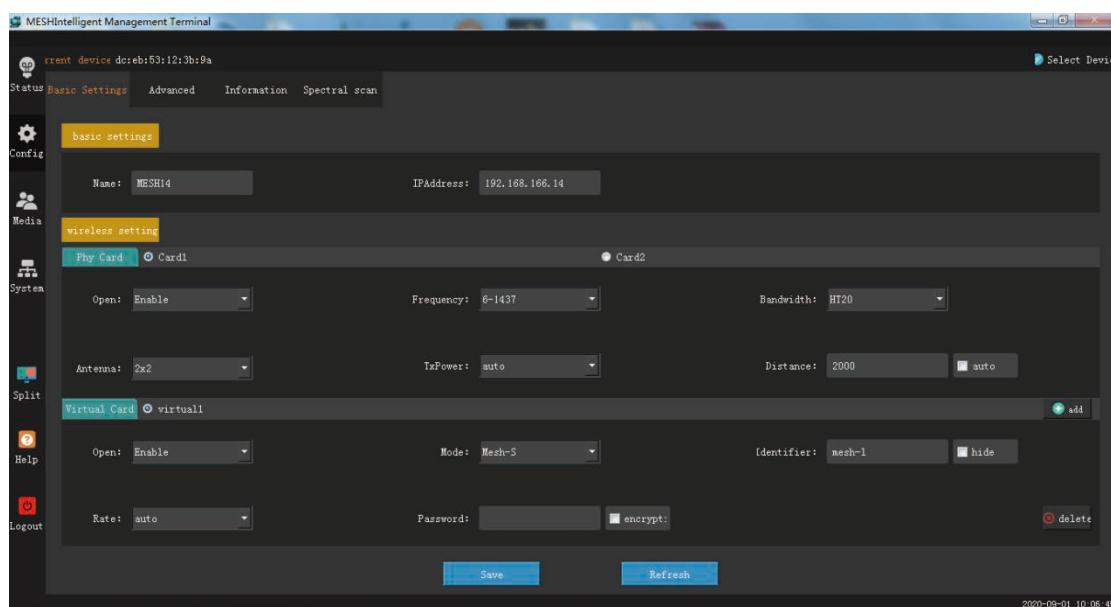
Basic settings can set equipment IP, wireless and other information, one-key configuration is convenient and quick, among which the smart network mode, only need to configure the frequency, bandwidth, distance, identification code these parameters, the smart network ensures that these parameters are consistent. It can be connected normally, and the distance needs to be slightly larger than the actual distance (m)

2.Parameter introduction

a. Name, IP address

b. Switch(open), antenna, Txpower: configure network card status, antenna channel and transmit power

c. Frequency, bandwidth, distance: Configure the frequency, bandwidth, and distance parameters of the network card to be the actual distance of the device, which needs to be longer than the actual distance, otherwise there will be failure to connect or packet loss

d. Mode: Configure the working mode of the network card, currently there are intelligent networks, base stations and clients

e. Identification code: The identification code is the identification for establishing a connection to the intelligent network, and devices with the same identification code can be connected to each other

f. Rate, password: set the speed level and password of the wireless network card

IV. Video management
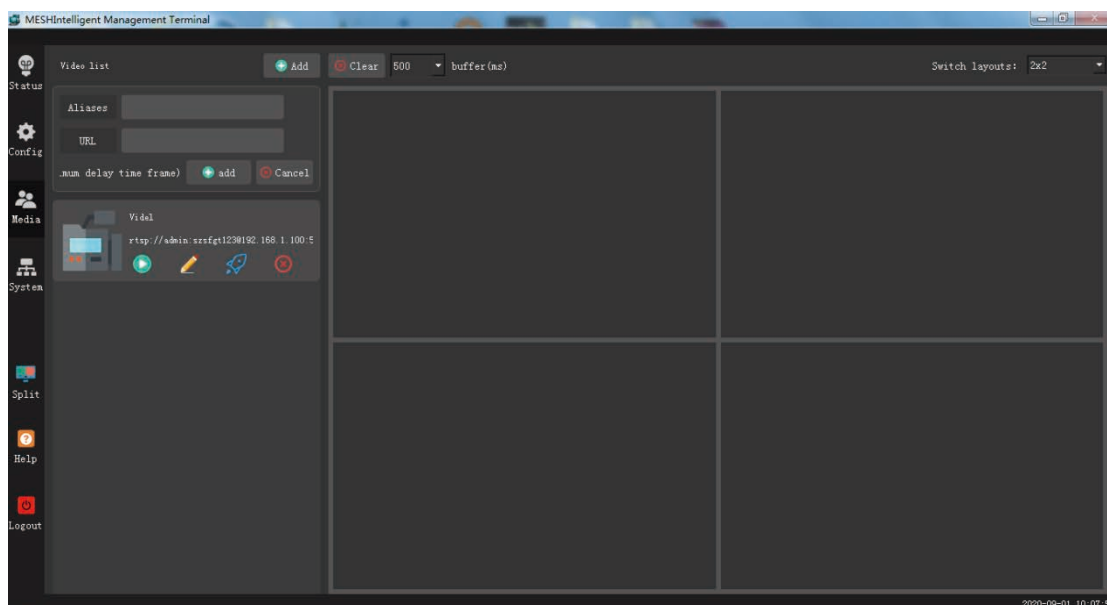
Media management can play all network media, including http, rtsp, udp, rtmp, rtp, mms and other streaming media, and supports up to 4x4 (16 channels) simultaneous playback.

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SAFE GUARD was founded in 1999, which is a leading global technology manufacturer specializing in wireless microwave video and data communication system for government, law enforcement, military, defense, UAV/UGV and broadcast markets, etc..

We have strong production and R&D groups. Our backbone in researching and production is from the previous state-run 806 plants and 54 Institute. Over the 19 years, SAFE GUARD has been devoting itself to designing and developing digital video audio wireless systems in mobile. Nowadays, SAFE GUARD has built up a mature COFDM product line, mainly including standard COFDM wireless transmitter & receiver, TDD-COFDM full duplex Ethernet transceiver, COFDM IP MESH, and the latest technology FDD-COFDM wireless Dual frequencies Network Transceiver. Moreover, we offer customized solutions and services for clients to any kinds of wireless transmissions they need--simplex, duplex, or mesh network.

Our COFDM systems have been exported to more than 32 countries covering Asia, Africa, Europe...especially in Middle-East. Each product goes through strict test and inspection with US original (HP) spectrum analyzer and Germany (Rohde & Schwarz) Network Analyzer. We aim to design and provide exclusive advanced wireless transmission system worldwide. Your support and feedback are our motivation!

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