

i-PRO Security Radar
External interface specifications

V1.00

i-PRO Co., Ltd.

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1. Introduction

This document describes the external interface specifications specifications of the i-PRO Security Radar (hereinafter referred to as "Security radar").

This model supports the following two functions.

Radar detection

An alarm is generated when detecting a moving object in the following three modes.

Intrusion detection: Detects moving objects that have entered the area.

Loitering detection: Detects moving objects that have stayed in the area for a certain period of time or more.

Cross line detection: Detects moving objects crossing the line in the specified direction.

Radar obstruction detection

By using this function, Radar obstruction detection is issued when an obstacle is placed in front of the radar.

1.1. Output Interface

The output interface of this function is shown below.

| Function | Output I/F | | | | | |
|-----------------------------------|------------------|-------------------------------------|---------------------------|---------------------------|----------------------------|----------------------------|
| | CGI (get_io2) | Stream additional information | ONVIF ® Meta Stream | TCP alarm notification | HTTP alarm notification | MQTT alarm notification |
| Radar Detection | ○ | ○ | ○ | ○ | ○ | ○ |
| Radar Obstruction Detection | — | — | ○ | ○ | ○ | ○ |

※ONVIF is a trade mark of ONVIF Inc.

2. CGI Command Interface

2.1. Confirmation of compliance with Security radar CGI

Send the following CGI from browsers such as Chrome and caminfo.html displayed corresponds to the following items.

■ How to check

Step 1: Send "http://192.168.0.10//cgi-bin/getinfo?FILE=1" to Security Radar.
(※1)

step 2: On the contents of the displayed response
NAME=WV-RD5500-C or NAME=WV-RD5500-CE
Is displayed.

※1 Change IP address according to your Security Radar.

2.2. Setting CGI

See the document below for CGI specs.

■ Command interface iPRO_SecurityRadar

[https://i-](https://i-pro.com/products_and_solutions/en/media/documentation_file/command-interface-i-pro_securityradarpdf)

[pro.com/products_and_solutions/en/media/documentation_file/command-interface-i-pro_securityradarpdf](https://i-pro.com/products_and_solutions/en/media/documentation_file/command-interface-i-pro_securityradarpdf)

2. Radar setup

4.3 Radar detection setup

4.4 Radar obstruction detection

2.3. get_io2

By sending CGI below, it is possible to check whether an alarm has been issued/the type of the detected object that has been given an alarm.

[CGI]

http://192.168.0.10/cgi-bin/get_io2?mode=monitor&format=3

[Response parameter]

| Parameter (*1) | Status | Display |
|--|--|---------------------------------------|
| intruder intruder_ch2 | No Intrusion Detection | intruder=False |
| | Intrusion detection | intruder=True |
| loitering loitering_ch2 | No oitering detected | loitering=False |
| | Loitering detected | loitering=True |
| crossline crossline_ch2 | No cross line detected | crossline=False |
| | cross line detected | crossline=True |
| alarm_object alarm_object_ch2 | Intrusion detection subject: people | alarm_object=INTRUDER ALARM HUMAN |
| | Intrusion detection subject: vehicle | alarm_object=INTRUDER ALARM VEHICLE |
| | Intrusion detection subject:other | alarm_object=INTRUDER ALARM OTHERS |
| | Loitering detection subject: people | alarm_object=LOITERING ALARM HUMAN |
| | Loitering detection subject: vehicle | alarm_object=LOITERING ALARM VEHICLE |
| | Loitering detection subject:other | alarm_object=LOITERING ALARM OTHERS |
| | Cross line detection subject: people | alarm_object=CROSS LINE ALARM HUMAN |
| | Cross line detection subject: vehicle | alarm_object=CROSS LINE ALARM VEHICLE |
| | Cross line detection subject: other | alarm_object=CROSS LINE ALARM OTHERS |
| scenechange scenechange_ch2 (※2) | No Radar Obstruction Detection | scenechange=False |
| | Radar Obstruction Detection | scenechange=True |

※ 1 Parameters with "_ch2" at the end of parameter names are detection information on the radar.

※2 "scenechange_ch2" responds to "Radar Obstruction Detection" in Security Radar. In addition, it does not respond with respect to "scenechange" and becomes "scenechange=False" fixed.

3. Additional information

When this function is enabled, additional information is added to H.264/H.265 RTP header and JPEG header.

For details of additional information, refer to the following document.

- Command Interface for H.265 supported models

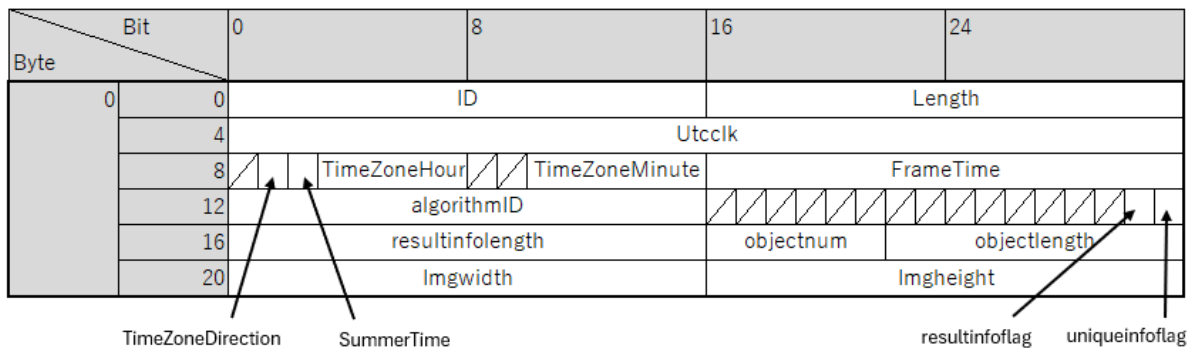
[https://i-](https://i-pro.com/products_and_solutions/en/media/documentation_file/command-interface-i-pro_h265models)

[pro.com/products_and_solutions/en/media/documentation_file/command-interface-i-pro_h265models](https://i-pro.com/products_and_solutions/en/media/documentation_file/command-interface-i-pro_h265models)

13.7 Location of meta information in each streams

3.1. Radar Detection

3.1.1. Basic information



[Data layout]

[list of the basic data]

| Parameter | Length (Bit) | Values and comments |
|-------------------|---------------|---|
| ID | 16 | 0x0039 (Fixed ID for Radar Detection data) |
| Length | 16 | Length of Radar Detection data (including ID and Length) in byte |
| Utclk | 32 | The career second from 1970 |
| TimeZoneDirection | 1 | Time Zone (±) 0x00 : + 0x01 : - |
| SummerTime | 1 | 0x00 : Outside of daylight saving time 0x01 : During daylight saving time |
| TimeZoneHour | 5 | Time zone (hour) 0x00: 0 hour, 0x01: 1 hour, 0x02: 2 hours, 0x03: 3 hours 0x04: 4 hours, 0x05: 5 hours, 0x06: 6 hours, |

| | | |
|-------------------|----|---|
| | | 0x07: 7 hours 0x08: 8 hours, 0x09: 9 hours, 0x0a: 10 hours, 0x0b: 11 hours 0x0c: 12 hours, 0x0d: 13 hours, 0x0e: 14 hours, 0x0f: 15 hours 0x10: 16 hours, 0x11: 17 hours, 0x12: 18 hours, 0x13: 19 hours 0x14: 20 hours, 0x15: 21 hours, 0x16: 22 hours, 0x17: 23 hours |
| TimeZoneMinute | 6 | Time zone (minute) 0x00: 0minutes, 0x01: 1minutes, 0x02: 2minutes, 0x39: 57minutes, 0x3a: 58minutes, 0x3b: 59minutes |
| FrameTime | 16 | Millisecond (Unit of 10 milliseconds) 0x0000: 0 millisecond, 0x0001: 10 milliseconds, 0x0062: 980 milliseconds, 0x0063: 990milliseconds |
| algorithmID | 16 | 0x0100 (fixed) |
| resultinfoflag | 1 | Result information flag 0 (b): Not include the result information 1 (b): Include the unique information |
| uniqueinfoflag | 1 | 0 (b) (Fixed value) |
| resultinfoflength | 16 | Length of the result information in byte |
| objectnum | 6 | Number of detected objects (up to 40) |
| objectlength | 10 | The amount of data per sensing object in byte |
| Imgwidth | 16 | Image Width |
| Imgheight | 16 | Image height |

The value of Imgwidth, Imgheight is the following fixed value depending on the aspect ratio of the delivered images.

(The coordinate system of the resulting vstart/hstart is also shown in the following table.)

| Image aspect ratio | Imgwidth | Imgheight |
|--------------------|------------------|------------------|
| 16:9 | 800 | 450 |
| 4:3 | -(Not supported) | -(Not supported) |
| 9:16(コリドール) | -(Not supported) | -(Not supported) |
| 1:1 | -(Not supported) | -(Not supported) |

| | | |
|--------|----|--|
| almobj | 8 | Detected object at the time of alarm issue 0x01 : human 0x02 : vehicle 0x04 : other |
| Hstart | 16 | Horizontal starting coordinate of the object (Upper left) |
| Vstart | 16 | Vertical starting coordinate of the object (Upper left) |
| Hcnt | 16 | Horizontal width of the object |
| Vcnt | 16 | Vertical width of the object |

4. ONVIF Meta Stream

There are two types of ONVIF meta-information as follows.

- ① Analytics stream : Send the detection frame periodically.
The sending period is 5fps.
- ② Event stream : Sent when an event occurs.

4.1. Analytics Stream

The data format is common to all events.

4.1.1. Parameter description

| Parameter | Value | Description |
|--|--|---|
| UTC time | Date and Time(UTC) | UTC of video frame |
| ObjectId | 4 Byte integer | Detected object ID |
| BoundingBox | -1 ~ 1(up to 6 decimal places) | Rectangle area of the detected object (coordinate of upper-left position and lower-right position) |
| CenterOfGravity | -1 ~ 1(up to 6 decimal places) | Midpoint of BoundingBox |
| color | #FFFF0000 (fix) | Color of detection frame when alarm is triggered * Applied only when an alarm is issued. |
| Class - ClassCandidate - Type - Likelihood | -Human, Vehicle, Other(Type) -0~1 (Likelihood) (up to 6 decimal places) e.g.) <tt:ClassCandidate> <tt:Type>Human</tt:Type> <tt:Likelihood>0.800000</tt:Likelihood> </tt:ClassCandidate> | Kind of object and likelihood Other : other |
| Class - Type | - 0~1 (Likelihood) (up to 6 decimal places) - Human, Vehicle, Other e.g.) | Kind of object and likelihood Other : other |

| | | |
|--|--|--|
| | <tt>Type Likelihood="0.800000">Human</ tt>Type> | |
| GeoLocation - lon - lat - elevation | - double type (up to 7 decimal places) - double type (up to 7 decimal places) - float type (up to 1 decimal places) | Longitude, latitude, and height of the object elevation: fixed at 0.0 * Not applied when "Latitude/longitude sending settings" is set to "Off". |
| Speed | float type (up to 1 decimal places) | Estimated velocity of the detected object at the time of transmission. The unit is m/s. (*1) If there is no speed estimation, <tt:Speed>0.0</tt:Speed> is assumed. |
| DirectionNamed | Up/Right/Down/Left/UpRight/ UpLeft/DownRight/DownLeft | Direction of movement |
| ObjectCount | 0 ~ 65,635 (Decimal number) | Sum of the number of object |

4.1.2. Meta Steam format sample

[When human is detected]

```
<?xml version="1.0" encoding="utf-8"?>
<tt:MetadataStream xmlns:tt="http://www.onvif.org/ver10/schema">
  <tt:VideoAnalytics>
    <tt:Frame UtcTime="2020-01-20T10:00:08.203Z">
      <tt:Object ObjectId="101">
        <tt:Appearance>
          <tt:Shape>
            <tt:BoundingBox left="-0.187500" top="0.544444" right="-0.118750"
bottom="0.411111" />
            <tt:CenterOfGravity x="-0.153125" y="0.477777"/>
          <tt:Extension>
```

```
<BoundingBoxAppearance>
  <Line color="#FFFF0000" displayedThicknessInPixels="4" />
</BoundingBoxAppearance>
</tt:Extension>
  </tt:Shape>
  <tt:Class>
  <tt:ClassCandidate>
    <tt:Type>Human</tt:Type>
    <tt:Likelihood>0.800000</tt:Likelihood>
  </tt:ClassCandidate>
  <tt:Type Likelihood="0.800000">Human</tt:Type>
</tt:Class>
  <tt:GeoLocation lon="1.0000000" lat="2.5000000" elevation="0.0" />
</tt:Appearance>
  <tt:Behavior>
  <tt:Speed>4.5</tt:Speed>
</tt:Behavior >
  <tt:Extension>
    <Properties>
      <Property name="DirectionNamed">Right</Property>
    </Properties>
  </tt:Extension>
</tt:Object>
  <tt:Extension>
    <Properties>
      <Property name="ObjectCount">1</Property>
    </Properties>
  </tt:Extension>
</tt:Frame>
</tt:VideoAnalytics>
</tt:MetadataStream>
```

4.2. Event Stream

The data format is different for each event.

4.2.1. Motion detection

In Event Stream of motion detection, the generated alarm is transmitted as an event.

4.2.1.1. Parameter Details

| Event | Parameter | Value | Description |
|---------------------|------------------------|--|--|
| Intrusion detection | UtcTime | Date and Time(UTC) | Year, date and time of metadata transmission |
| | VideoSource | VideoSourceConfig2 | Token name of VideoSourceConfiguration |
| | AnalyticsConfiguration | AnalyticsConfig2 | Token name of AnalyticsConfiguration |
| | Rule | Rule1, Rule2, Rule3, Rule4, Rule5, Rule6, Rule7, Rule8 | Area number (detection area 1 ~ 8) |
| | ObjectId | 4 Byte integer | ID number of detected object |
| | IsInside | true | true: The object is in the detection area |
| | ClassTypes | Human, Vehicle, Other | Classification of the object |
| | Likelihood | 0.00~1.00 (up to 2 decimal places) | Detection score |
| | Speed | float type (up to 1 decimal places) | Estimated velocity of the detected object at the time of transmission. The unit is m/s. (*1) If there is no speed estimation, <tt:SimpleItem Name="Speed" Value="0.0"> is assumed. |
| | Image | Base64 encoded | JPEG image at the time of the event |
| Loitering detection | UtcTime | Date and Time(UTC) | Year, date and time of metadata transmission |
| | VideoSource | VideoSourceConfig2 | Token name of VideoSourceConfiguration |
| | AnalyticsConfiguration | AnalyticsConfig2 | Token name of AnalyticsConfiguration |
| | Rule | Rule1, Rule2, Rule3, Rule4, Rule5, Rule6, Rule7, Rule8 | Area number (detection area 1 ~ 8) |
| | ObjectId | 4 Byte integer | ID number of detected object |
| | Since | Date and Time(UTC) | The time from which the object started loitering. |
| | ClassTypes *1 | Human, Vehicle, Other | Classification of the object |

| | | | |
|-------------------------|------------------------|---|--|
| | Likelihood *1 | 0.00~1.00 (up to 2 decimal places) | Detection score |
| | Image *1 | Base64 encoded | JPEG image at the time of the event |
| Cross line detection | UtcTime | Date and Time(UTC) | Year, date and time of metadata transmission |
| | VideoSource | VideoSourceConfig2 | Token name of VideoSourceConfiguration |
| | AnalyticsConfiguration | AnalyticsConfig2 | Token name of AnalyticsConfiguration |
| | Rule | Rule1, Rule2, Rule3, Rule4, Rule5, Rule6, Rule7, Rule8 | Line number (detection line 1 ~ 8) |
| | ObjectId | 4 Byte integer | ID number of detected object |
| | ClassTypes | Human, Vehicle, Other | Classification of the object |
| | Likelihood | 0.00~1.00 (up to 2 decimal places) | Detection score |
| | Speed | float type (up to 1 decimal places) | Estimated velocity of the detected object at the time of transmission. The unit is m/s. (*1) If there is no speed estimation, <tt:SimpleItem Name="Speed" Value="0.0"> is assumed. |
| | Image | Base64 encoded | JPEG image at the time of the event |

*1 Add only for i-PRO Original Stream. See section 8.1 for more information on i-PRO Original Stream.

4.2.1.2. Meta Stream format sample

[When human is detected and an intrusion detection alarm is triggered]

```
<?xml version="1.0" encoding="UTF-8"?>
<tt:MetadataStream xmlns:tt="http://www.onvif.org/ver10/schema"
xmlns:xsd="http://www.w3.org/2001/XMLSchema"
xmlns:wsnt="http://docs.oasis-open.org/wsn/b-2">
  <tt:Event>
    <wsnt:NotificationMessage>
      <wsnt:Topic
        Dialect=http://www.onvif.org/ver10/tev/topicExpression/ConcreteSet
        xmlns:tns1="http://www.onvif.org/ver10/topics"
        xmlns:tnsipro1="http://i-
pro.com/2021/onvif/event/topics">tns1:RuleEngine/FieldDetector
        /ObjectsInside
      </wsnt:Topic>
      <wsnt:Message>
        <tt:Message UtcTime="2021-11-15T12:14:26Z">
          <tt:Source>
            <tt:SimpleItem Name="VideoSource" Value="VideoSourceConfig2"/>
            <tt:SimpleItem Name="AnalyticsConfiguration" Value="AnalyticsConfig2"/>
            <tt:SimpleItem Name="Rule" Value="Rule1"/>
          </tt:Source>
          <tt>Data>
            <tt:SimpleItem Name="IsInside" Value="true"/>
            <tt:SimpleItem Name="ObjectId" Value="2681"/>
            <tt:SimpleItem Name="ClassTypes" Value="Human"/>
            <tt:SimpleItem Name="Likelihood" Value="0.85">
            <tt:SimpleItem Name="Speed" Value="15.2">
            <tt:ElementItem Name="Image">
              <xsd:base64Binary>/9j//gBMAB ((*snip*))
v1/CgR//2Q==</xsd:base64Binary>
            </tt:ElementItem>
          </tt>Data>
        </tt:Message>
      </wsnt:Message>
    </wsnt:NotificationMessage>
  </tt:Event>
</tt:MetadataStream>
```

[When human is detected and an loitering detection alarm is triggered]

```
<?xml version="1.0" encoding="UTF-8"?>
<tt:MetadataStream xmlns:tt="http://www.onvif.org/ver10/schema"
xmlns:xsd="http://www.w3.org/2001/XMLSchema"
xmlns:wsnt="http://docs.oasis-open.org/wsn/b-2">
  <tt:Event>
    <wsnt:NotificationMessage>
      <wsnt:Topic
Dialect=http://www.onvif.org/ver10/tev/topicExpression/ConcreteSet
  xmlns:tns1=http://www.onvif.org/ver10/topics
  xmlns:tnsipro1="http://i-pro.com/2021/onvif/event/topics">tns1:RuleEngine
/LoiteringDetector/ObjectIsLoitering
      </wsnt:Topic>
    <wsnt:Message>
      <tt:Message UtcTime="2021-11-16T03:58:31Z">
        <tt:Source>
          <tt:SimpleItem Name="VideoSource" Value="VideoSourceConfig2"/>
          <tt:SimpleItem Name="AnalyticsConfiguration" Value="AnalyticsConfig2"/>
          <tt:SimpleItem Name="Rule" Value="Rule1"/>
        </tt:Source>
        <tt>Data>
          <tt:SimpleItem Name="ObjectId" Value="71"/>
          <tt:SimpleItem Name="Since" Value="2021-11-16T03:58:21Z"/>
          <tt:SimpleItem Name="ClassTypes" Value="Human"/>
          <tt:SimpleItem Name="Likelihood" Value="0.90">
            <tt:ElementItem Name="Image">
              <xsd:base64Binary>/9j//gBMAB ((*snip*))
v1/CgR//2Q==</xsd:base64Binary>
            </tt:ElementItem>
          </tt>Data>
        </tt:Message>
      </wsnt:Message>
    </wsnt:NotificationMessage>
  </tt:Event>
</tt:MetadataStream>
```

[When human is detected and an cross line detection alarm is triggered]

```
<?xml version="1.0" encoding="UTF-8"?>
<tt:MetadataStream xmlns:tt=http://www.onvif.org/ver10/schema
xmlns:xsd="http://www.w3.org/2001/XMLSchema"
xmlns:wsnt="http://docs.oasis-open.org/wsn/b-2">
<tt:Event>
<wsnt:NotificationMessage>
<wsnt:Topic
Dialect=http://www.onvif.org/ver10/tev/topicExpression/ConcreteSet
xmlns:tns1="http://www.onvif.org/ver10/topics"
xmlns:tnsipro1="http://i-pro.com/2021/onvif/event/topics">tns1:RuleEngine
/LineDetector/Crossed</wsnt:Topic>
<wsnt:Message>
<tt:Message UtcTime="2021-11-16T06:42:40Z">
<tt:Source>
<tt:SimpleItem Name="VideoSource" Value="VideoSourceConfig2"/>
<tt:SimpleItem Name="AnalyticsConfiguration" Value="AnalyticsConfig2"/>
<tt:SimpleItem Name="Rule" Value="Rule1"/>
</tt:Source>
<tt>Data>
<tt:SimpleItem Name="ObjectId" Value="1064"/>
<tt:SimpleItem Name="ClassTypes" Value="Human "/>
<tt:SimpleItem Name="Likelihood" Value="0.80">
<tt:ElementItem Name="Image">
<xsd:base64Binary>/9j//gBMAB ((*snip*))
v1/CgR//2Q==</xsd:base64Binary>
</tt:ElementItem>
</tt>Data>
</tt:Message>
</wsnt:Message>
</wsnt:NotificationMessage>
</tt:Event>
</tt:MetadataStream>
```

5. TCP alarm notification

Refer to the document below to learn about TCP alarm notification.

- Command Interface for H.265 supported models

https://i-pro.com/products_and_solutions/en/media/documentation_file/command-interface-i-pro_h265models

7.12 Panasonic Alarm Protocol(TCP notification)

The alarm notification is transmitted in the form of message ID listed below.

| Message name | Extension area | | |
|---------------------------------------|----------------|------------|---|
| | Category | Message ID | Message(ASCII) |
| INTRUDER ALARM (Radar Detection) | 0x01 | 0x58 | INTRUDER ALARM XX **** (※1)(※2) (例) INTRUDER ALARM INTRUDER ALARM 0102 INTRUDER ALARM HUMAN INTRUDER ALARM VEHICLE 0102 INTRUDER ALARM OTHERS |
| LOITERING ALARM (Radar Detection) | 0x01 | 0x59 | LOITERING ALARM XX **** (※1)(※2) (例) LOITERING ALARM LOITERING ALARM 0102 LOITERING ALARM HUMAN LOITERING ALARM VEHICLE 0102 LOITERING ALARM OTHERS |
| CROSS LINE ALARM (Radar Detection) | 0x01 | 0x5A | CROSS LINE ALARM XX **** (※1)(※2) (例) CROSS LINE ALARM CROSS LINE ALARM 0102 CROSS LINE ALARM HUMAN CROSS LINE ALARM VEHICLE 0102 CROSS LINE ALARM OTHERS |
| RADAR OBSTRUCTION | 0x01 | 0x5B | RADAR OBSTRUCTION DETECTION ALARM |

| | | | |
|-----------|--|--|--|
| DETECTION | | | (Firm:V1.10 and later) SCENE CHANGE ALARM (Firm:V1.00) |
|-----------|--|--|--|

*1 XX represents detection object as follows. When an alarm is issued simultaneously in multiple areas, the value of the detection target in the detection area with the lowest number is assigned.

Human: HUMAN

Vehicle: VEHICLE

unknown: OTHERS

The first half of ** is filled with detection condition 01~02

The latter half of ** is filled with detection area/line 01~FF

Detection area/line1...01

Detection area/line2...02

Detection area/line3...04

Detection area/line4...08

Detection area/line5...10

Detection area/line6...20

Detection area/line7...40

Detection area/line8...80

When detection covers more than one area, it is OR value of the numbers above.

For example, it is displayed as follows if the detection area 2 and 3 both detected objects that is set as an intrusion detection in detection criteria 01.

INTRUDER ALARM 0106

6. HTTP alarm notification

Refer to the document below to learn about HTTP alarm notification.

- Command Interface for H.265 supported models

[https://i-](https://i-pro.com/products_and_solutions/en/media/documentation_file/command-interface-i-pro_h265models)

[pro.com/products_and_solutions/en/media/documentation_file/command-interface-i-pro_h265models](https://i-pro.com/products_and_solutions/en/media/documentation_file/command-interface-i-pro_h265models)

7.13 HTTP alarm notification

The HTTP alarm notification is transmitted in the form of alternative characters as follows.

| Alternative characters within MHttpRequest# parameter | Value |
|---|---|
| %almsrc | 41(fix) |
| %almsrc2 | Intrusion detection (Radar) : 58 Loitering detection (Radar) : 59 Cross line detection (Radar) : 5A Radar obstruction detection : 5B |

7. MQTT alarm notification

The Security Radar notifies the alarm information using the MQTT protocol as MQTT client.

7.1. Radar detection

7.1.1. Setting specifications

It is necessary to make the following settings in advance with this application.

| Items | Description |
|--------------------------|--|
| Transmission destination | Select whether to send or not * In order to transmit data using the MQTT protocol, it is necessary to enable MQTT setting of Security Radar |
| Topic | Name of topic |
| QoS | QoS level(0, 1, 2) Retain: Select to save the last transmitted messages on the MQTT server |

7.1.2. Detail of telegraphic protocol

This application transmits the following telegram as PUBLISH message.

| Bit | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|-----|------------------|---|---|---|----------|-----------|---|--------|
| 1 | Message Type | | | | DUP Flag | QoS Level | | Retain |
| 2 | Remaining Length | | | | | | | |

【Data format of fixed header】

【Header part】

| Parameter | Length | Values and comment |
|---------------------|----------------------|---|
| Fixed header | | |
| Message Type | 4-bit unsigned value | Message Type(0~15) |
| DUP Flag | 1-bit | Flag for redelivering 0: Not redeliver 1: redeliver |
| QoS Level | 2-bit | QoS レベル (Quality of Service levels) 0: At most once 1: At least once 2: Exactly once |
| Retain | 1-bit | Flag for retaining 0: Off 1: On |

| | | |
|------------------------|--------------------|--|
| Remaining Length | 8-bit | The number of bytes left in the current packet, including variable header and payload data |
| Variable header | | |
| Msg Len | 16-bit (MSB, LSB) | Length of payload |
| Topic Length | 16-bit (MSB, LSB) | Length of topic name |
| Topic | UTF-encoded string | Topic name |
| Message Identifier | 16-bit(MSB, LSB) | Message ID |

【Payload】

| Parameter | Value | Notation | Description |
|------------------|--|-------------------|--|
| CameraIPAddress | (0~255)(0~255) (0~255)(0~255) | Decimal number | Security Radar IP Address |
| CameraMACAddress | (00~ff)(00~ff) (00~ff)(00~ff) (00~ff)(00~ff) | Hex number | Security Radar MAC Address |
| Time | Date and time(UTC) | Decimal number | Date and time Format: yyyyymmddhhmmss e.g.) August 29, 2013 12:35:01 Japan time 20130829123501 |
| TimeZone | 01200~11300 | | Time difference from UTC Minus is represented by 0 and plus is represented by 1. e.g.) Osaka, Sapporo, Tokyo (time difference of 9 hours) 10900 |
| SummerTime | 0, 1 | | Daylight saving time setting 0:non-daylight saving time 1:daylight saving time |
| AlarmMessage | INTRUDER ALARM XX **** (※1)(※2) | String | Intruder alarm |
| | LOITERING ALARM XX **** (※1)(※2) | | Loitering alarm |
| | CROSS LINE ALARM XX **** (※1)(※2) | | Cross line alarm |

*1 XX represents detection object as follows. When an alarm is issued simultaneously in multiple areas, the value of the detection target in the detection area with the lowest number is assigned.

Human : HUMAN

Vehicle : VEHICLE

unknown : OTHERS

*2 Area/line information can be added to ****.

The first half of ** is filled with detection condition 01~02

The latter half of ** is filled with detection area/line 01~FF

Detection area/line1...01

Detection area/line2...02

Detection area/line3...04

Detection area/line4...08

Detection area/line5...10

Detection area/line6...20

Detection area/line7...40

Detection area/line8...80

When detection covers more than one area, it is OR value of the numbers above.

For example, it is displayed as follows if the detection area 2 and 3 both detected objects that is set as an intrusion detection in detection criteria 01.

INTRUDER ALARM 0106

7.1.3. Payload transmission format

Security Radar(MAC address = 00:80:45:0d:00:01, channel number = 1)

at 2021/01/11 18:10:00 JST under the following conditions,

- Detection condition: Detection condition 1
- Detection area number: 2
- Detectoin object: Vehicle
- Alarm type: Intruder alarm

```
{  
  "CameraIPAddress":"192168000010",  
  "CameraMACAddress":"0080450d0001",  
  "Ch":"2",  
  "Time":"20210111091000",  
  "TimeZone":"10900",  
  "SummerTime":"0",  
  "AlarmMessage":"INTRUDER ALARM VEHICLE 0102"  
}
```

7.2. Radar Obstruction Detection

7.2.1. Setting specifications

It is necessary to make the following settings in advance with this application.

| Items | Description |
|--------------------------|--|
| Transmission destination | Select whether to send or not * In order to transmit data using the MQTT protocol, it is necessary to enable MQTT setting of Security Radar |
| Topic | Name of topic |
| QoS | QoS level(0, 1, 2) Retain: Select to save the last transmitted messages on the MQTT server |

7.2.2. Detail of telegraphic protocol

This application transmits the following telegram as PUBLISH message.

| Bit | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|-----|------------------|---|---|---|----------|-----------|---|--------|
| 1 | Message Type | | | | DUP Flag | QoS Level | | Retain |
| 2 | Remaining Length | | | | | | | |

【Data format of fixed header】

【Header part】

| Parameter | Length | Values and comment |
|------------------------|----------------------|---|
| Fixed header | | |
| Message Type | 4-bit unsigned value | Message Type(0~15) |
| DUP Flag | 1-bit | Flag for redelivering 0: Not redeliver 1: redeliver |
| QoS Level | 2-bit | QoS レベル (Quality of Service levels) 0: At most once 1: At least once 2: Exactly once |
| Retain | 1-bit | Flag for retaining 0: Off 1: On |
| Remaining Length | 8-bit | The number of bytes left in the current packet, including variable header and payload data |
| Variable header | | |

| | | |
|--------------------|--------------------|----------------------|
| Msg Len | 16-bit (MSB, LSB) | Length of payload |
| Topic Length | 16-bit (MSB, LSB) | Length of topic name |
| Topic | UTF-encoded string | Topic name |
| Message Identifier | 16-bit(MSB, LSB) | Message ID |

【Payload】

| Parameter | Parameter | Parameter | Parameter |
|------------------|--|-------------------|--|
| CameraIPAddress | (0~255)(0~255) (0~255)(0~255) | Decimal number | Security Radar IP Address |
| CameraMACaddress | (00~ff)(00~ff) (00~ff)(00~ff) (00~ff)(00~ff) | Hex number | Security Radar MAC Address |
| Time | Date and time(UTC) | Decimal number | Date and time Format: yyyymmddhhmmss e.g.) August 29, 2013 12:35:01 Japan time 20130829123501 |
| TimeZone | 01200~11300 | | Time difference from UTC Minus is represented by 0 and plus is represented by 1. e.g.) Osaka, Sapporo, Tokyo (time difference of 9 hours) 10900 |
| SummerTime | 0, 1 | | Daylight saving time setting 0:non-daylight saving time 1:daylight saving time |
| AlarmMessage | Radar Obstruction Detection | String | RADAR OBSTRUCTION DETECTION ALARM (Firm: V1.10 and later) TAMPER DETECTION ALARM (Firm: V1.00) |

7.2.3. Payload transmission format

Security Radar(MAC address = 00:80:45:0d:00:01, channel number = 1)
at 2021/01/11 18:10:00 JST under the following conditions,

- Alarm type: Radar obstruction detection alarm(Firm:V1.10 and later)

```
{  
  "CameraIPAddress":"192168000010",  
  "CameraMACAddress":"0080450d0001",  
  "Ch":"2",  
  "Time":"20210111091000",  
  "TimeZone":"10900",  
  "SummerTime":"0",  
  "AlarmMessage":" RADAR OBSTRUCTION DETECTION ALARM"  
}
```

- Alarm type: Radar obstruction detection alarm(Firm:V1.00)

```
{  
  "CameraIPAddress":"192168000010",  
  "CameraMACAddress":"0080450d0001",  
  "Ch":"2",  
  "Time":"20210111091000",  
  "TimeZone":"10900",  
  "SummerTime":"0",  
  "AlarmMessage":" TAMPER DETECTION ALARM"  
}
```

8. Appendix

8.1. How to use Meta Data Stream

This product sends meta information by making a request with the following two types of RTSP URLs.

- (1) i-PRO Original Stream
- (2) ONVIF RTSP Stream

The transmission sequence for each request is described below.

(1) i-PRO Original Stream

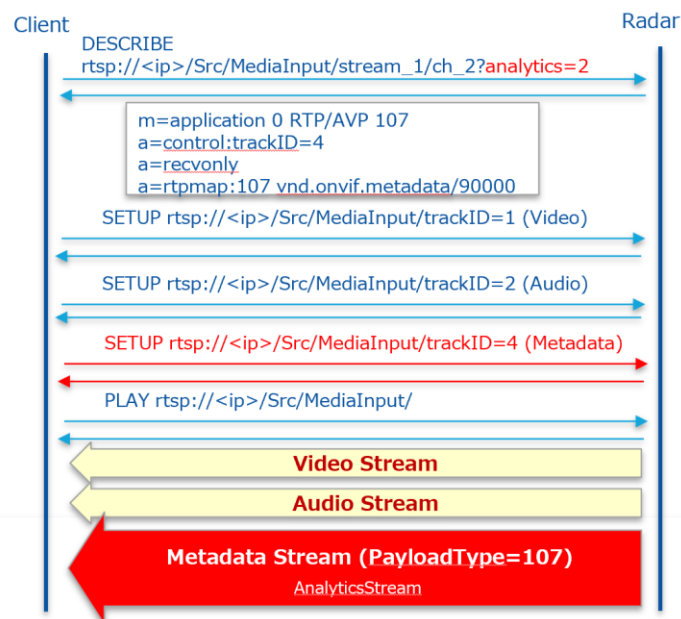
*The RTSP URL is i-PRO's own RTSP URL.

*Send "analytics=2" when requesting (RTSP URL) Analytics Stream.

Example: To receive meta information on channel number 4, specify the following.

`rtsp://<ip>/Src/MediaInput/stream_1/ch_2?analytics=2`

*Send "event=1" or "analytics=2&event=1" respectively when requesting (RTSP URL) Analytics Stream, Event Stream, or both.



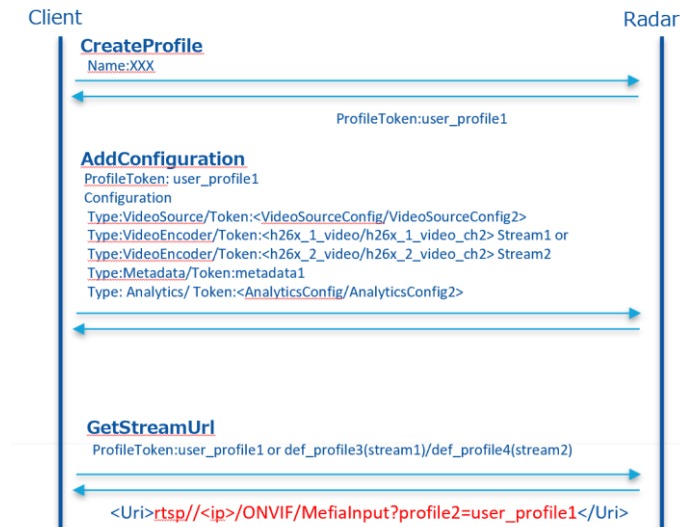
② ONVIF RTSP Stream

* Configure by ONVIF commands

- CreateProfile

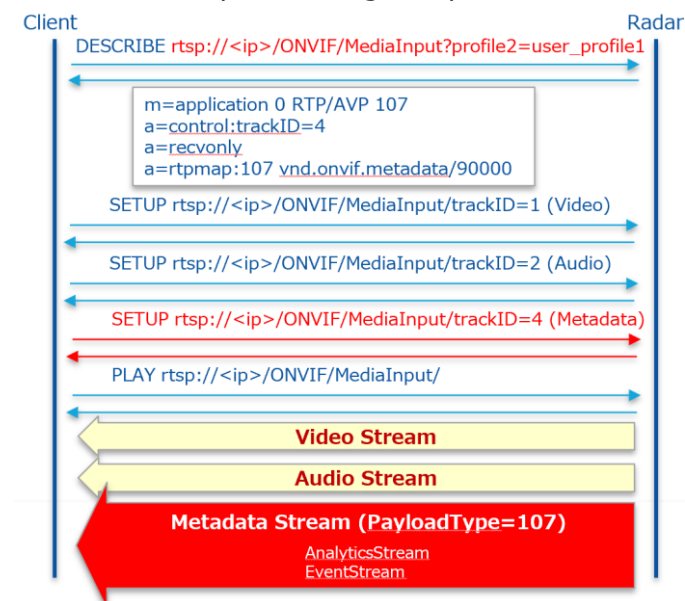
- AddConfiguration (VideoSource/VideoEncoder/Metadata/Analytics)

* Get RTSP URL by ONVIF commands(GetStreamUri)



* Streaming by URL got by ONVIF commands

- Event stream is also sent by streaming analytics



See the document "i-PRO_ApplicationNote_ONVIF.pdf" for details.