



Internal Security and Law Enforcement Operator Training

RSI System Operator Troubleshooting

Goal and Objectives



Perform basic troubleshooting for Radiation Solutions, Inc. (RSI) mobile systems.

Recognize faults using the indicators in RadView.

Review the architecture and components of the RSI system.

Discuss basic troubleshooting to address common RSI system faults.

Identify who to contact for additional support.

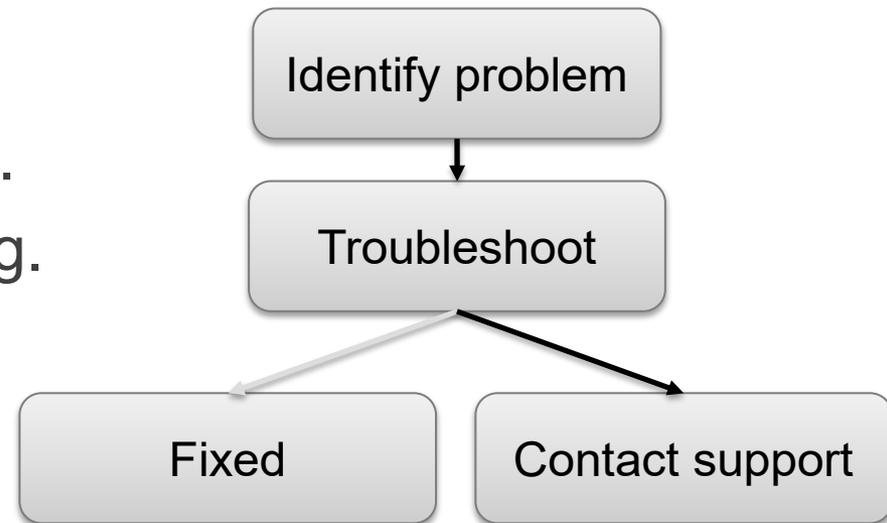
Troubleshooting process

Three types of problems:

1. Problems that can be fixed by operators.
2. Problems that cannot be fixed without specialist support.
3. Problems only the manufacturer (RSI) can fix.

Operator role:

- Identify problem, **gather info.**
- Perform basic troubleshooting.
- Contact specialist support.



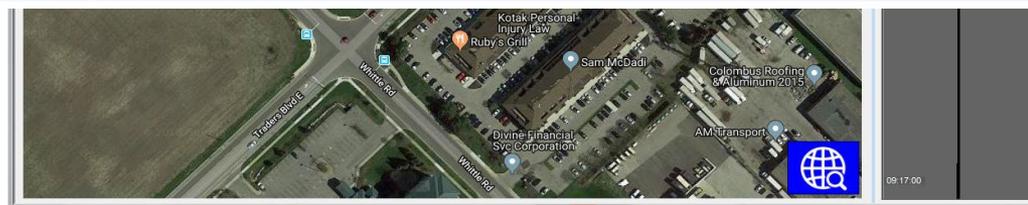
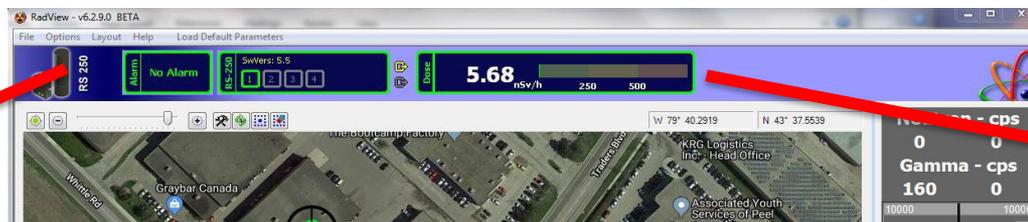
Fault Indicators

- Top bar on RadView:

- Alarm status
- Detector status
- Radiation level

- Colors in software:

- Green = operational
- Yellow = warning or startup
- Red = fault or alarm
- Grey = no connection



Detector Status



Outside box color = overall system status

Name of system



Interior square box color = individual detector status

Detector Status Examples



Grey on all status indicators

- No communication or system is off.



Green on all status indicators

- All good!



Yellow individual detector status **warning**

- Gamma detector is stabilizing.



Red individual detector status **error**

- One of the connected detectors has a major error.



Yellow overall system status **warning**

- Overall system is in a degraded state.



Red overall system status **error**

- Hardware in the system is not operating correctly.

Example Scenario

What kind of warning or error do the following status indicators represent?

1

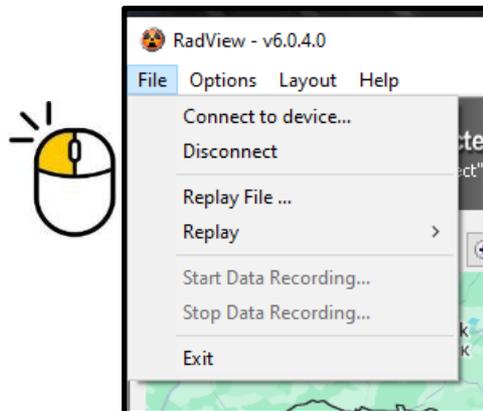
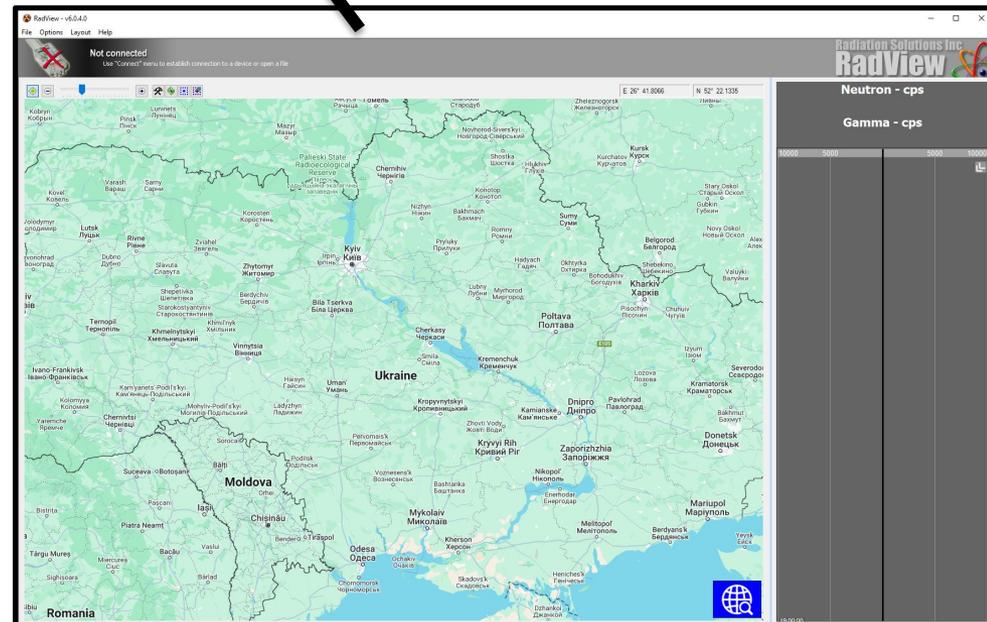
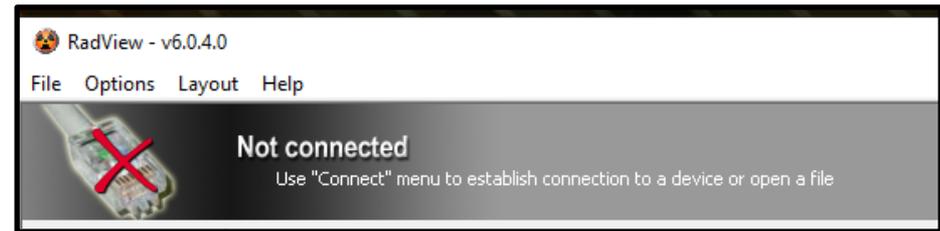


2



Connecting

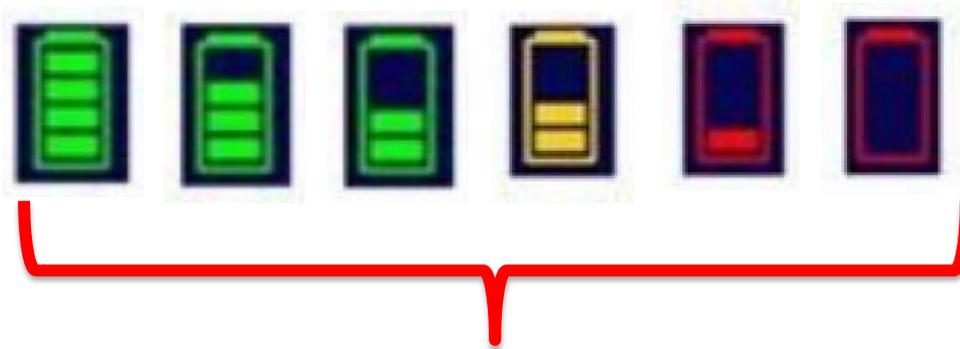
- Two types of indicators that show in RadView when no RSI system is connected:
 - “Not connected” banner
 - Grey status indicator
- Is the system powered on?
- Is the computer connected to the system?
- Attempt to connect by clicking “File” then “Connect to device”.



Battery Status



Battery and charge status



Progression from full to empty charge



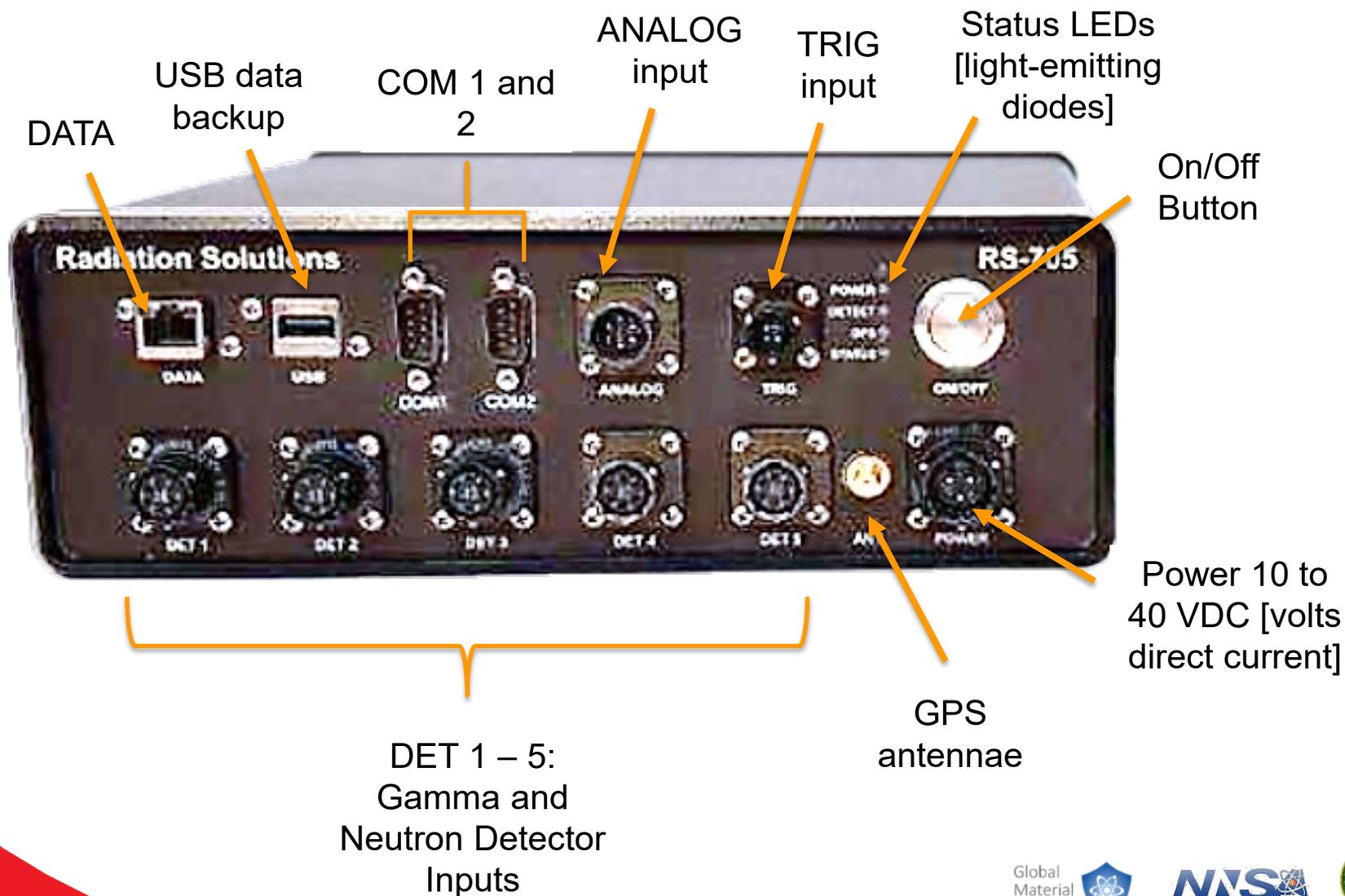
Battery info not available

System Architecture Review

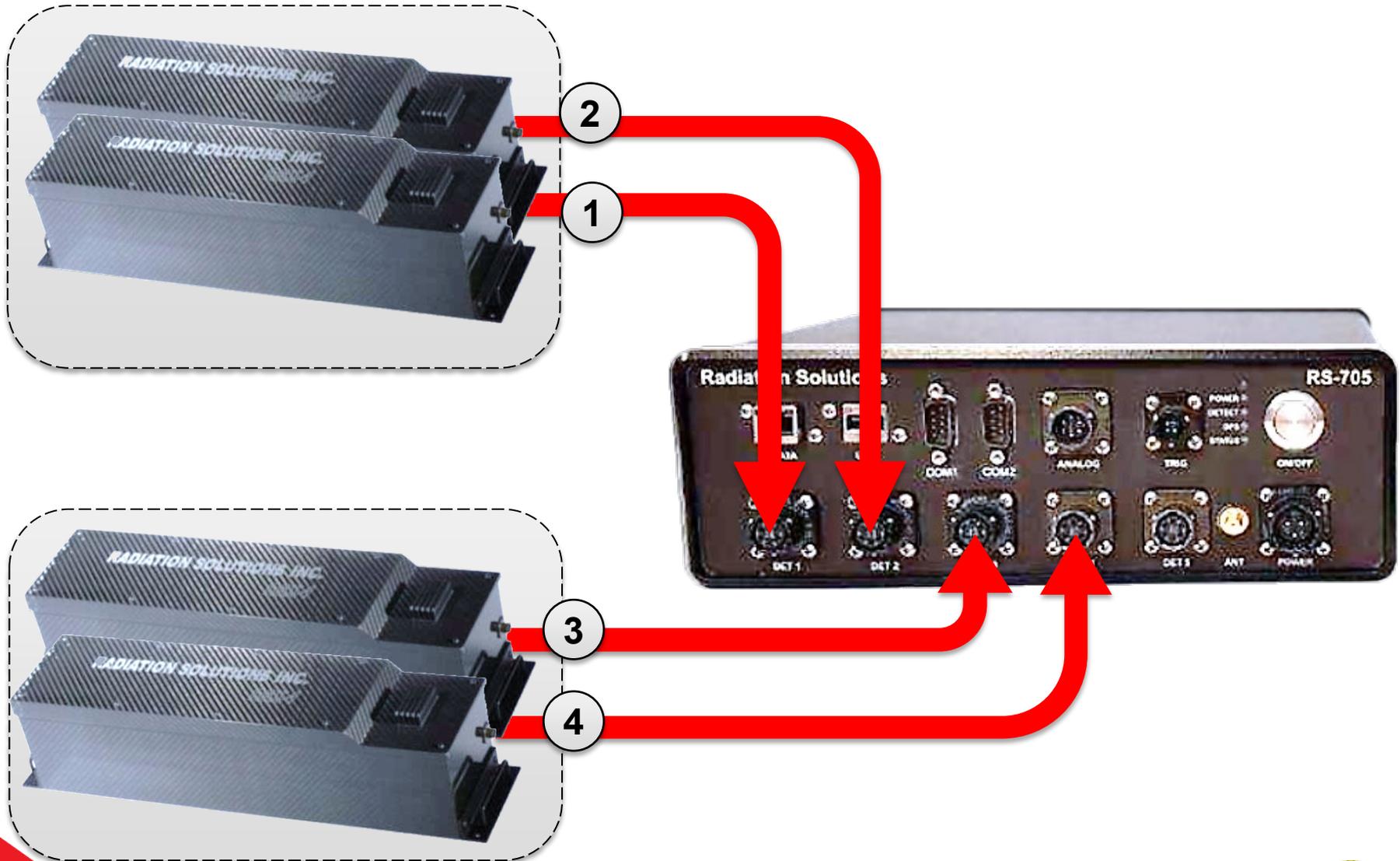
- Most of the problems that can be fixed by an operator rely on checking connections.
- It is important to understand how the system works so you can provide information about errors to a specialist.



- RS-700 series



Gamma Detector Connections



Neutron Detector Connections



5



System Power

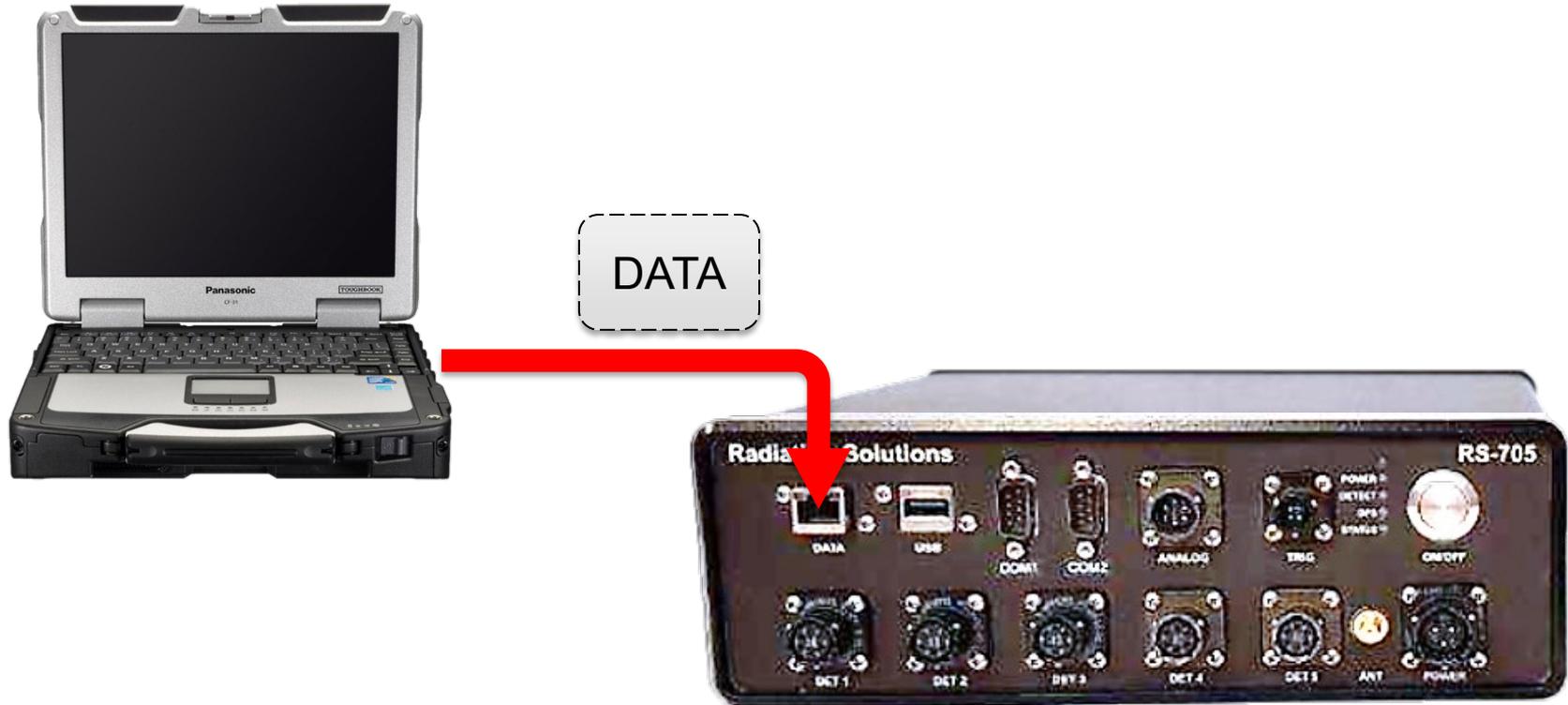
Power



ANT



Computer Connections



RS-700 Status Lights

- Power ●
- Detect ●
- GPS ●
- Status ●



- Next, we review the steps an operator can take to address some faults with the RSI system.
- Remember troubleshooting steps:
 1. Identify problem, gather information.
 2. Perform basic troubleshooting.
 3. Contact specialist support.



Individual Detector Faults

Yellow individual detector status **warning**

- Usually a 300 second countdown
- Nothing – just wait

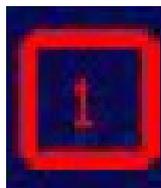


Red individual detector status **error**

- What does the status message say?

Message **Det 3 Wrong Device**

Detector
experiencing
error



Troubleshooting Detector Errors

Error types that can be addressed by operators:

- Communication error
- No sample received



Check the connections (cables, ports on detector, ports on controller box) if you see these errors:

- Are the detectors, ports, and cables clean and free from debris?
- Are there any tears or kinks in the cables?



System Faults

Yellow overall system status **warning**

- System is in a degraded state.



Red overall system status **error**

- Some **errors** are major issues that prevent the RSI system from operating.
- For others, the system may continue operating in a degraded state.
 - GPS
 - Battery



Troubleshooting System Errors - GPS

Many of the system errors that an operator can address are related to the GPS.



- Steps to Address:
 1. Gather information; record the message and the state of the system.
 2. Move the vehicle to a place with a clear view to the sky.
 3. Contact specialist support.
- Note that without the GPS functioning, mapping features of the RSI system will not work.
 - However, radiation detection will still work.

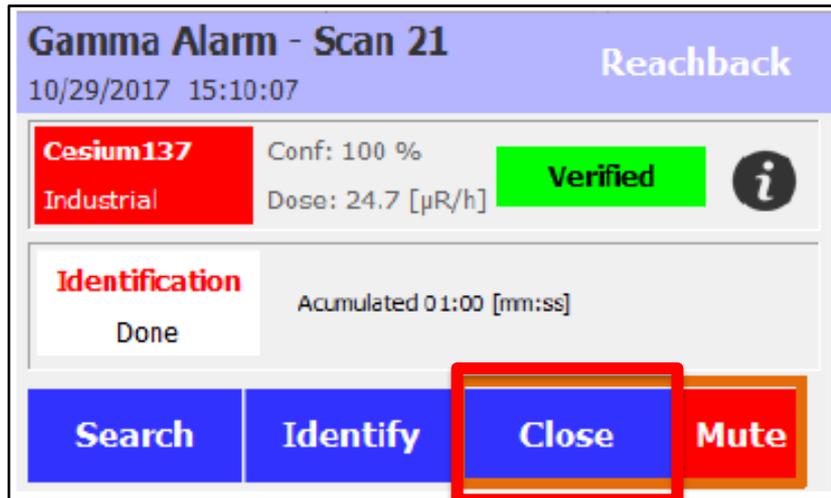
Troubleshooting Battery Errors

- Most battery errors are related to the voltage on the battery being too low.
- Reasons:
 - Battery drained
 - Battery board failure
- Troubleshooting steps:
 1. Check power.
 2. Restart system.
 3. Leave plugged in to a power source for several hours.
- A specialist may need to remove the system's battery to recharge it.



Addressing Alarm Errors

- Constant alarm state:
 - “Close” all alarms



- Stuck in alarm condition?
 - Are your check sources nearby?
 - Is the vehicle parked where high radiation is present?
 - Restart the system in another location.

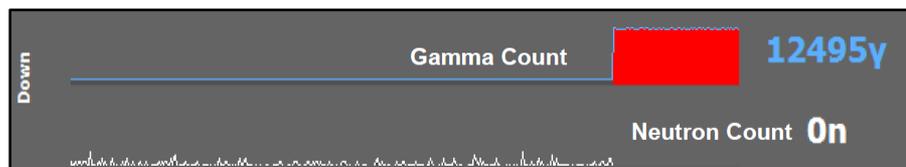
- Is radiation really present?
- Is your personal radiation detector (PRD) alarming?



Source Checks

- Did you troubleshoot and fix an issue?
 - How do you know the system is working correctly?
- Source check:
 - Use a known radiation source to test the system alarm.

- Does the source cause an alarm?



- Is the source identified, correct?

Gamma Alarm - Scan 21 Reachback

10/29/2017 15:10:07

Cesium137 Industrial	Conf: 100 % Dose: 24.7 [µR/h]	Verified	i
Identification Done	Acumulated 01:00 [mm:ss]		

Search **Identify** **Close** **Mute**

Example Scenarios

- Scenario 1:

- Gamma 4 status turns yellow
- What do you do?



- Scenario 2:

- Gamma 4 + system status turns red
- What do you do?



Troubleshooting Connection Issues

- Grey on all status indicators means the RadView software is trying to connect to the RSI system but has not connected.

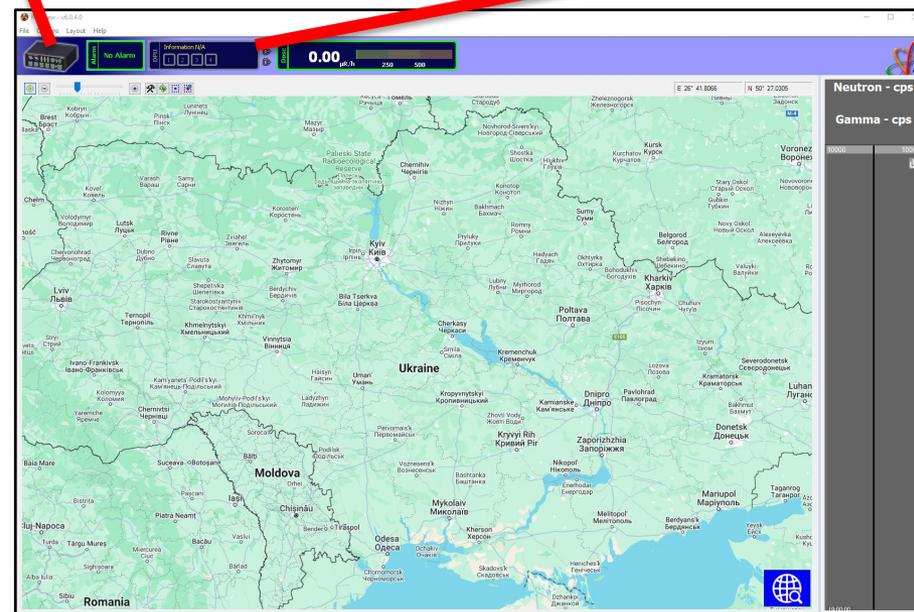
- Reasons:

- No communications (cable or WiFi)
- System is turned off



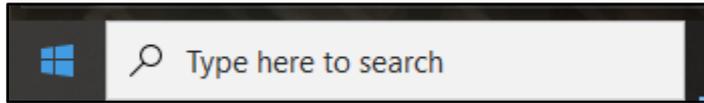
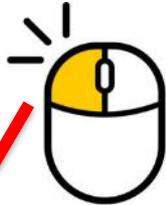
- Troubleshooting steps:

1. Check Power
2. Check WiFi connection
3. Check ethernet cable connection
4. Restart RSI system
5. Check computer network

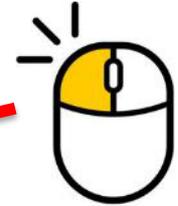
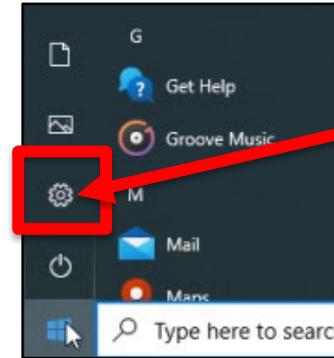


Connecting to a Computer

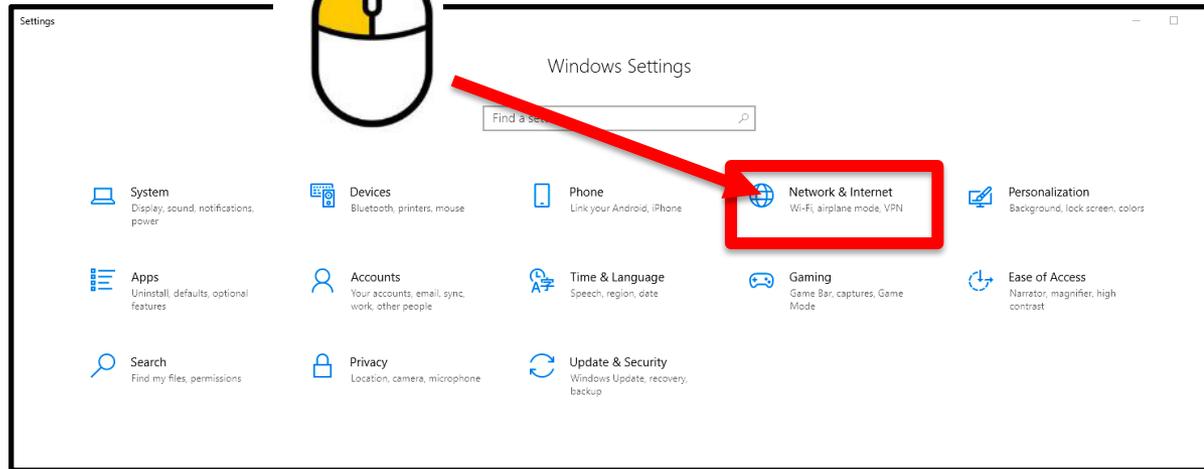
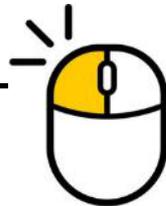
1



2

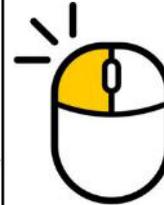
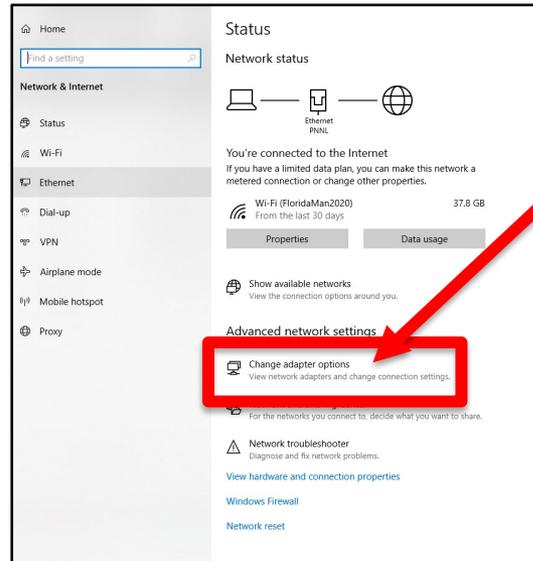


3

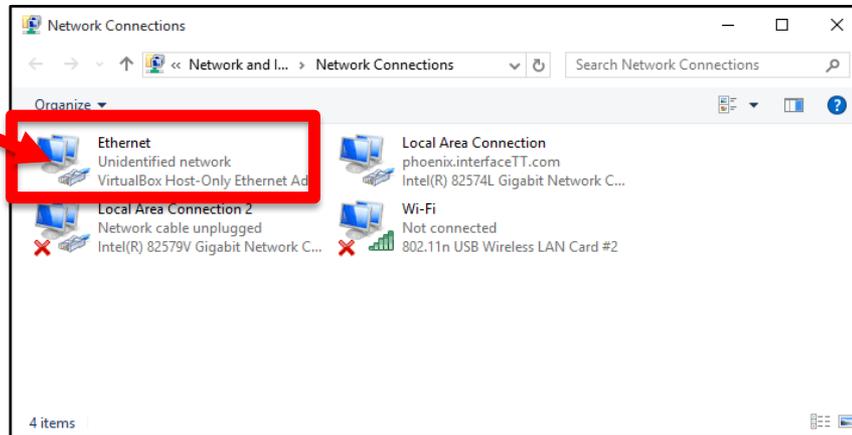
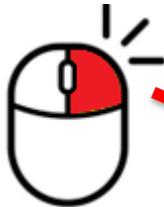


Connecting to a Computer (continued)

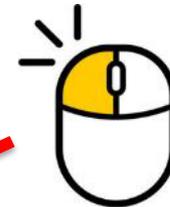
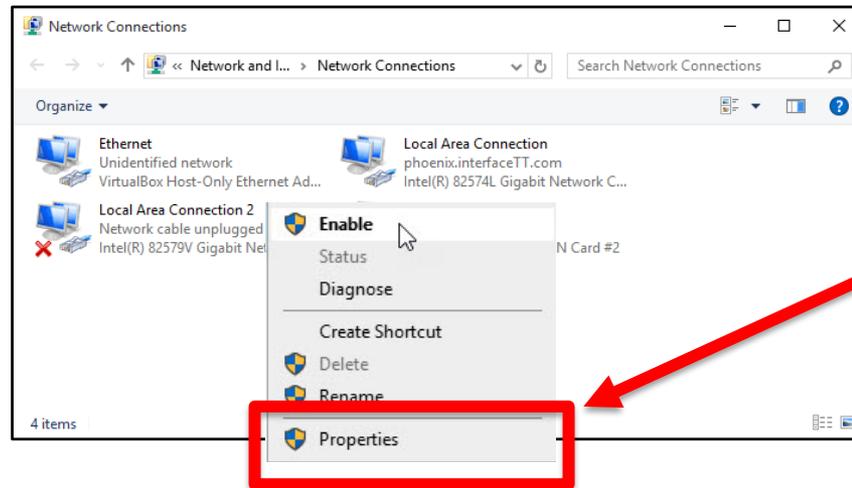
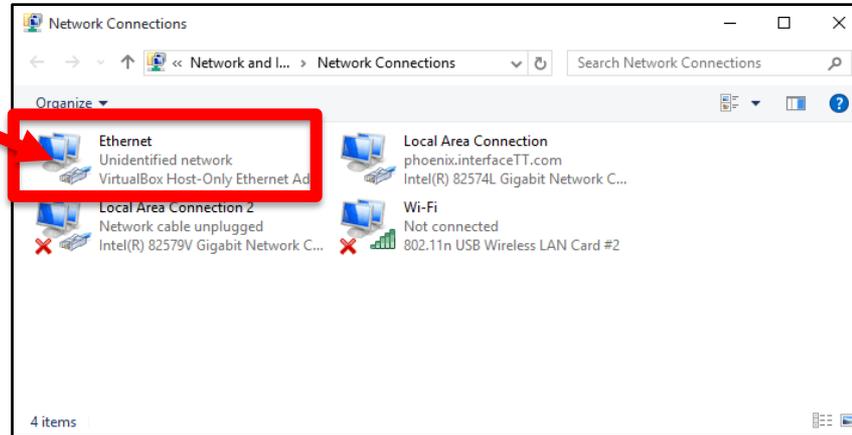
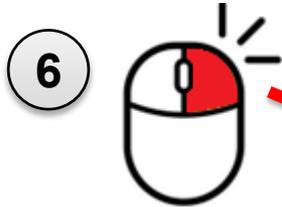
4



5

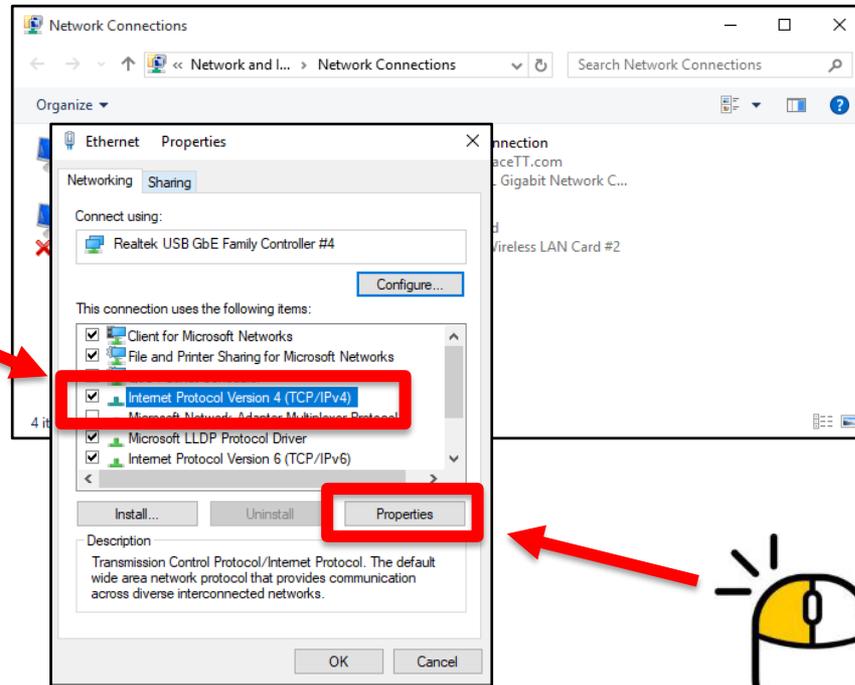


Connecting to a Computer (continued)



Connecting to a Computer (continued)

8



Network Connections

Network and I... > Network Connections

Search Network Connections

Organize

Ethernet Properties

Networking Sharing

Connect using:
Realtek USB GbE Family Controller #4

Configure...

This connection uses the following items:

- Client for Microsoft Networks
- File and Printer Sharing for Microsoft Networks
- Internet Protocol Version 4 (TCP/IPv4)
- Microsoft Network Adapter Multiplexing Protocol
- Microsoft LLDP Protocol Driver
- Internet Protocol Version 6 (TCP/IPv6)

Install... Uninstall Properties

Description
Transmission Control Protocol/Internet Protocol. The default wide area network protocol that provides communication across diverse interconnected networks.

OK Cancel

9



Connecting to a Computer (continued)

10



Internet Protocol Version 4 (TCP/IPv4) Properties

General

You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

Obtain an IP address automatically

Use the following IP address:

IP address: 192 . 168 . 1 . 100

Subnet mask: 255 . 255 . 255 . 0

Default gateway: . . .

Obtain DNS server address automatically

Use the following DNS server addresses:

Preferred DNS server: . . .

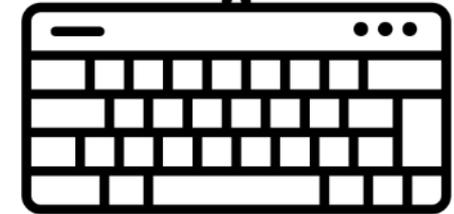
Alternate DNS server: . . .

Validate settings upon exit

Advanced...

OK Cancel

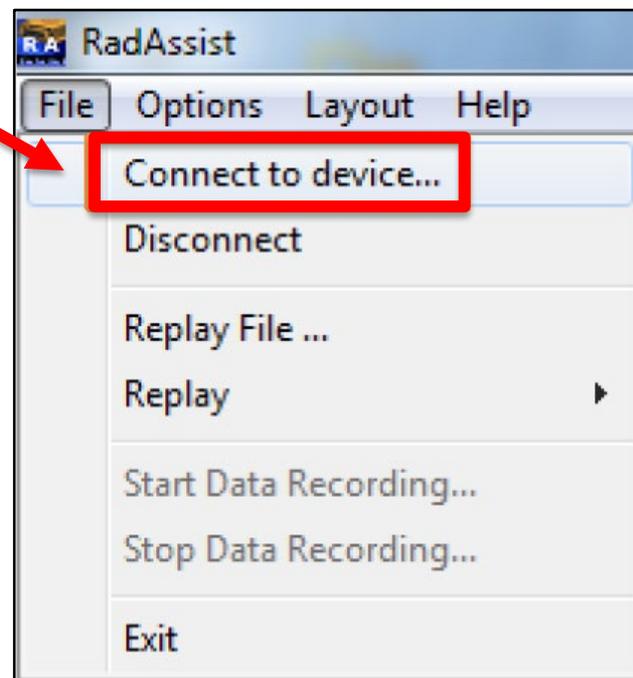
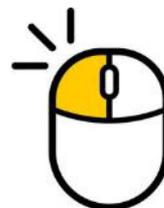
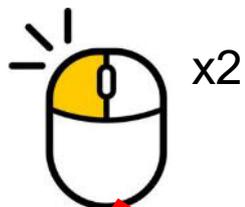
11



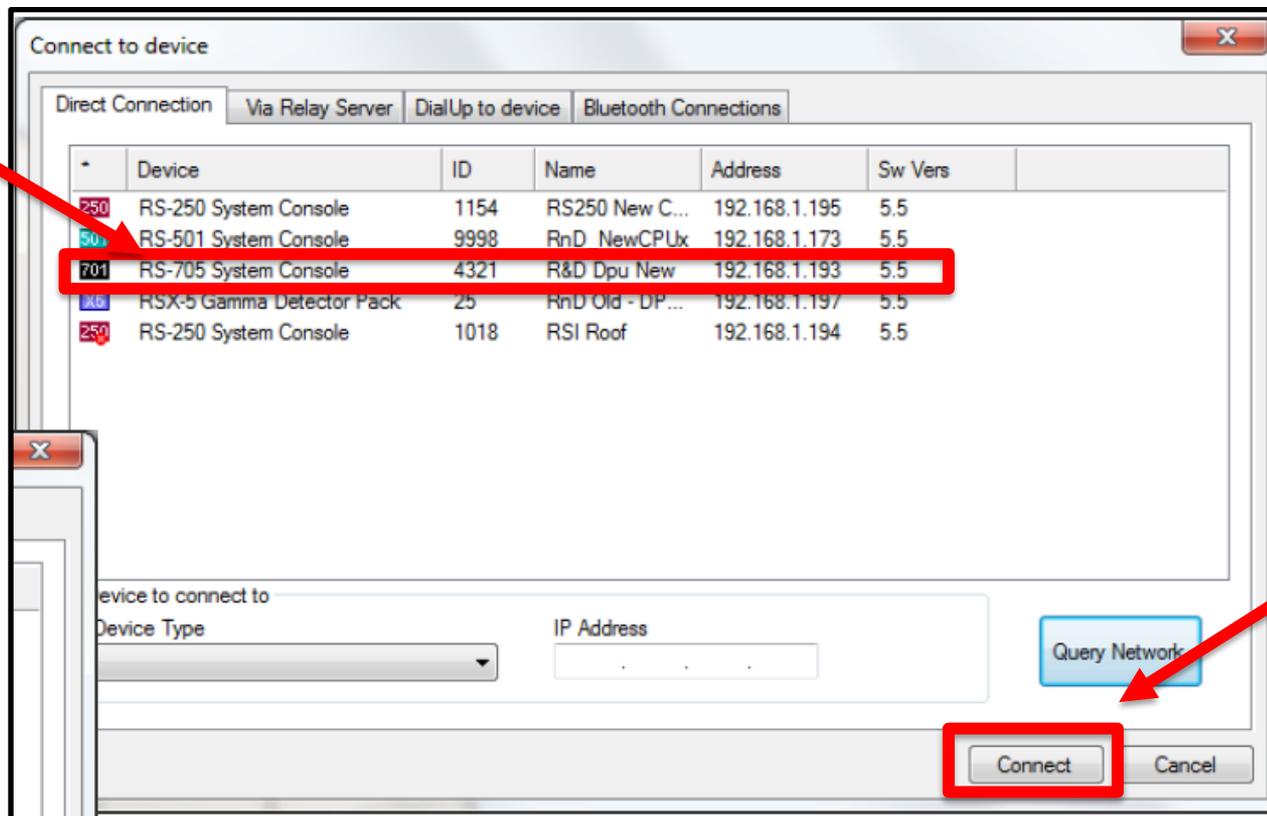
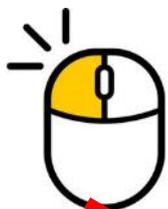
12



Connecting to a Computer (continued)



Connecting to a Computer (continued)



Connect to device

Direct Connection | Via Relay Server | DialUp to device | Bluetooth Connections

	Device	ID	Name	Address	Sw Vers
250	RS-250 System Console	1154	RS250 New C...	192.168.1.195	5.5
50	RS-501 System Console	9998	RnD NewCPUx	192.168.1.173	5.5
701	RS-705 System Console	4321	R&D Dpu New	192.168.1.193	5.5
250	RSX-5 Gamma Detector Pack	25	RnD Old - DP...	192.168.1.197	5.5
250	RS-250 System Console	1018	RSI Roof	192.168.1.194	5.5

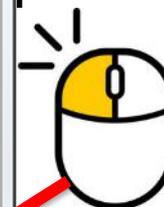
Device to connect to

Device Type:

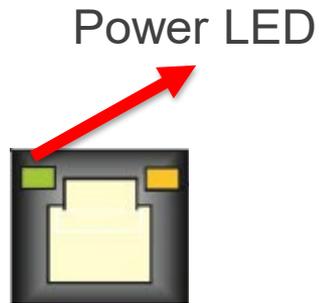
IP Address:

Query Network

Connect Cancel



LED Status Indication

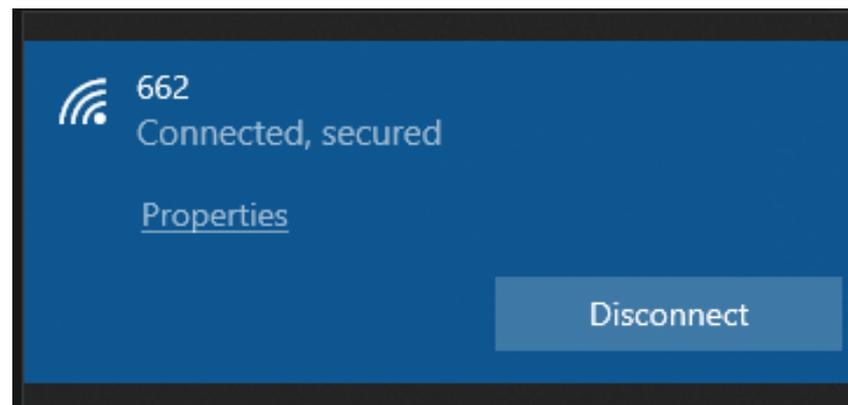


- Green = OK
- The LED will dim when power is less than 9 VDC [volts direct current].
- At 8.5 VDC, the power supply will shut off.

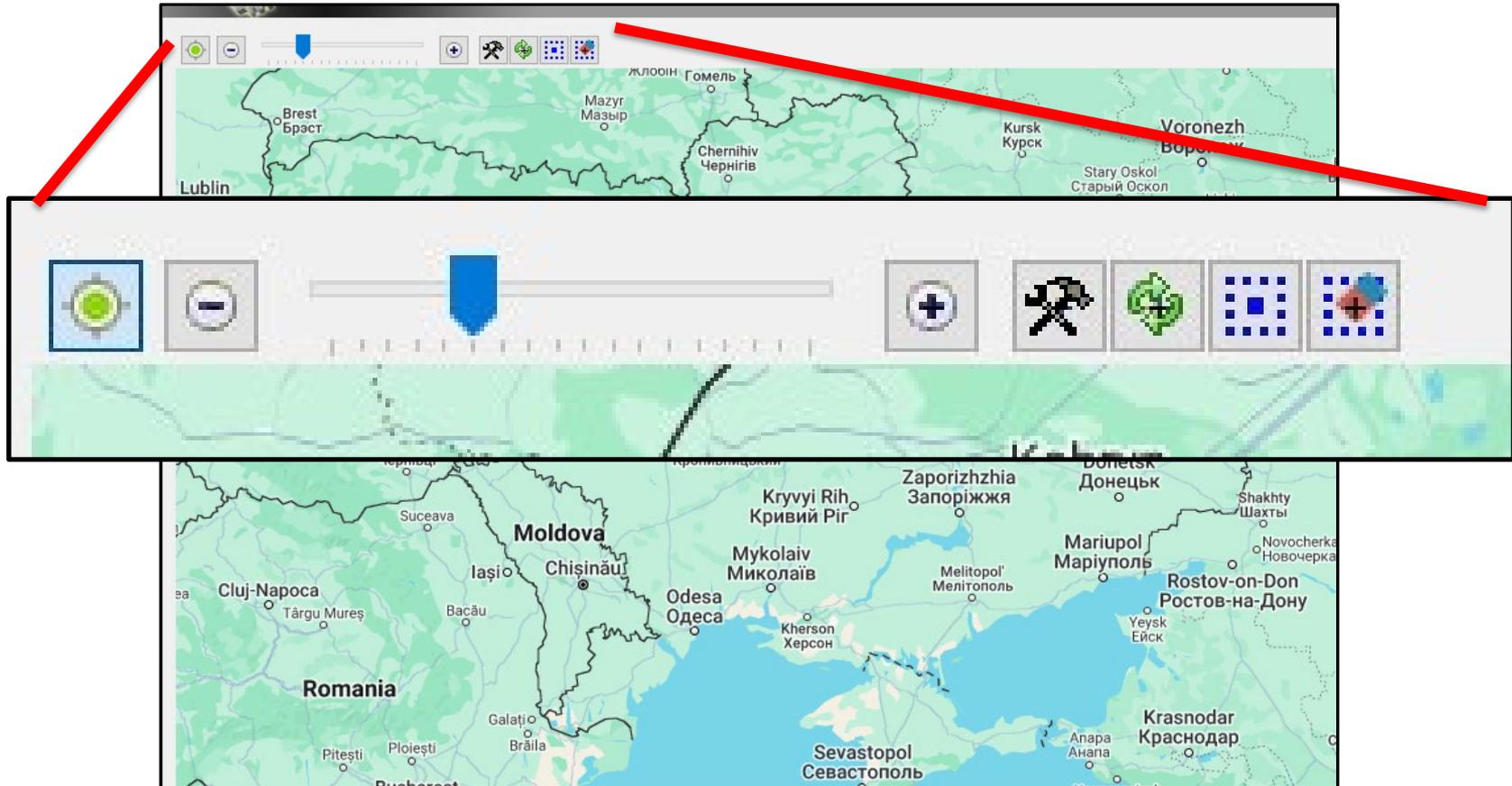
- LED light on the ethernet port should be green.
- If amber or no light, there may be a connection error.
- Troubleshooting: restart the CB5 controller.

Connecting to a Computer (WiFi)

- Connect to the WiFi signal if wireless is used.



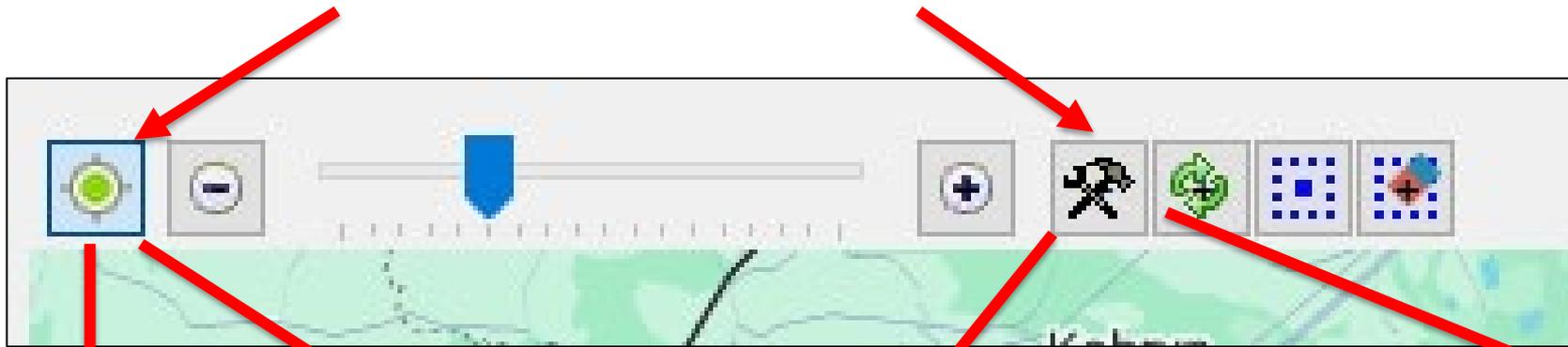
Troubleshooting Maps



Troubleshooting Maps (continued)

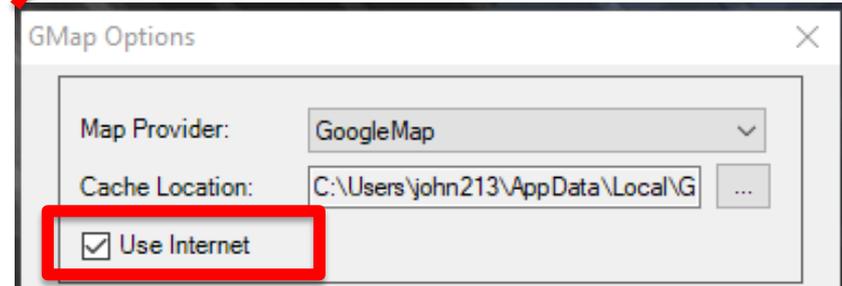
GPS tracking on/off

Properties

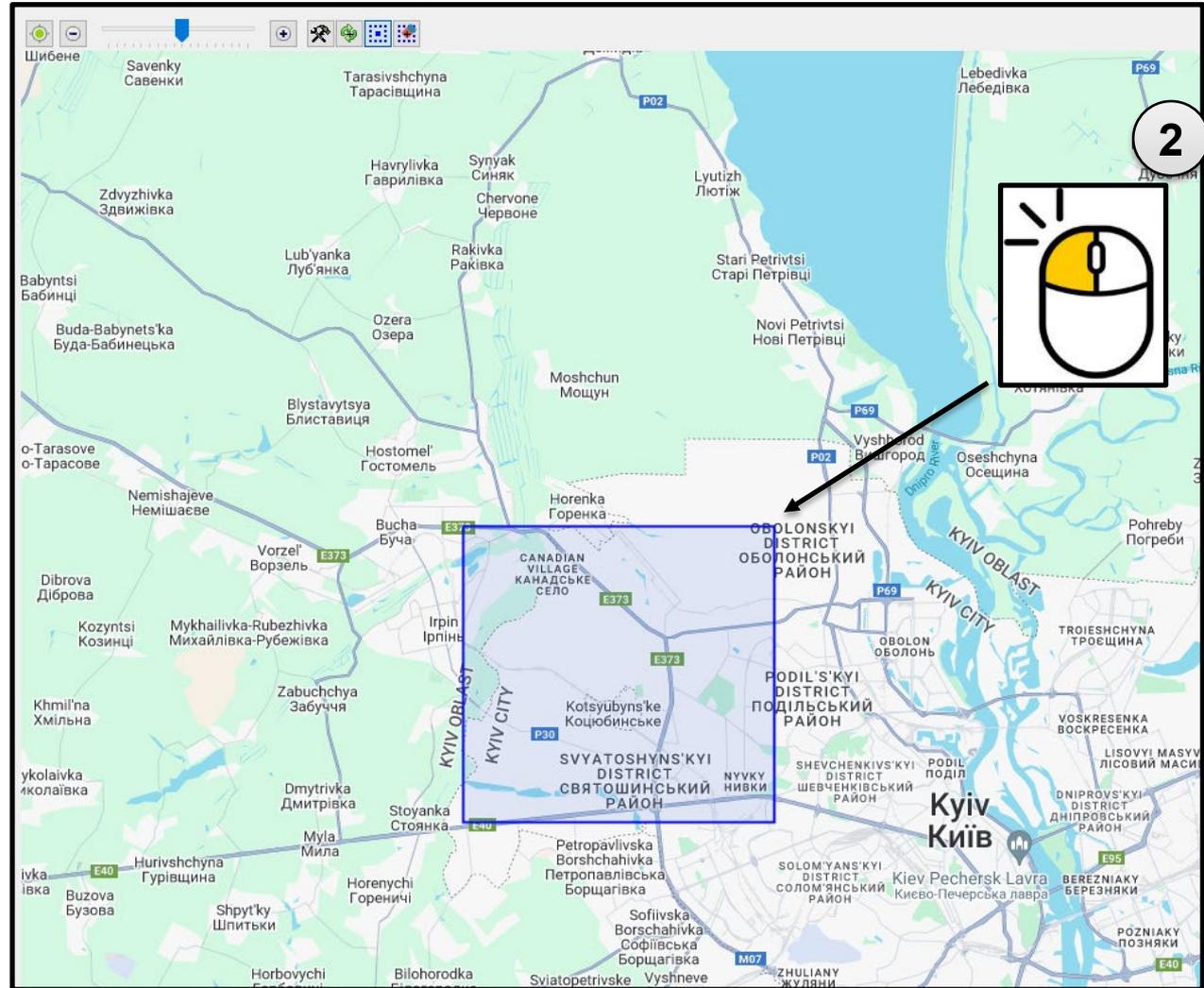
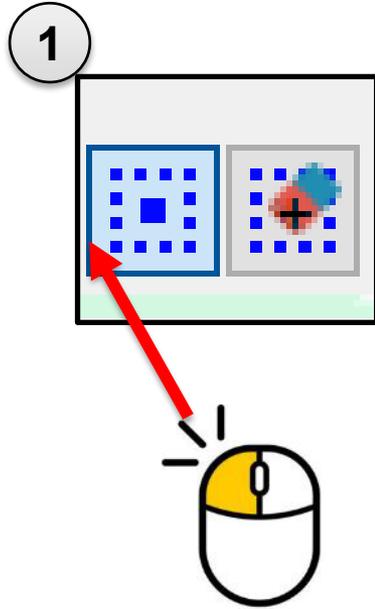


ON

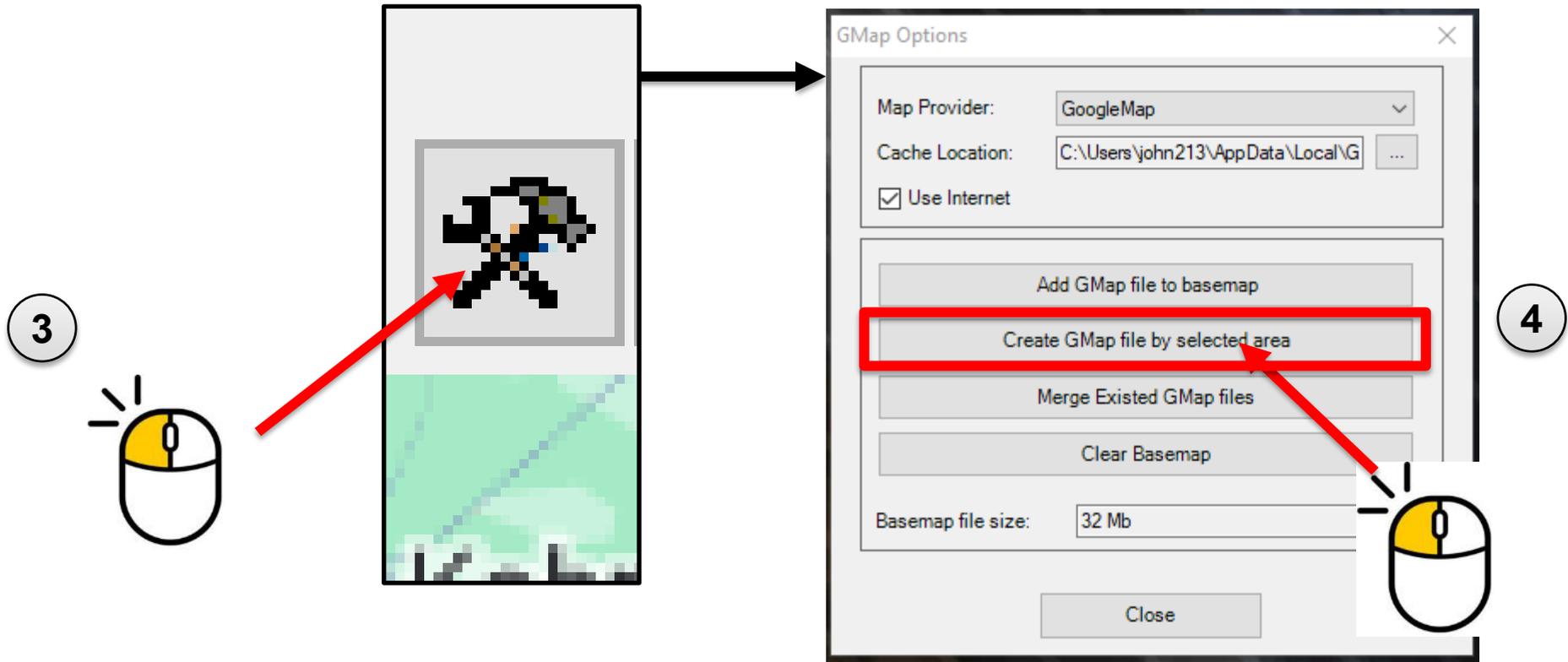
OFF



Troubleshooting Maps (continued)

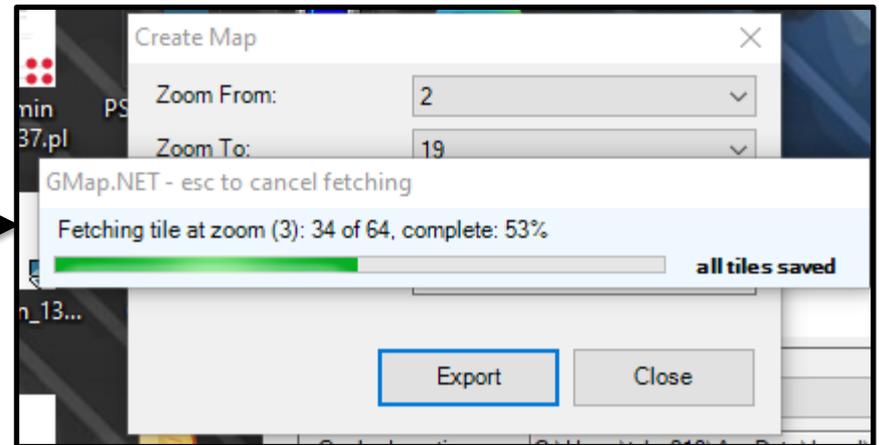
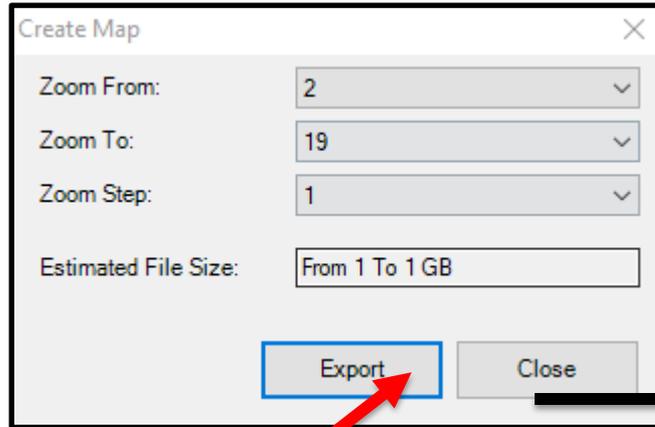


Troubleshooting Maps (continued)

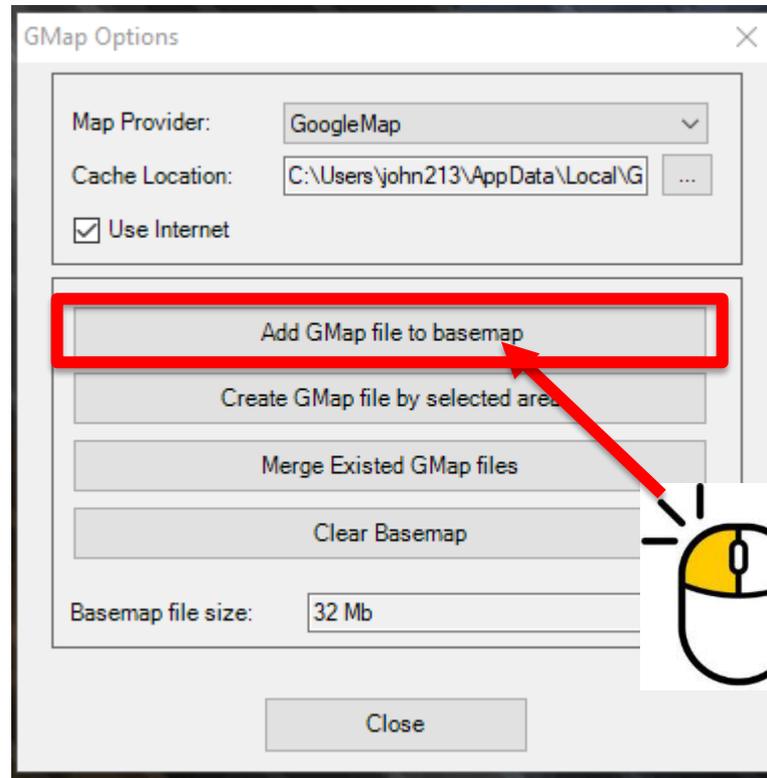


Troubleshooting Maps (continued)

5



6



Who do you contact when you cannot fix the problem?

1. Maintenance specialists within your agency

- Does your agency have an individual who oversees equipment?

2. External support:

- NSDD: NSDDTechnicalServices@pnnl.gov
- Radiation Solutions Inc. (RSI):
service@radiationsolutions.ca

In this module, we learned about:

How to recognize faults through the indicators in RadView

The architecture and components of the RSI system

How to perform basic troubleshooting to address common RSI system faults

Who to contact for additional support