



WWVDS Maintenance Manual

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Quality Record

ISO 9001 is the international standard that demonstrates the ability of a company to consistently meet customer and regulatory requirements. GovComm is ISO 9001:2015 certified.

Approval

The signatures below certify that this document has been reviewed and accepted and demonstrate that the signatories are aware of all the requirements contained herein and are committed to ensuring their participation.

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Amendment Record

This document is reviewed to ensure its continuing relevance to the systems and process that it describes. A record of contextual additions or omissions is given below:

Page #	Context	Revision	Date
All Pages	Multiple changes regarding format and forms	2	12/12/2024

Company Proprietary Information

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About This Document

This document provides maintenance instructions for GovComm's Wrong-Way Vehicle Detection System (WWVDS). These instructions do not replace or supersede any applicable Department of Transportation (DOT) regulations, standards, or directives. The operation and performance of the WWVDS must always comply with all relevant DOT requirements.

Prerequisites

Before proceeding with the following guidelines, make sure to have the necessary resources and tools:

- Installed and configured WWVDS and highlighted signs
- Cabinet key (if applicable)
- Computer with a network interface card and an Internet browser running Windows 10 or later
- Multimeter (capable of measuring DC voltage)
- Safety gloves
- Safety glasses (for lead-acid batteries or if there's a risk of battery damage)

Notify the Department of Transportation

If the WWVDS is connected to a DOT network, notify the appropriate DOT operator *before* beginning any maintenance that planned WWVDS maintenance will be performed and that alerts may be generated. If applicable, request that the system be placed in "maintenance mode".

Upon completion of all maintenance procedures, notify the DOT operator.

WWVDS Maintenance Procedures

The following maintenance procedures should be performed **at least quarterly**.

- **Collect Product Information**

Record key system data, including serial numbers, network parameters, firmware versions, and any other relevant information. This information is crucial for troubleshooting, maintenance history, and future upgrades.

Note that you can save the system report as a PDF from the “About” page of the WWVDS web interface, which contains the product information.

- **Visual Damage Check**

Visually inspect the WWVDS, highlighted signs, and ancillary components for any signs of damage resulting from vehicle impact, vandalism, theft, wind, water, or other environmental factors.

- **Solar Panel Check (If Applicable)**

For systems utilizing solar power, verify that the solar panels are correctly positioned and free from obstructions.

- **Battery Check (If Applicable)**

For systems utilizing batteries, check battery charge levels and confirm they are supplying the appropriate voltage.

- **Highlighted Signs Unintended Flashing Check**

Confirm that the highlighted signs do not flash except when triggered by a wrong-way event.

- **WWVDS Configuration Check**

Verify the system's configuration and ensure it is operating as expected. This check is preferably performed on-site, but can also be done remotely.

After completing each procedure above, record the results on the corresponding checklist in the following section.

WWVDS Maintenance Check List

Maintenance Start Date & Time

Maintenance Start Date	
Maintenance Start Time	

Product Information

Site ID	
Local Hub	
Station	
Product Manufacturer's Name	GovComm
Product Model	
Product Serial Number	
Product Firmware Version Number	
Main Unit IP Address	
Main Unit Gateway	
Main Unit Subnet Mask	
Detection Camera IP Address	
Confirmation Camera IP Address	

1. Visual Damage Check

Test #	Procedure	Expected Result	Pass	Fail
1	Visually inspect the WWVDS, highlighted signs, and ancillary components for any signs of damage	No signs of damage	☐	☐

2. Solar Panel Check (If Applicable)

Test #	Procedure	Expected Result	Pass	Fail
2	Verify solar panels are correctly positioned and free from obstructions	Solar panels correctly positioned and unobstructed	☐	☐

3. Battery Check (If Applicable)

When working with batteries, it is recommended to wear safety glasses and gloves.

Test #	Procedure	Expected Result	Pass	Fail
3	Check battery charge levels with a multimeter and confirm they are supplying the appropriate voltage	Voltage is between 13.6V and 14.4V while charging	☐	☐

4. Highlighted Signs Unintended Flashing Check

Test #	Procedure	Expected Result	Pass	Fail
4	Observe the highlighted signs to ensure they do not flash except when triggered by a wrong-way event	Highlighted signs do not flash without a wrong-way event	☐	☐

5. WWVDS Configuration Check

Note: For detailed instructions on connecting your computer to the WWVDS main unit locally, configuring system parameters, and simulating wrong-way events, refer to the "WWVDS Configuration Manual."

5a. Login & Home Page

Test #	Procedure	Expected Result	Pass	Fail
5	Log in to the WWVDS web interface and confirm cameras are displaying live video with correct and incrementing time of day	WWVDS cameras display live video with the correct date and time, and the time is incrementing	☐	☐
6	Confirm camera views are clear and unobstructed	Camera views are clear and unobstructed	☐	☐
7	Refresh the home page and confirm the date & time in the upper right corner match the overlay on the camera views	WWVDS and camera date and time are synchronized	☐	☐

System's Home Page:



The screenshot shows the WWVDS web interface. At the top, there's a navigation bar with links for Home, Configuration, Reporting, and About. The main content area is divided into several sections:

- Licenses:** A sidebar menu with options like Wrong-Way, Presence, Statistics, Speed, and High Speed.
- System Information:** A section displaying various system parameters such as Site ID, System Name, Latitude, Longitude, IP/Mask, GW, DNS, WAN IP, S/N, and Detection/Confirmation Camera details.
- Video Stream:** A central area showing two live camera feeds. The left feed is labeled 'Detection - Optical' and the right feed is labeled 'Detection - Thermal'. Both feeds show a street scene with vehicles and green bounding boxes indicating detected objects.
- Notifications:** A table on the right side listing recent notifications with columns for #, Time, and Type. The notifications are categorized as 'Detection Camera - Optical' and 'Detection Camera - Thermal'.
- AI Engine:** A section at the bottom right showing the AI Engine Name ('Wrong-Way') and Status ('Running').

5b. Configuration: Engine Parameters

Test #	Procedure	Expected Result	Pass	Fail
8	Confirm AI engine control status is set to "Running"	AI engine status is "Running"	☐	☐
9	Confirm the NTP server IP address and polling interval are set	NTP server IP and interval set	☐	☐
10	Confirm system health parameters (CPU, Memory, File System) are within acceptable ranges	System health parameters are within acceptable ranges. Values are considered acceptable if displayed in green or amber. Occasionally, a red value may appear briefly; refresh the page a few times to confirm if the red reading persists	☐	☐

Engine Parameters Page:


[Home](#)
[Configuration](#)
[Reporting](#)
[About](#)

Thu January 30 14:25:44 2025
Hi, admin
Logout

[Detection Camera](#)
[Wrong-Way](#)
[Engine](#)
[User Management](#)
[Maintenance](#)
[Confirmation Camera](#)
[Signs](#)

Engine Control

Name: Wrong-Way

Status: Running (Since 3 minutes)

[Start](#) [Stop](#) [Refresh](#)

NTP

Server Address: time.windows.com

Min Poll (sec): 8

Max Poll (sec): 16

[Apply](#)

System Health

CPU 0: 22.8% CPU 1: 22.8% CPU 2: 34% CPU 3: 25.5% CPU 4: 30.3% CPU 5: 22.8% Average: 26.4% GPU: 68.4%	Memory Total: 7.16GB Available: 4.78GB Used: 2.17GB Percentage: 33.2% Total: 3.58GB Used: 0.00B Percentage: 0%	Misc CPU: 41.125 GPU: 39.062 Power: 20W Sram: Orin Board: A603	File System Mount: /app/clean_images.sh Total: 116.12GB Used: 24.08GB Free: 86.10GB Percentage: 21.9% Clean FS
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Processes and Logs

Command	%CPU	Mem(MB)
systemd	0	164
kthreadd	0	0
rcu_gp	0	0
rcu_par_gp	0	0
kworker/0-0-events	0	0
kworker/0-0H-events_highpri	0	0

core.log

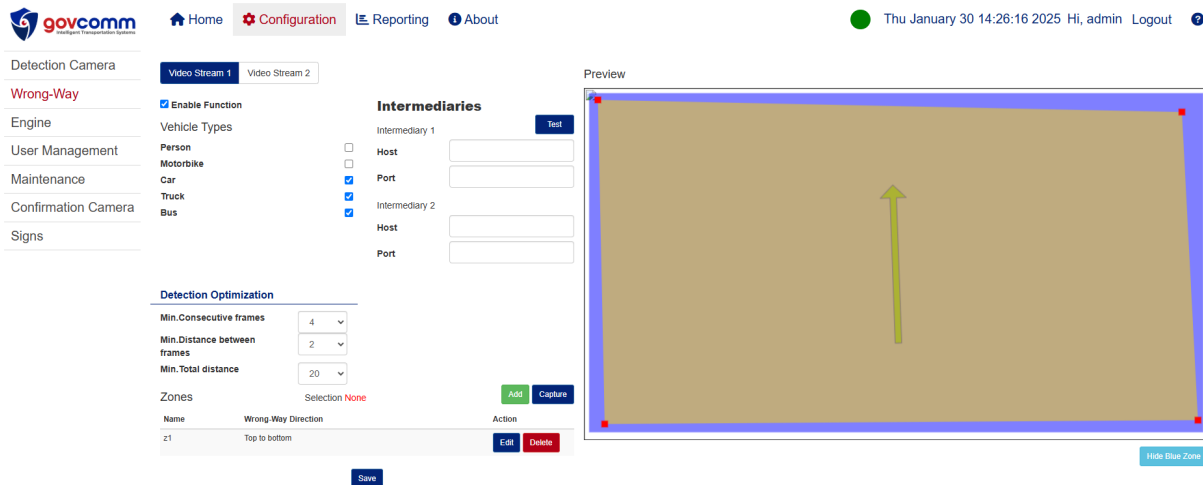
```

2025-01-30 14:24:00.094 : core : [INFO] : [cam 1] [Processing] at minute
2025-01-30 14:24:00.207 : core : [INFO] : [cam 2] [Processing] at minute
2025-01-30 14:25:00.206 : core : [INFO] : [cam 1] [Processing] at minute
2025-01-30 14:25:00.208 : core : [INFO] : [cam 2] [Processing] at minute
  
```

5c. Configuration: Wrong-Way Parameters

Test #	Procedure	Expected Result	Pass	Fail
11	Confirm "Enable Function" is checked and Vehicle Types (i.e. Car, Truck, Bus, etc.) are selected	Wrong-way detection enabled for vehicle types	☐	☐
12	Confirm at least one Intermediary is configured	Intermediary is configured	☐	☐
13	Confirm monitoring areas (blue) for optical & thermal sensors cover required lanes and shoulders	Monitoring areas cover required lanes and shoulders	☐	☐
14	Confirm detection areas (yellow) for optical & thermal sensors are within monitoring areas (blue)	Detection areas are within monitoring areas	☐	☐
15	Confirm vehicles in detection areas (yellow) have centroids (yellow) overlaid	Vehicles in detection areas have centroids overlaid	☐	☐

Wrong-Way Parameters Page:



The screenshot shows the 'Wrong-Way' configuration page in the govcomm web application. The page includes a sidebar with navigation links, a main configuration area, and a preview window.

Navigation: Home, Configuration (active), Reporting, About. User: Thu January 30 14:26:16 2025 HI, admin Logout

Left Sidebar: Detection Camera, Wrong-Way (active), Engine, User Management, Maintenance, Confirmation Camera, Signs.

Main Configuration Area:

- Video Stream:** Video Stream 1 (selected), Video Stream 2
- Enable Function:** ☒
- Vehicle Types:**
 - Person ☐
 - Motorbike ☐
 - Car ☒
 - Truck ☒
 - Bus ☒
- Intermediaries:**
 - Intermediary 1: Host , Port (Test button)
 - Intermediary 2: Host , Port
- Detection Optimization:**
 - Min. Consecutive frames: 4
 - Min. Distance between frames: 2
 - Min. Total distance: 20
- Zones:** Selection None. Table with columns: Name, Wrong Way Direction, Action. Row: z1, Top to bottom, Edit, Delete.

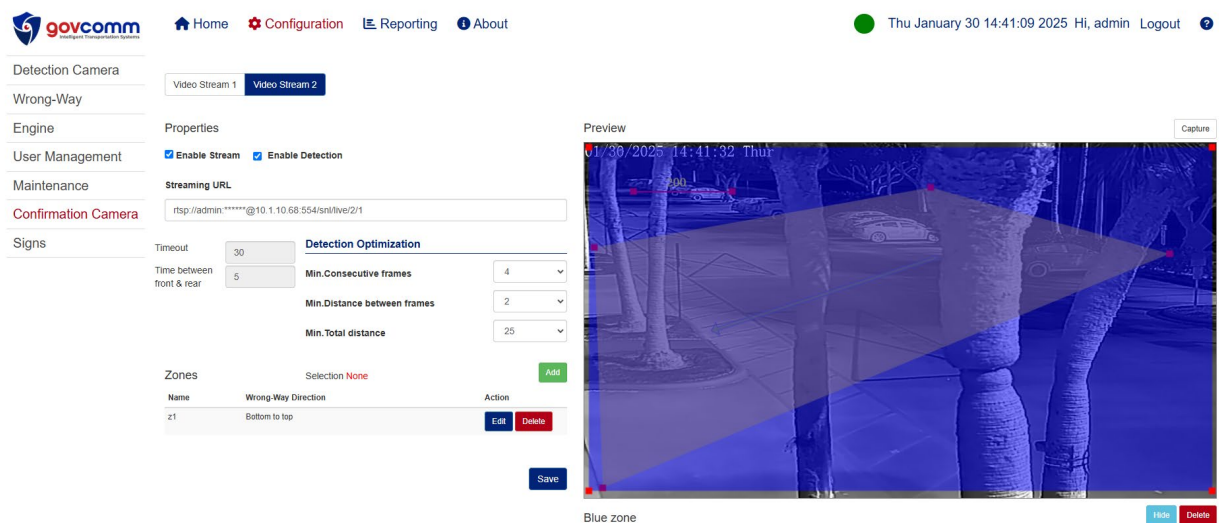
Preview: A large rectangular area with a blue border and a yellow arrow pointing upwards, representing the detection area.

Buttons: Add, Capture, Save, Hide Blue Zone.

5d. Configuration: Confirmation Camera Parameters

Test #	Procedure	Expected Result	Pass	Fail
16	Confirm monitoring areas (blue) for optical & thermal sensors cover required lanes and shoulders	Monitoring areas cover required lanes and shoulders	☐	☐
17	Confirm confirmation areas (yellow) for optical & thermal sensors are within monitoring areas (blue)	Confirmation areas are within monitoring areas	☐	☐

Confirmation Camera Parameters Page:



The screenshot shows the 'Confirmation Camera' configuration page. The left sidebar contains navigation links: Detection Camera, Wrong-Way, Engine, User Management, Maintenance, Confirmation Camera (selected), and Signs. The main content area is divided into several sections:

- Properties:** Includes checkboxes for 'Enable Stream' and 'Enable Detection', both of which are checked.
- Streaming URL:** A text field containing 'rtsp://admin*****@10.1.10.68:554/rtsp/2/1'.
- Detection Optimization:** Includes dropdown menus for 'Min. Consecutive frames' (set to 4), 'Min. Distance between frames' (set to 2), and 'Min. Total distance' (set to 25).
- Zones:** A table with columns 'Name', 'Wrong Way Direction', and 'Action'. It contains one entry named 'z1' with the direction 'Bottom to top'. There are 'Edit' and 'Delete' buttons for this entry.

On the right side, there is a 'Preview' window showing a live video feed of a street scene. A blue polygonal zone is overlaid on the video, representing the monitoring area. Below the preview, there are 'Save', 'Hide', and 'Delete' buttons.

5e. Configuration: Maintenance Parameters

Notify the DOT operator *before* simulating a wrong-way event. Request that the system be placed in "maintenance mode", if applicable.

Test #	Procedure	Expected Result	Pass	Fail
18	Simulate wrong-way event	Flashing lights triggered on all highlighted signs; TMC receives alerts & images	☐	☐
19	Cut power breaker and restore power. Confirm all programmed settings reload correctly after reboot	Programmed settings persist after reboot	☐	☐

Maintenance Parameters Page:


[Home](#)
[Configuration](#)
[Reporting](#)
[About](#)

Thu January 30 14:46:32 2025
Hi, admin
[Logout](#)

[Detection Camera](#)
[Wrong-Way](#)
[Engine](#)
[User Management](#)
[Maintenance](#)
[Confirmation Camera](#)
[Signs](#)

Import Configuration Settings

Import a saved configuration file onto this system to support the saved settings.

Choose File | No file chosen

Note: After importing a configuration file, log out of the system, then log back in.

Import

Reboot

System Up Time: **up 25 minutes**

Sync Time

System Time: **Thu Jan 30 14:46:32 2025**

PC Time: **Thu Jan 30 14:46:32 2025**

Click the button to reboot the device.

Note: Please do not disconnect power or otherwise turn the system off while rebooting.

Reboot

WW

 Click here to simulate WW with 10 second delay

Export Configuration Settings

Click **Export** to save your current configuration to your computer. It is recommended to export the configuration before Firmware upgrade or configuration modification.

Export

Export Device Compass

Network Settings

IP Address

Subnet Mask

Gateway

DNS

WAN IP

Port Forward

Note: Changing IP address would cause device to reboot. Please access new IP address after change.

Save

Licensing

Select license file to import

Generate Info

Troubleshooting

☐ Video
 ☐ Image
 ☒ JSON
 ☒ Debug

Save

Maintenance Completion Record

Maintenance End Time	
Maintenance End Date	
Technician Name & Signature	