



FALCON BMS

FLIGHT SCHOOL

ENGLISH USER MANUAL

MISSION READY / FALCON BMS 4.38

YOUR COCKPIT. YOUR FLIGHT SCHOOL.

Operation and setup of Flight School
in BMS Live Monitor

ONE STUDENT / ONE INSTRUCTOR / ONE DATA PATH

Direct, encrypted 1:1 observation with isolated student data.

TARGET SYSTEM	Windows x64 / Falcon BMS 4.38
APPLICATION	BMS Live Monitor 1.10.5 / Flight School
CONNECTION	Direct 1:1 connection / TLS / TCP 43861
PROTECTION	Four-digit session PIN / read-only

About This Manual

BINDING VERSION

This manual covers only Flight School in BMS Live Monitor Server 1.10.5. The connection path is Internet - direct 1:1 connection - TLS on TCP port 43861 with a four-digit session PIN.

Flight School connects two instances of BmsLiveMonitor.exe. The student shares their own Falcon flight. The instructor sees only the data permitted by the student in a separate student cockpit.

What This Edition Explains

- Configure the student and instructor roles completely.
- Securely limit Windows Firewall and the router for the direct Internet connection.
- Operate all eleven data shares and the MFD frame rate from 5 to 60 FPS.
- Share the address, port and four-digit PIN securely.
- Correctly interpret pit, pause, freeze, flight end and connection interruption.
- Check typical connection, DED and MFD problems systematically.

Not Covered by This Manual

- Normal BmsDisplayClient and LAN server operation on port 43860.
- Control Panel, local instruments, cockpit hardware or standalone MFD viewers.
- Self-test, home-network mode or any telemetry web or relay service.

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1. Purpose, Roles and Product Boundaries

On the student PC, Live Monitor reads Falcon BMS 4.38. The instructor connects their Live Monitor directly to the session and sees the shared displays in a separate student cockpit.

The Two Roles

Student	Falcon BMS 4.38 and BmsLiveMonitor.exe 1.10.5. Starts and ends the session and controls every share.
Instructor	BmsLiveMonitor.exe 1.10.5. Joins with address, TCP port and four-digit PIN and observes read-only.

Clear Boundaries

- No BmsDisplayClient operation. The normal client uses the separate LAN path on port 43860.
- No remote control. The Flight School channel contains no panel, cockpit or Falcon control commands.
- No telemetry web service. Training data travels directly from the student to the instructor.
- No self-test or home-network mode in this tab.
- Exactly one active instructor per session.

INDEPENDENT OPERATION

A Flight School failure does not stop Falcon, local displays, normal display clients or cockpit hardware.

2. Requirements and Data Path

Student PC	Windows 10/11 x64, Falcon BMS 4.38 and BmsLiveMonitor.exe 1.10.5
Instructor PC	Windows 10/11 x64 and BmsLiveMonitor.exe 1.10.5; a locally running Falcon is not required
Internet	Reachable public IPv4 or global IPv6 address of the student PC, or a hostname
Port	TCP 43861 by default; Live Monitor, firewall, router and instructor must use the same value
MFD	Falcon RTT export, active 3D cockpit and student share for left or right MFD

Isolated Training Data Path

Student's Falcon -> Shared Memory -> BmsLiveMonitor FLIGHT SCHOOL -> TLS 1.2/1.3 on TCP 43861 -> instructor's BmsLiveMonitor -> isolated student cockpit.

- Telemetry is transmitted at no more than 20 Hz as the latest available state.
- MFD images use a separate binary channel and only one active student share.
- Pause and freeze remain visible; new MFD compression stops while either state is active.
- The instructor's own data and the remote student's data remain technically isolated.

3. Student: Configure Flight School

FLUGSCHULE
Getrennter, rein beobachtender Unterrichtsbereich. Der normale Live-Monitor-, Client- und Cockpitbetrieb läuft unabhängig weiter.

UNTERRICHTSSITZUNG

ROLLE:

VERBUNDUNGSWEG: Internet - direkte t1-Verbindung - TLS

ANZEIGENAME:

DIREKTER TCP-PORT:

FLUGUNTERRICHT STARTEN

Die öffentliche IP wird automatisch ermittelt. Für IPv4 TCP-Port 43861 weiterleiten; für globale IPv6 in der FRITZ!Box eine IPv6-Freigabe anlegen.

VOM SCHÜLER FREIGELEGTE COCKPITDATEN

☒ Fluglage / ADI ☒ Geschwindigkeit / Mach
☒ Höhe / Radarhöhe ☒ Steigen / Sinken
☒ Kurs / HSI ☒ AoA / G-Kräfte
☒ Fahrwerk ☒ Triebwerk / Kraftstoff
☒ Warnungen ☒ DED
☒ Linkes / rechtes MFD

MAXIMALE MFD-BILDRATE:

SITZUNGSSTATUS

STATUS: Nicht gestartet

ERKANNTES ÖFFENTLICHE IP: WIRD ERMITTELT ...

SITZUNGS-PIN: --

VERBUNDUNGS-DATEN: **KOPIEREN**

MFD-FREIGABE: Maximal 15 FPS

FLUGLEHRER: Noch kein Fluglehrer beigetreten

SCHÜLER: Nicht im Pit

LEHRERFENSTER: ☒ Schüler-Cockpit nach erfolgreichem Beibritt sofort öffnen
☐ Schüler-Lockpit beim Öffnen in den Vordergrund holen

Current student view in direct TLS mode. Native selection lists may appear empty in the UI test capture.

- 1 Start BmsLiveMonitor.exe and open FLUGSCHULE (FLIGHT SCHOOL).
- 2 Under ROLLE (ROLE), select Schüler - eigenen Flug freigeben (Student - share own flight).
- 3 Enter a clear ANZEIGENAME (DISPLAY NAME).
- 4 Check DIREKTER TCP-PORT (DIRECT TCP PORT). The default is 43861.
- 5 Select only the cockpit data the instructor is allowed to see.
- 6 For the left or right MFD, select the maximum frame rate. The default is 15 FPS.

THE STUDENT CONTROLS ALL SHARES

Shares can be changed during the session. Pit, pause, freeze, flight end and connection status remain visible independently.

4. Set Up Windows Firewall and Router

Windows Firewall on the Student PC

- 1 Open Windows Security -> Firewall and network protection -> Advanced settings, or start wf.msc.
- 2 Under Inbound Rules, create a new custom rule.
- 3 Select the exact path of the BmsLiveMonitor.exe being used.
- 4 Select TCP and enter local port 43861.
- 5 Allow the connection and select only the active network profile, normally Private on a home network.
- 6 Name the rule clearly, for example BMS Flight School TCP 43861.

NEVER DISABLE THE FIREWALL

A rule limited to BmsLiveMonitor.exe and one TCP port is safer than a general port opening.

Router or FRITZ!Box

- 1 Give the student PC a stable internal address, preferably with a DHCP reservation.
- 2 For IPv4, forward exactly external TCP 43861 to TCP 43861 on the student PC.
- 3 For global IPv6, create an IPv6 permit for the student PC and TCP 43861.
- 4 Never use Exposed Host, a full-device permit or port 43860.
- 5 Disable the permit after training if it is not required regularly.

FRITZ!Box menu names vary by FRITZ!OS and language; the settings are normally under Internet and Port Sharing. With CGNAT, inbound IPv4 cannot be solved by port forwarding alone. A reachable global IPv6 address or a suitable provider solution is then required.

5. Student: Start Training

- 1 Verify that Live Monitor, Windows Firewall and the router all use the same TCP port.
- 2 Check the cockpit shares and MFD frame rate.
- 3 Select FLUGUNTERRICHT STARTEN (START FLIGHT TRAINING). Live Monitor then listens on IPv4 and IPv6.
- 4 In SITZUNGSSTATUS (SESSION STATUS), wait for the detected public IP and the new four-digit PIN.
- 5 Select VERBINDUNGSDATEN KOPIEREN (COPY CONNECTION DATA).
- 6 Send the address, TCP port and PIN privately to the intended instructor only.
- 7 After the instructor joins, verify the displayed instructor name.

Information to Share

Value	Example	Note
Public IPv4	203.0.113.25	The router forwards TCP 43861 to the student PC
Global IPv6	2001:db8:...	Enter without brackets on the instructor PC; an IPv6 permit is required
Hostname	pilot.example.net	Must resolve to the current public address
TCP port	43861	Must be identical in every configuration
Session PIN	four digits	Valid only for this session; never post publicly

IP NOT DETECTED

If the software shows NICHT ERMITTELT - MANUELL PRÜFEN (NOT DETECTED - CHECK MANUALLY), determine the public address in the router or with a trusted IP-check service. Copying remains disabled until then.

6. Instructor: Connect to the Session

FLUGSCHULE
Getrennter, rein beobachtender Unterrichtsbereich. Der normale Live-Monitor-, Client- und Cockpitbetrieb läuft unabhängig weiter.

UNTERRICHTSSITZUNG		SITZUNGSSTATUS	
ROLLE	Fluglehrer - Schüler beobachten	STATUS	Nicht gestartet
VERBINDUNGSWEG	Internet - direkte t1-Verbindung - TLS	SITZUNGS-PIN	—
ANZEIGENAME		MFD-FREIGABE	Noch nicht bekannt
ÖFFENTLICHE IPv4 / IPv6 / HOSTNAME		SCHÜLER	Noch mit keinem Schüler verbunden
DIREKTER TCP-PORT		PIT-STATUS	Nicht im Pit
VERSTELLTE SITZUNGS-PIN		LEHRERFENSTER	☒ Schüler-Cockpit nach erfolgreichem Beitritt sofort öffnen ☐ Schüler-Cockpit beim Öffnen in den Vordergrund holen

FLUGUNTERRICHT BEITRETEN

Öffentliche IPv4 - globale IPv6 ohne eckige Klammern oder Hostname sowie TCP-Port und vierstellige Sitzungs-PIN des Schülers eintragen.

Current instructor view before joining. Address, port and four-digit PIN are provided by the student.

- 1 Start BmsLiveMonitor.exe 1.10.5 and open FLUGSCHULE (FLIGHT SCHOOL).
- 2 Under ROLLE (ROLE), select Fluglehrer - Schüler beobachten (Instructor - observe student).
- 3 Enter an ANZEIGENAME (DISPLAY NAME); the student will see it.
- 4 Enter the student's public IPv4, global IPv6 without brackets, or hostname.
- 5 Copy the TCP port and four-digit SITZUNGS-PIN (SESSION PIN) exactly.
- 6 Configure automatic opening and optional focus transfer as required.
- 7 Select FLUGUNTERRICHT BEITRETEN (JOIN FLIGHT TRAINING) and wait for the TLS connection.

WAITING FOR PIT IS CORRECT

The instructor window opens immediately after a successful join. Cockpit values and MFD images appear only when current student telemetry is available in the pit.

7. Understand the Training Status

Status	Meaning	Action
Waiting for instructor	Student session is running; nobody has joined	Check address, port and PIN
Connected - waiting for pit	TLS is established; no current pit telemetry	Load a mission and enter the 3D cockpit
Student in pit - live	Training data is current	Conduct the training session
FLIGHT PAUSED	Falcon is paused	Status remains visible; MFD compression stops
FLIGHT FREEZE	Simulation is frozen	End freeze in the simulator when appropriate
Connection interrupted	TLS connection or current Falcon data is missing	Do not treat the last values as current
Flight ended	Falcon reports the end of the flight	Debrief or end the session

During Training

- Only the student changes shares; blocked areas are marked clearly.
- MFD and instrument-group shares can be changed without restarting the session.
- The student cockpit is display-only and cannot control Falcon.
- Ending Flight School affects only the training channel; normal Live Monitor and cockpit operation continue.

8. The Student Cockpit on the Instructor PC

After a successful join, the instructor's Live Monitor opens a separate student cockpit. Until the student enters the pit, it shows connection and session status. The static cockpit composition then fills with live data.

Area	Content	Behaviour
Header	Student name, connection, pit, pause, freeze and live state	Interruptions mark the last values as not current
Left side	Important LEDs and left MFD	Only shared student data; inactive LEDs are grey
Top centre	Undistorted DED	Dedicated student share with five lines and inversion masks
Centre	Centre Console and other named Falcon states	Static, coherent arrangement
Right side	Flight or system values and right MFD	Blocked groups are marked clearly

Window Operation

- Move the window freely and scale the complete view proportionally.
- Position and size are stored locally and restored to available monitors.
- Individual instruments cannot be rebuilt, detached or rearranged.
- LED names remain visible; active states use warning, readiness or operating colours.
- Blocked instruments show NOT SHARED BY STUDENT.
- Automatic opening is enabled by default; focus transfer is disabled by default.

STRICT DATA ISOLATION

The instructor's own instruments, MFDs, clients and cockpit outputs are never overwritten with remote student data.

9. Shares, DED and MFD Frame Rate

Share	Display on Instructor PC
Attitude / ADI	Roll and pitch
Airspeed / Mach	KIAS and Mach
Altitude / radar altitude	Barometric altitude, radar altitude and BMS states
Climb / descent	Vertical speed in ft/min
Heading / HSI	Heading, command values, beacon, deviation and navigation
AoA / G forces	Angle of attack and current G force
Landing gear	Overall, nose, left and right positions
Engine / fuel	RPM, fuel quantity and flow
Warnings	Named Falcon LED states
DED	Five lines with inversion masks
Left / right MFD	Both RTT images as a read-only JPEG data stream

Choose a Safe MFD Frame Rate

- 5 to 60 FPS in 5-FPS steps; the stored default is 15 FPS.
- Only the student controls the rate; the instructor cannot change it.
- Start at 15 FPS and increase gradually only on a stable connection.
- If latency rises or upload is limited, lower the MFD frame rate first.
- Without a share, or during pause or freeze, no new MFD images are generated.

10. Security, Privacy and Ending a Session

Encryption	Direct connection using TLS 1.2 or TLS 1.3
Session PIN	Four random digits bind the short-lived certificate to the session; basic access protection
Participants	Exactly one active instructor per session
Data scope	Only student shares plus training status; no control channel
Public IP	Stateless HTTPS lookup; no telemetry and no MFD images
Website	Not part of the training data path and not a telemetry relay

Safe Operation

- Share the PIN, public address and port only with the intended instructor.
- Never publish the PIN in forums, screenshots, support tickets or public chats.
- Share only the required cockpit data; DED and MFD shares are independent.
- Never forward port 43860 to the Internet.
- Never disable Windows Firewall, the router firewall or the graphics card.

End the Session

- 1 The student selects FLUGUNTERRICHT BEENDEN (END FLIGHT TRAINING); the instructor can also disconnect.
- 2 Verify that SITZUNGSSTATUS (SESSION STATUS) no longer shows an active session.
- 3 Disable router and Windows rules that are not required permanently.
- 4 For the next session, share the newly generated PIN privately again.

11. Troubleshooting

Symptom	Likely Cause	Targeted Check
Instructor cannot reach student	Wrong address, port not forwarded, firewall or CGNAT	Check port values, router target and Windows rule; compare IPv4 and IPv6
TLS connection rejected	Address, port or PIN does not match	Copy connection data again; enter all four digits exactly
Connected - waiting for pit	Falcon is not in the 3D cockpit or telemetry is not current	Start Falcon, load a mission and check LIVE OVERVIEW
Instrument not shared	Student blocked the group	Enable the required share; no restart is needed
DED missing	DED blocked or Falcon exports no lines	Check the DED share and Falcon DED
MFD remains blank	MFD blocked, RTT off, no pit, pause or freeze	Check share, RTT, pit and pause or freeze; start at 15 FPS
Connection interrupted	Internet change, router, firewall or session end	Do not use the last values; read both status messages
Instructor window not visible	Monitor layout changed	Check automatic opening and reopen the window

FIND THE CAUSE BEFORE CHANGING THE DISPLAY

Do not disable drivers, firewall or hardware at random. First note the role, address, port, PIN phase, pit status and affected share.

12. Quick Checks and Validated Baseline

Student - 60-Second Check

- Falcon BMS 4.38 and BmsLiveMonitor.exe 1.10.5 are running.
- Role, display name, TCP 43861 and shares are configured.
- The Windows rule and router permit target the student PC.
- MFD is shared when required; start at 15 FPS.
- Public address, port and new PIN were sent privately.

Instructor - 60-Second Check

- BmsLiveMonitor.exe 1.10.5 and the instructor role are selected.
- Address, TCP port and four-digit PIN were copied exactly.
- The student cockpit opens after joining; waiting for pit is correct.
- Use only current live values; observe interruption, pause and freeze.

Documented Quality Status

Final baseline	Server 1.10.5 / Client 1.7.9 / tag FINAL-BMS-Server-1.10.5-Client-1.7.9
Direct transport	TLS 1.2/1.3, IPv4/IPv6, wrong PIN, one-instructor rule, pit gate and binary MFD packets tested
MFD	5 to 60 FPS; default 15 FPS; 60-FPS synthetic test passed
Practical validation	Real two-PC test over separate Internet connections, router, firewall, stability and bandwidth still pending

TECHNICALLY TESTED IS NOT FIELD-VALIDATED

For the first real Internet training session, start at 15 MFD FPS and monitor connection, status and isolation deliberately.

FALCON BMS FLIGHT SCHOOL

One student. One instructor. One clear data path.

TEST SAFELY AND DELIBERATELY

Flight School remains a separate read-only observation path. Start with a limited MFD frame rate, share session data privately and report status or errors with the exact role, phase and port.

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