



User manual — replay, live acquisition & decommutation of flight-test data

IRIG 106 Chapter 10 (.c10)

DTMUX ETEP (.mux)

Live network

Acquisition card

100% offline

8 languages

© ETEP — Manual v4.0

Contents

1. Overview
2. The three working modes
3. Opening a recording
4. The interface at a glance
5. The menu bar
6. The top bar
7. Time navigation & the A/B zone
8. The Channels / Slots panel
9. Mosaics & workspaces
10. Full screen & multi-monitor
11. Views by channel type
12. Decommulation (Ethernet video, PCM)
13. Cross-cutting tabs
14. Network — real time
15. D.T.MUX Recorder (acquisition card)
16. Export, extraction & test report
17. Card descriptors (.inf)
18. Settings & personalization
19. Small screens & ground stations
20. Help & event log
21. ETEP files & preview
22. Privacy & offline operation
23. Shortcuts & tips

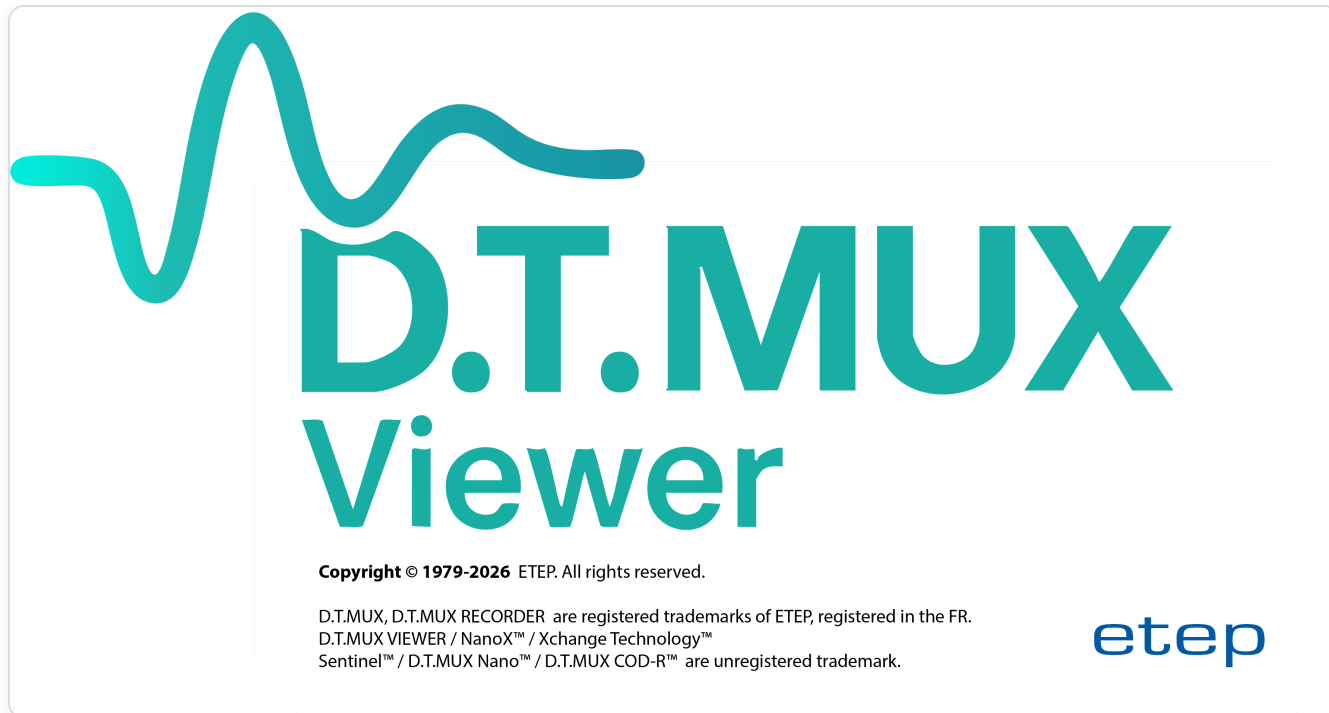
1. Overview

D.T.MUX Viewer replays, decodes and records flight-test data — after the flight, live over the network, or straight from an ETEP acquisition card.

It reads two recording formats:

- **.c10** — **IRIG 106 Chapter 10** recordings;
- **.mux** — **DTMUX** recordings from ETEP recorders.

Whatever the source, you build **mosaics**: each cell shows one channel — analog curve, spectrum, temperature, video, MIL-STD-1553 or ARINC bus, GPS map, serial console, flight cockpit, decommutated PCM parameter... You move through time with a playback bar, like a media player.



The splash screen shown at startup; the installed version number appears on it.

2. The three working modes

The **Mode** drop-down list, on the left of the top bar, selects where the data comes from. Switching mode is **exclusive**: it closes the current source.

Mode	Source	What you get
File	A <code>.c10</code> or <code>.mux</code> recording on disk	Full replay: play/pause, speed, seeking, A/B loop zone, export, report.
Network	A live DTMUX or Chapter 10 stream received over UDP/TCP	Real-time display, and recording of the stream to a file.
D.T.MUX Recorder	An ETEP acquisition card fitted in the machine	Live acquisition of the card's inputs, recording, and replay onto the card's physical outputs.

Good to know

The Recorder mode only appears when a compatible card is present. Section 15 describes it in full.

3. Opening a recording

Three ways to open a recording (mode **File**):

- menu **File ▶ Open...** (or **Ctrl + O**), then pick a `.c10` or `.mux` file;
- **drag and drop** the file straight into the window;

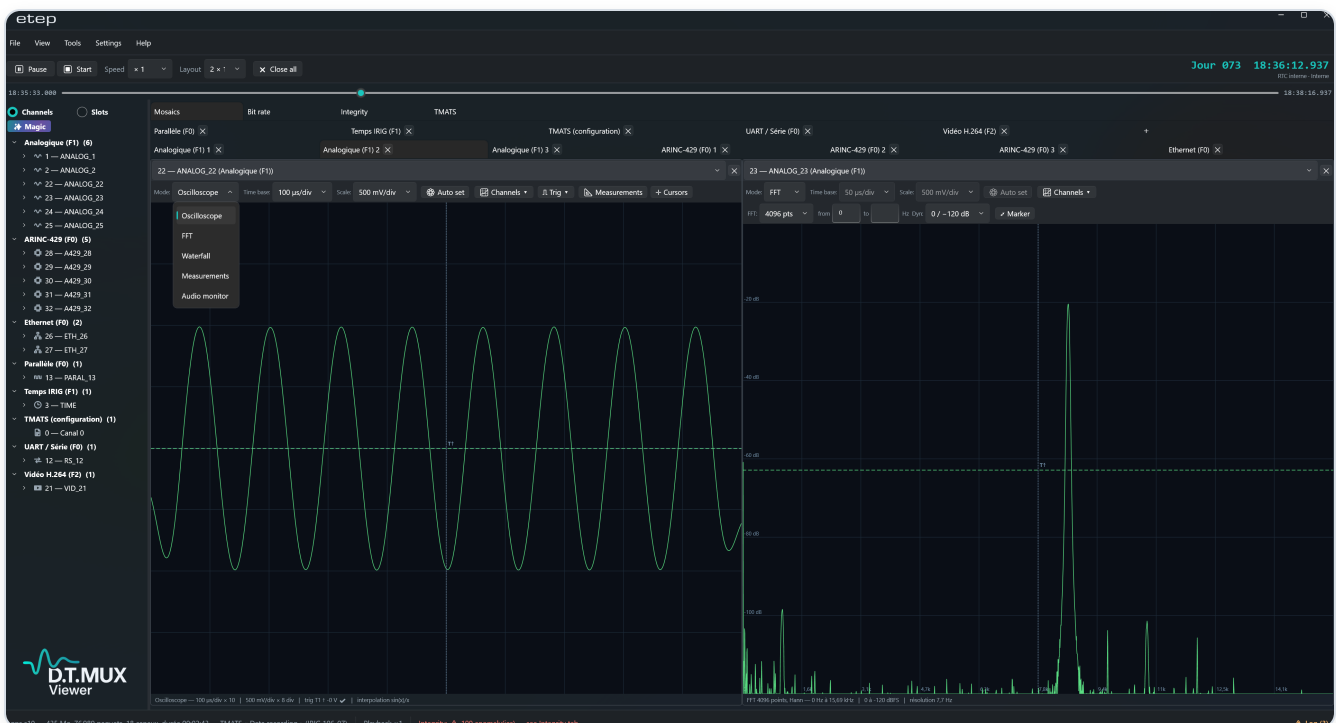
- menu **File ▶ Open recent** — the **10 most recent files** (with “Clear the list”). Files that no longer exist are removed automatically.

On opening, the software **indexes** the file (sync word, checksums, sequence numbers). A progress bar is shown, then the channel list appears in the left-hand panel.

Your arrangement is remembered

For each file, the software stores the mosaic layout, the channels displayed and the settings of every cell (mode, time base, scale, trigger...). Reopening the same recording restores your workspace as you left it.

4. The interface at a glance



The main window: menu bar on top, channel tree on the left, time slider, and the views area — here an analog channel as an oscilloscope and its FFT spectrum.

From top to bottom:

- the **menu bar** (File, View, Tools, Settings, Help);
- the **top bar**: working mode, playback controls, layout, and — on the right — the clock, the snapshot button and the **REC** indicator while recording;
- the **time slider** with the A/B playback zone;
- the **Channels / Slots panel** on the left, listing everything the recording contains;
- the **tabs**: Mosaics, Rate, Integrity, Secretariat;
- the **status bar** at the bottom: file, size, number of channels, duration, integrity, event-log indicator.

Small screen?

On a small display the interface automatically switches to a **compact presentation** that frees the space taken by the chrome. See section 19.

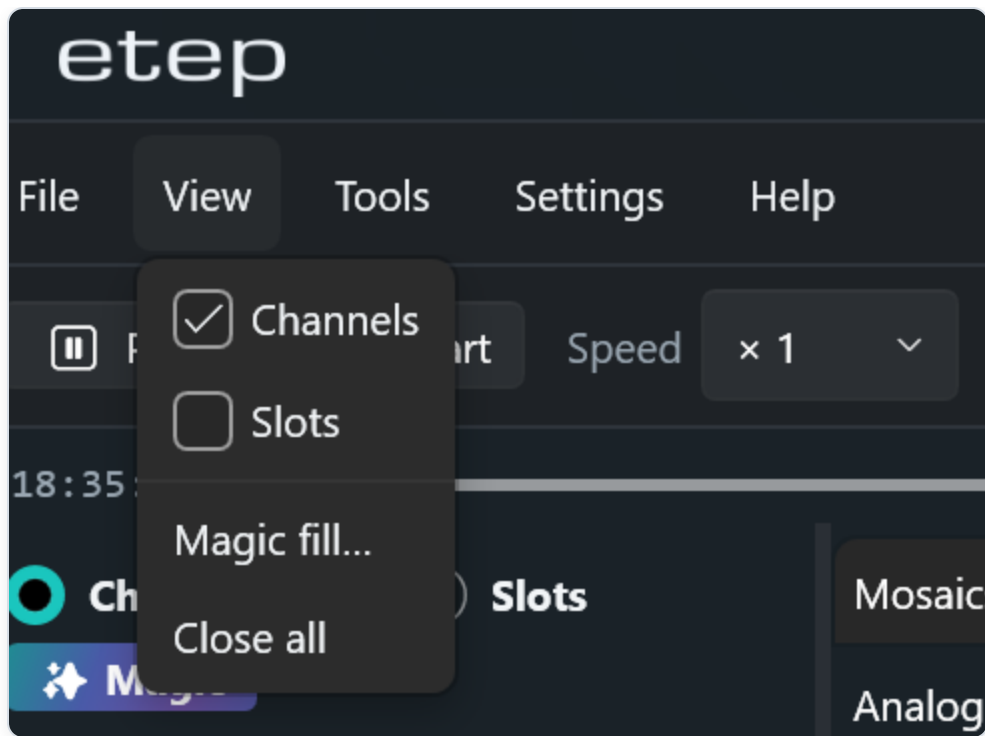
5. The menu bar

File

- **Open...** — open a `.c10` / `.mux` recording (**Ctrl** + **O**).
- **Open recent** — the 10 last files.
- **Save the configuration... / Load a configuration...** — save your whole workspace (mosaics, cells, per-cell settings) to a `.dtmuxview` file and reload it later, on this recording or another one. Cells are matched by **channel number**.
- **Extract a segment...** — write a new, lighter recording containing only the channels and the time span you choose (see section 16).
- **Quit.**

View

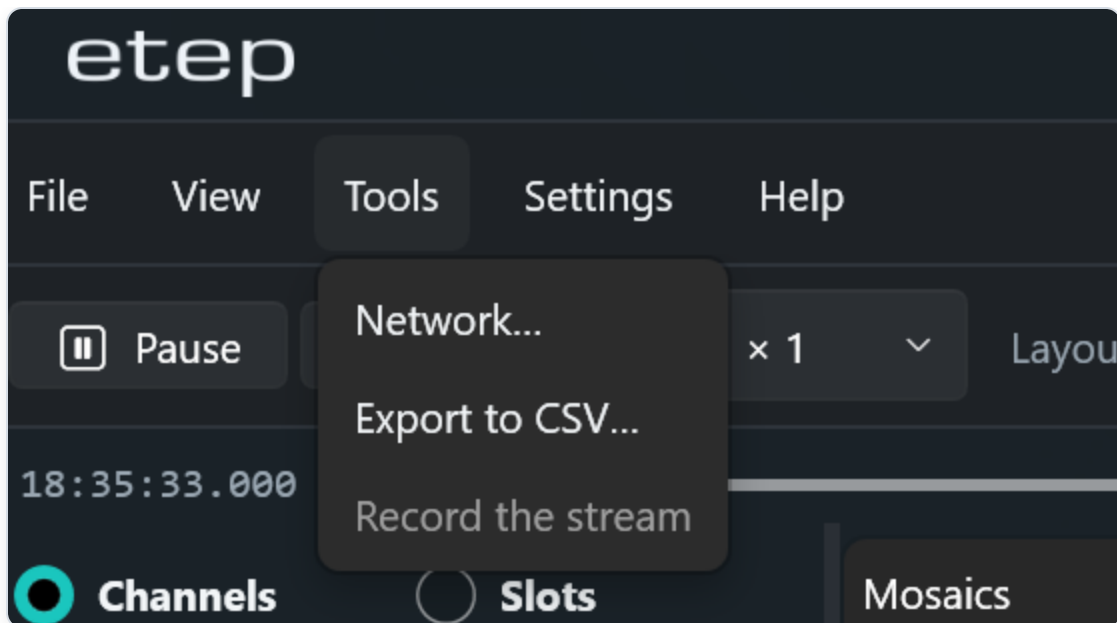
- **Channels / Slots** — list the recording by channel number, or grouped by the physical acquisition card (slot).
- **Channel list** — show or hide the left-hand panel. Handy to give the curves the full width of the screen.
- **Magic fill...** — fill a mosaic automatically (see section 8).
- **Close all** — empty every cell.
- **Free placement** — release the mosaic from its grid (see section 9).
- **Mosaics** — the list of open mosaics: switch between them, or create a **New mosaic**.
- **Full screen** — the mosaic takes the whole screen (see section 10).



The View menu.

Tools

- **Network...** — settings of the live reception and transmission (section 14).
- **Recorder (card)...** — settings of the acquisition card (section 15).
- **Decommuration** ▶ **Ethernet video... / PCM...** — extract a video carried by an Ethernet channel, or decommutate a PCM stream (section 12).
- **Import a card descriptor (.inf)...** — complete what the recording does not state about your acquisition cards (section 17).
- **Export to CSV...** — export samples or messages to a spreadsheet (section 16).
- **Export a report...** — build a test report in PDF (section 16).



The Tools menu.

Settings

- **Theme** — Dark, Light, or follow Windows.
- **Language** — French, English, Japanese, Hindi, Spanish, Chinese, Italian, German.
- **Display density** — **Automatic** (compact on a small screen, comfortable otherwise), **Comfortable** or **Compact** (section 19).
- **Loop playback** — when a A/B zone is set, playback loops inside it.
- **Event log...** — the log window (section 20).

Help

- **Manual** — this document.
- **Release notes...** — what changed in each version.
- **About...** — version, and the ETEP contact details.

6. The top bar

Control	What it does
Mode	File / Network / Recorder (section 2).
Play · Pause · Start	Run the replay, pause it, jump back to the beginning.
Speed	From $\times 0.25$ to $\times 16$.
Broadcast	Send the open file out over the network (mode File).
Layout	Mosaic grid: 1×1 , 1×2 , 1×3 , 2×1 , 2×2 , 3×3 ...
Free	Free placement of the cells (section 9).
Close all	Empty every cell.
Record ●	Record the received stream (modes Network and Recorder).
Freeze II	Freeze the display; acquisition and recording carry on underneath.
Snapshot 	Capture the workspace as an image, to be inserted in the test report.
...	Appears when the window is too narrow: holds the commands that no longer fit.
REC	A blinking red dot: a recording is running.
Clock	Current position in the recording, and the time source.

Recording in progress

While the

REC

indicator is blinking, closing the application asks you to confirm — so an ongoing test capture is never lost by accident.

7. Time navigation & the A/B zone

The slider spans the whole recording; the times of the first and last packet are shown at each end. Click anywhere to jump there.

The A/B playback zone

Two markers define a working span:

- **[A]** sets the start at the current position, **[B]** sets the end, **X** clears the zone;
- the markers can also be dragged directly on the slider;
- with **Settings > Loop playback** enabled, playback keeps looping inside A–B;

- the same zone is offered as a default span by the segment extraction, the CSV export and the test report.

Faster

In the analog

Panorama

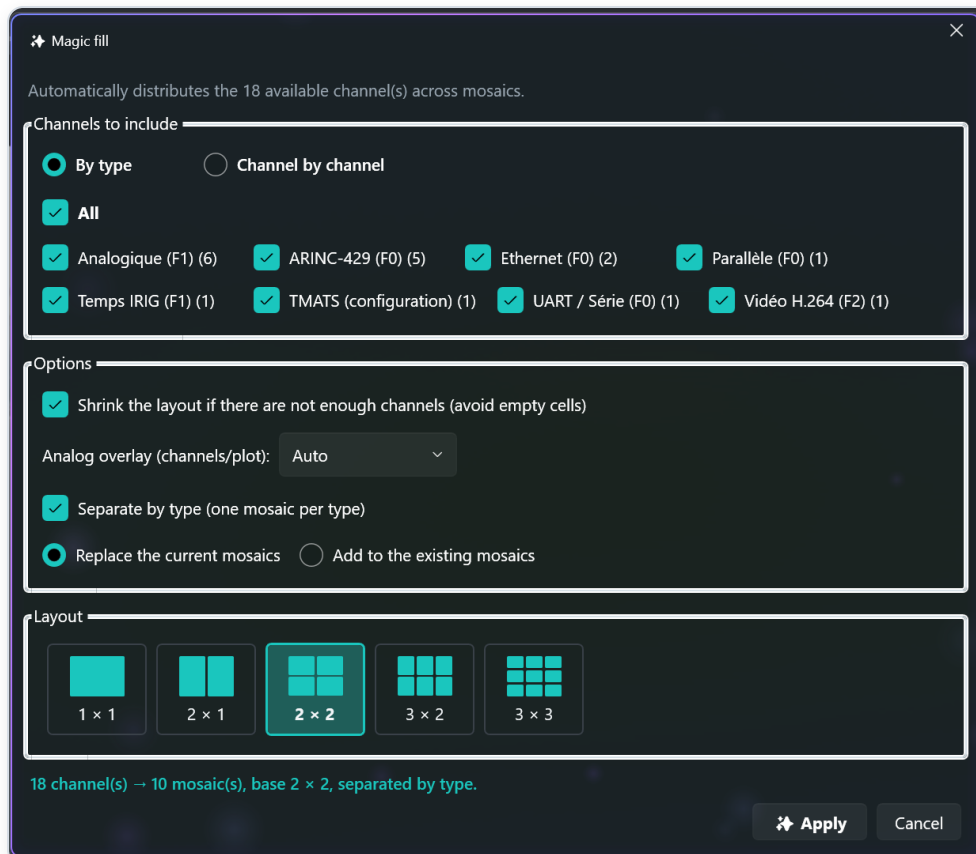
mode you can drag a range straight on the waveform: it sets A and B for you (section 11.1).

8. The Channels / Slots panel

The left-hand panel lists everything the recording contains, grouped by family (analog, video, buses, time...), with a small icon per type. **Slots** view groups the channels by the physical acquisition card instead.

- **Double-click** a channel to place it in the first free cell;
- **drag and drop** it onto the cell of your choice;
- expanding a channel shows its characteristics (sample rate, full scale, card...).

✨ Magic fill



Magic fill builds a complete mosaic in one go.

Magic fill builds the mosaic for you: pick the channel families you want, how many analog traces to superimpose per graph, and it lays out the cells.

- **One card per graph** — superimposed analog channels never mix two acquisition cards. Example: card A with one analog channel gets its own graph; card B with three gets them together. (Greyed out when the recording does not describe the cards.)

9. Mosaics & workspaces

Several mosaics

A mosaic is a page of cells. You can keep several of them side by side — one per test phase, one per system...

- the tab strip under **Mosaics** holds one tab per mosaic, plus a + to add one;
- **View ▶ Mosaics** lists them all, switches between them and creates new ones — this is the way to go when the tab strip is hidden (compact presentation);
- **Ctrl + 1 ... 9** switches directly to a mosaic;
- a tab can be renamed, duplicated, closed, or **torn off** onto a second monitor by dragging it out.

Filling and arranging cells

- each cell has a **channel selector** in its header, and a ✕ to empty it;
- the ⚙ button on the left of the header **folds the settings** of that channel (mode, time base, scale, trigger, video controls...). Once a channel is set up, folding its settings gives the space back to the trace. The choice is remembered per channel;
- **Layout** chooses the grid; 🖱 **Free** releases the cells so you can move and resize them freely (they stop against each other rather than overlapping);
- **double-click** a cell to enlarge it to the whole mosaic, double-click again to go back.

Workspaces (.dtmuxview)

File ▶ Save the configuration... stores your whole arrangement — mosaics, cells, and every per-cell setting — in a **.dtmuxview** file. **File ▶ Load a configuration...** applies it again, including on another recording: cells are matched by **channel number**.

10. Full screen & multi-monitor

- **View ▶ Full screen** gives the whole screen to the mosaic: menus, panel and status bar disappear. The ⏏ button stays visible so you can leave full screen **without a keyboard** — on a touch panel too. **Esc** also exits.
- **Enlarging one cell**: double-click it (double-click again to restore).
- **Second monitor**: drag a mosaic tab out of the window; it becomes an independent window you can move to another screen. Closing it puts the mosaic back.

11. Views by channel type

Each channel family has its own view. The list below covers them all.

11.1 Analog channel

The richest view. The **Mode** list at the top of the cell offers six presentations of the same channel:

Mode	What it shows
Oscilloscope	The waveform against time, with time base and vertical scale, up to 4 superimposed traces.
FFT	The frequency spectrum (Hann window), in dBV or dBFS.
Waterfall	The spectrum over time, as a colour map, a 3D surface, or a Campbell diagram against a reference channel (engine speed).
Measurements	A table of measurements for every displayed channel.
Audio listening	Listen to the channel, with per-channel volume and a mixer.
Panorama	The whole file at a glance (see below).

Oscilloscope

- **Channels** ▾ — choose up to 4 channels to superimpose, each with its own colour (standard oscilloscope code: yellow, blue, pink, green);
- **Time base** and **Scale** — horizontal and vertical settings, per division;
- **Auto set** — finds a sensible time base, scale and trigger by itself. It does not fire on noise (it says so instead), and on a silent channel it waits for the signal to arrive;
- **Trigger** ▾ — trigger on an edge: level, slope, Auto/Normal modes, source and horizontal position. In normal use the trigger line is hidden and only two small flags mark the level at the edges of the graph; the full line reappears while you adjust it;
- **Measurements** — peak-to-peak, max, min, mean, RMS, frequency, period, duty cycle, rise and fall times, overshoot, sliding statistics. The **Measurement settings** button lets you pick exactly which ones to show;
- **Cursors** — two time cursors and two voltage cursors with easy-to-grab handles: Δt , $1/\Delta t$, ΔV and the value under the cursor;
-  **Personalization** — trace and grid colours, brightness, background.

Measurements mode

All measurements for all displayed channels, shown as cards, one colour per channel. A **physical quantity** panel converts volts into your unit with $y = a \cdot x + b$ (per channel, remembered). The panel folds away when you do not need it.

FFT

Number of points, frequency span, dynamic range down to 0/−160 dB, unit in **dBV** (0 dB = 1 V RMS — inject 1 Vrms and read 0 dB) or dBFS. The **Marker** reads the dominant peak automatically, or a peak you point at, and the gap to a second one.

Panorama



Panorama: the whole recording of two channels at a glance. Weak signals are amplified for display, and the factor is stated ("×64").

Panorama draws the **entire file** in the cell — the peak envelope and the average level — so a problem is spotted immediately, then examined by zooming in. Up to 4 channels are stacked.

- **Anomalies are flagged automatically** in a strip above each track: **clipping** (red), **acquisition gaps** (orange), **prolonged silences** (grey). The count appears in the cell status line;
- **hand** — drag to pan, click to move the playback position;
- **magnifier** — click to zoom in, **Alt**+click to zoom out, drag a rectangle to zoom onto it;
- **selection** — drag a range to set the **A–B playback zone**, ready for looping, extraction or export;
- **▶** plays the selected range;
- **zoom**: mouse wheel around the pointer, middle button held (up/down) for continuous zoom, double-click for the whole file. A permanent mini-overview at the bottom shows where you are. Zoom in far enough and the real, sample-by-sample waveform appears.

Panorama needs a file

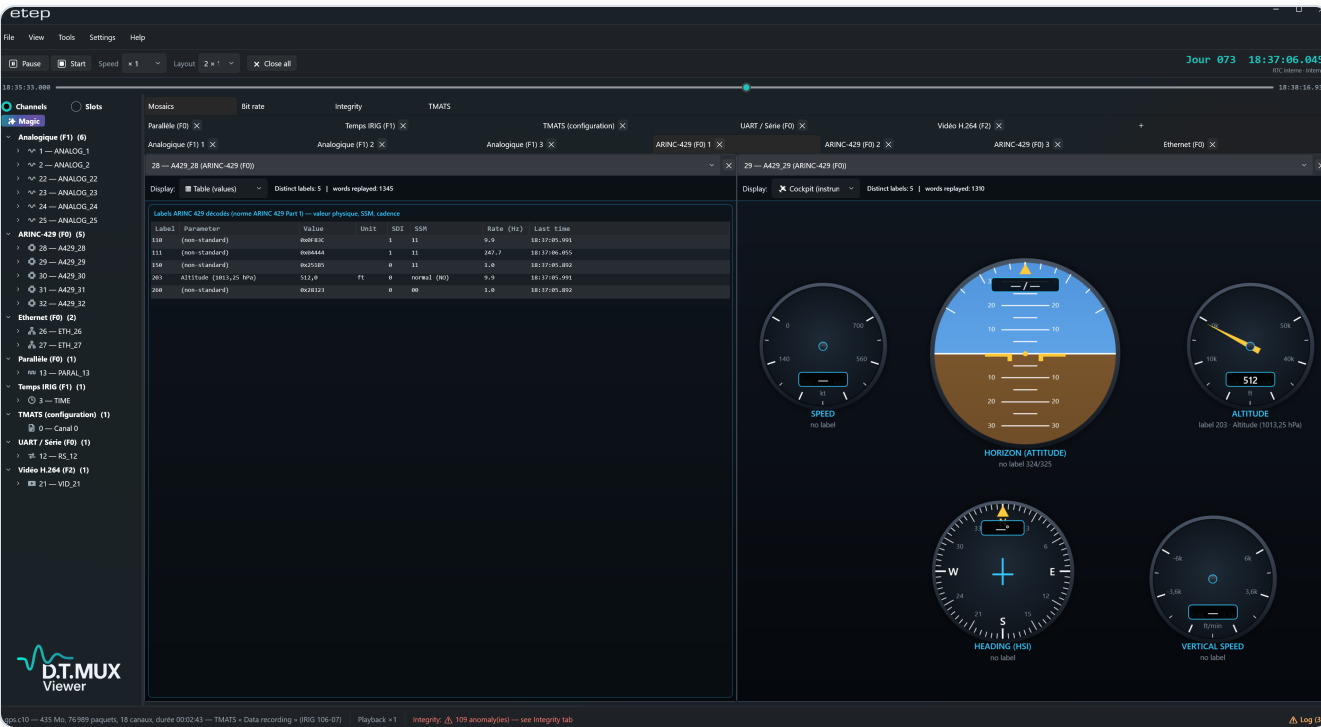
It reads the whole recording, so it is available in File mode.

11.2 Temperature channel (PT100 probe)

DTMUX temperature channels carry PT100 probes. The view shows the temperature in °C, and an **oscilloscope** presentation with an adjustable time window and a manual °C/division (0.01 to 300), auto-centred on the signal.

11.3 ARINC 429

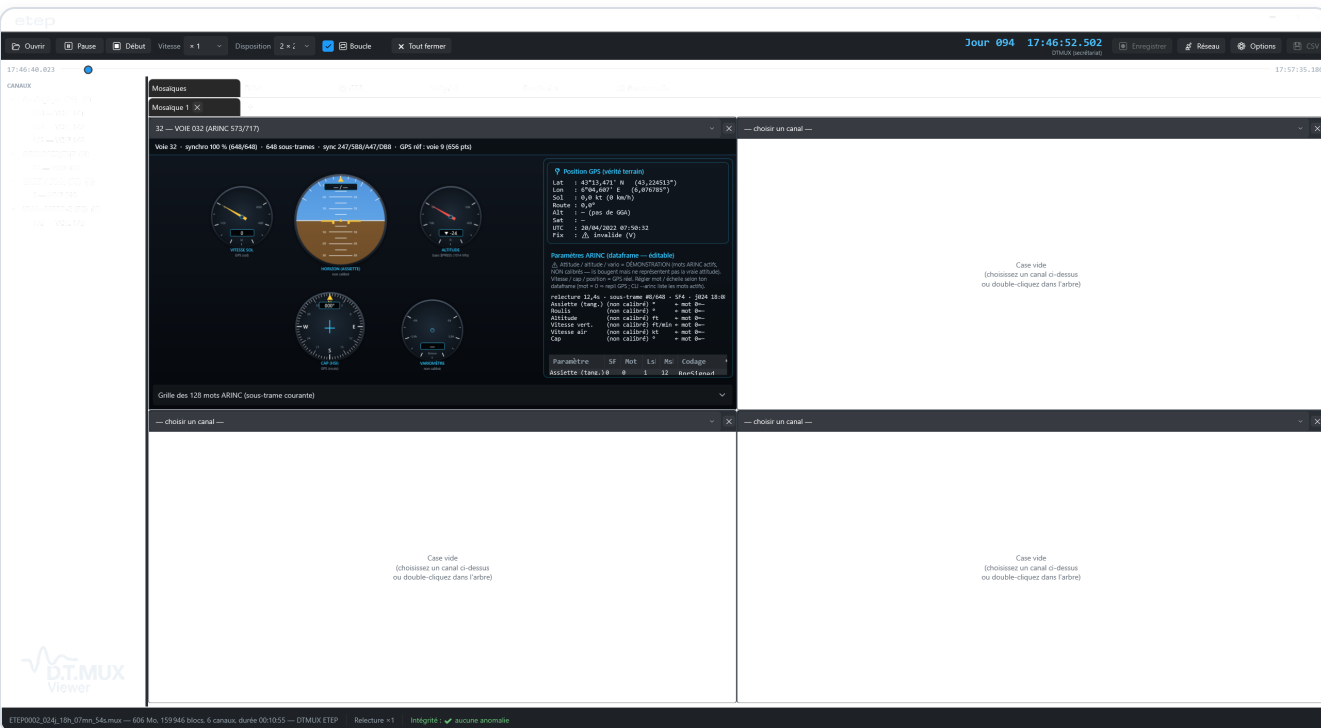
Opens as a **table** by default: time, label, SDI, SSM, decoded value and unit, with filtering by label. A **cockpit** presentation is also available, with the standard instruments driven by the decoded labels.



An ARINC channel as a table.

11.4 ARINC 573 / 717 (flight recorder)

Table of subframes and words, and a **cockpit** presentation.



The cockpit view.

Read this before using the cockpit

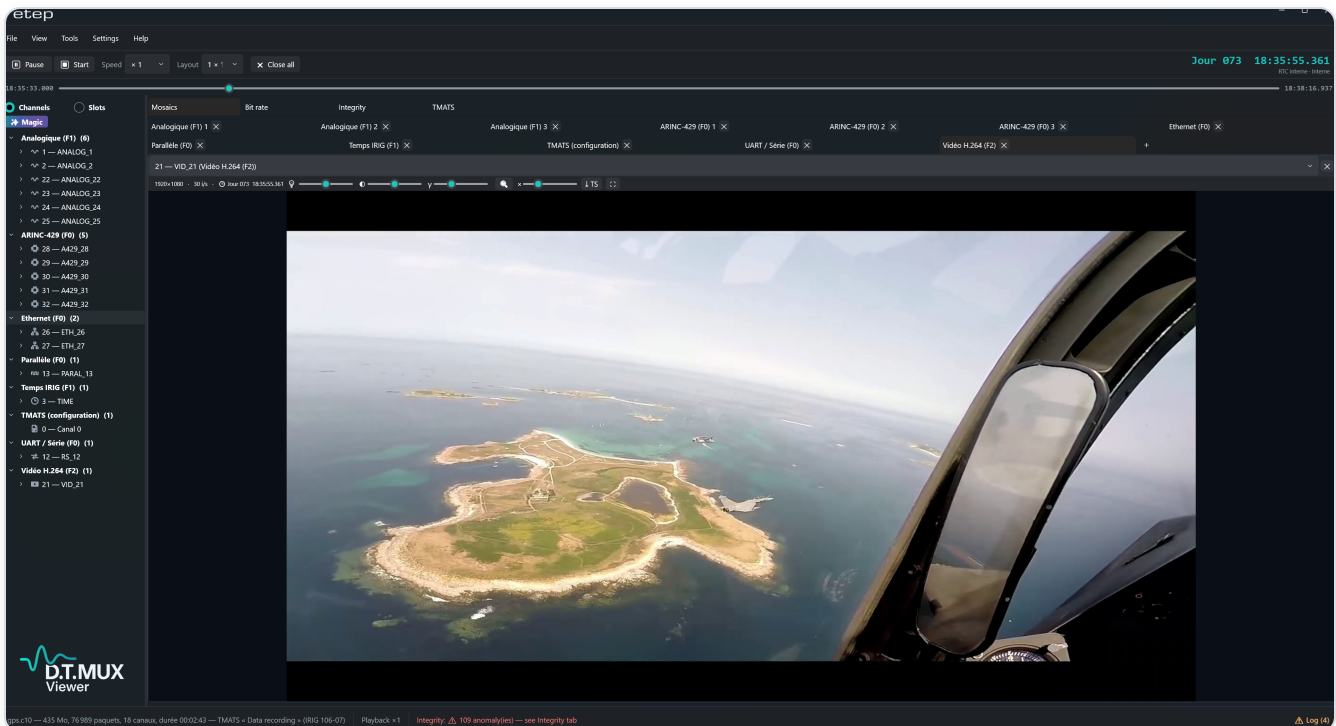
The structure (frames, subframes, words) is decoded reliably. The **meaning**

of each word depends on the aircraft's data frame, which the recording does not contain. Unless your data frame has been entered, the instruments are driven by generic assumptions: use the cockpit as an illustration, and the table as the reference.

11.5 Video channels

Three video families are supported and open in the same player:

- **H.264 / MPEG** Chapter 10 video;
- **JPEG 2000** video (Motion JPEG 2000) in `.mux` recordings;
- the video family used by some ETEP recorders, which earlier versions could not decode.



The video player, driven by the main playback bar.

Common controls: playback tied to the time slider, frame-by-frame stepping, brightness / contrast / gamma, magnifier, timestamp overlay, **rotation** in 90° steps (remembered per channel), full screen, and **image capture** to PNG.

11.6 GPS (map)

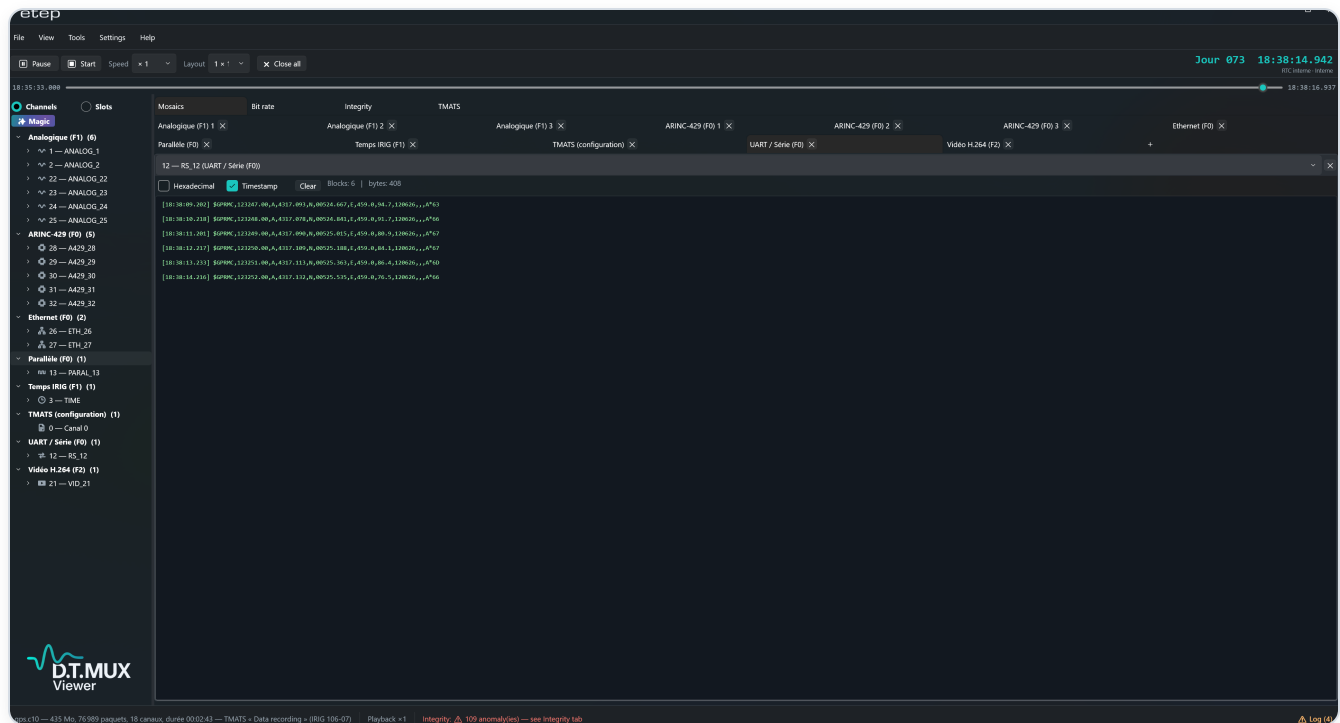
The trajectory on a map, with the current position, speed and altitude. Map tiles are cached locally; the software works fully offline (section 22).

11.7 MIL-STD-1553, CAN, Ethernet buses

Message table: time, command word, remote terminal, sub-address, word count, status and data, with filters. Ethernet channels can also carry a video stream — see section 12.

11.8 UART / serial, Parallel, Time

- **UART** — a console showing the received characters, in text or hexadecimal.
- **Parallel** — the state of the lines and the transitions detected.
- **Time** — the time source of the recording and its flags.



The serial console.

11.9 Decommuted PCM parameters

Once a PCM channel is decommuted (section 12), its parameters behave like ordinary channels: they can be placed in cells, shown as a **value**, in a **table**, or as a real **oscilloscope** curve. Values can be displayed as a physical quantity, decimal, hexadecimal or binary. A **synchronization dot** on the cell header shows the state in real time: green = locked, blinking red = loss of synchronization at the current position.

12. Decommuration (Ethernet video, PCM)

Ethernet video

Some Ethernet channels carry a video stream instead of ordinary traffic.

Tools ▶ Decommuration ▶ Ethernet video... lists the channels, you tick the ones to treat as video, and they then open in the video player like any other video channel.

Tools ▶ Decommuration ▶ PCM... opens the decommuration workbench:

- **Synchronization** — choose the channel to decommutate (or open a bit stream already extracted), set the frame format, and check the lock;
- **Parameters** — describe your parameters in a table: position, number of bits, commutation, conversion to a physical quantity;
- **Display** — once the channel is synchronized and its parameter set loaded, the channel appears in the tree with its parameters, ready to be placed in the mosaic.

13. Cross-cutting tabs

- **Mosaics** — the views area described above.
- **Rate** — the data rate of each channel over time: spot a channel that stops, or one that saturates.
- **Integrity** — the result of the checks made while indexing: sync words, checksums, sequence numbers, time continuity. A green banner means no anomaly.
- **Secretariat** — the descriptive header of the recording (the TMATS of a `.c10`, the secretariat of a `.mux`): channels declared, sample rates, full scales, names, cards.

14. Network — real time

The screenshot shows the 'Network' settings window with three main sections:

- Transmit current file (to another PC):**
 - Destination (unicast IP, multicast 224-239.x or broadcast): 192.168.1.110
 - Port: 4444
 - Max datagram size (bytes): 1432
 - TMATS period (s): 10
 - Lossless transmission via Npcap (frame injection, recommended): ☒
 - Buttons: Start transmit, Stop
- Receive a Chapter 10 UDP stream (live display):**
 - Listening port: 4444
 - Multicast group (optional):
 - Network interface (Ethernet / WiFi): All interfaces
 - Record the received stream to a .c10 file: ☐ (Path: C:\Users\AdrienGoethals\Documents\reception_udp.c10)
 - Preload configuration from a TMATS file: ☐ (Path:)
 - Lossless reception via Npcap (kernel capture, recommended): ☒
 - Buttons: Start receive, Stop
- Receive a .mux DTMUX stream (live display):**
 - Transport: UDP
 - Sender host (TCP): 192.168.1.30
 - Ports: 4001,4002
 - Interface (UDP / multicast listening): All interfaces
 - Record the received stream to a replayable .mux file: ☐ (Path: C:\Users\AdrienGoethals\Documents\reception_dtmux.mux)
 - Buttons: Start .mux reception, Stop

Switch the **Mode** list to **Network**, then open **Tools > Network...** to set:

- the **format** expected: DTMUX (`.mux`) or Chapter 10 (`.c10`);
- the **transport** (UDP or TCP) and the **ports**. A DTMUX transmitter often uses **two ports**: one for the secretariat, one for the data — enter them separated by a comma, for example `4001,4002` ;
- the destination for transmission, used by the **Broadcast** button in File mode.

The window shows  **Waiting for stream** until the first packets arrive. As soon as the secretariat is received, the channels appear and the mosaics can be filled.

-  **Record** writes the received stream to a file. It can be **armed** before the stream arrives: recording then starts by itself with the first packet.
-  **Freeze** freezes the display without interrupting reception or recording.

If nothing arrives

Check three things: the transmitter sends to **this machine's**

IP address; the ports match; and Windows Firewall allows the application (accept the prompt shown at the first reception). Some transmitters send their secretariat

only once, at start-up

: in that case start the reception first, then restart the transmitter.

15. D.T.MUX Recorder (acquisition card)

With an ETEP acquisition card fitted, the Viewer becomes the recorder's front end: it acquires the card's inputs live, displays them, records them to `.mux` , and can replay a recording onto the card's physical outputs.

- **Tools > Recorder (card)...** — detect and program the card, then set the sample rate and the gain of each channel;
-  **Card config** in the top bar reopens those settings at any time;
-  **Record** writes a `.mux` file. Recording can also be **driven automatically by a discrete input** (it starts and stops with the signal);
-  **Replay** plays a recording back onto the card's physical outputs;
-  **Freeze** freezes the display while acquisition and recording carry on;
- your workspace is remembered **per card**: mosaics and per-channel settings come back after a reconfiguration or a restart.

16. Export, extraction & test report

CSV export

Tools ▸ Export to CSV... — works on `.c10` and `.mux`. Choose the channels, the time span (the whole file or the A/B zone) and the unit: raw samples or physical quantity.

Segment extraction

File ▸ Extract a segment... — produces a new, lighter recording containing only the channels you tick and the time span you choose (in seconds, or between the A and B markers, on a large timeline). Useful to send a colleague the ten seconds that matter instead of a 4 GB file.

Test report

Tools ▸ Export a report... opens an assistant that builds a PDF report:

- tick the sections you want (recording summary, channel list, integrity, measurements, images...);
- fill in the test header (title, aircraft, date, operator...);
- insert the **snapshots** taken with the  button — the workspace exactly as it was on screen;
- save your choices as a named **template** and reuse it for the next test;
- preview before generating.

17. Card descriptors (.inf)

A recording does not always state everything about the acquisition cards that produced it.

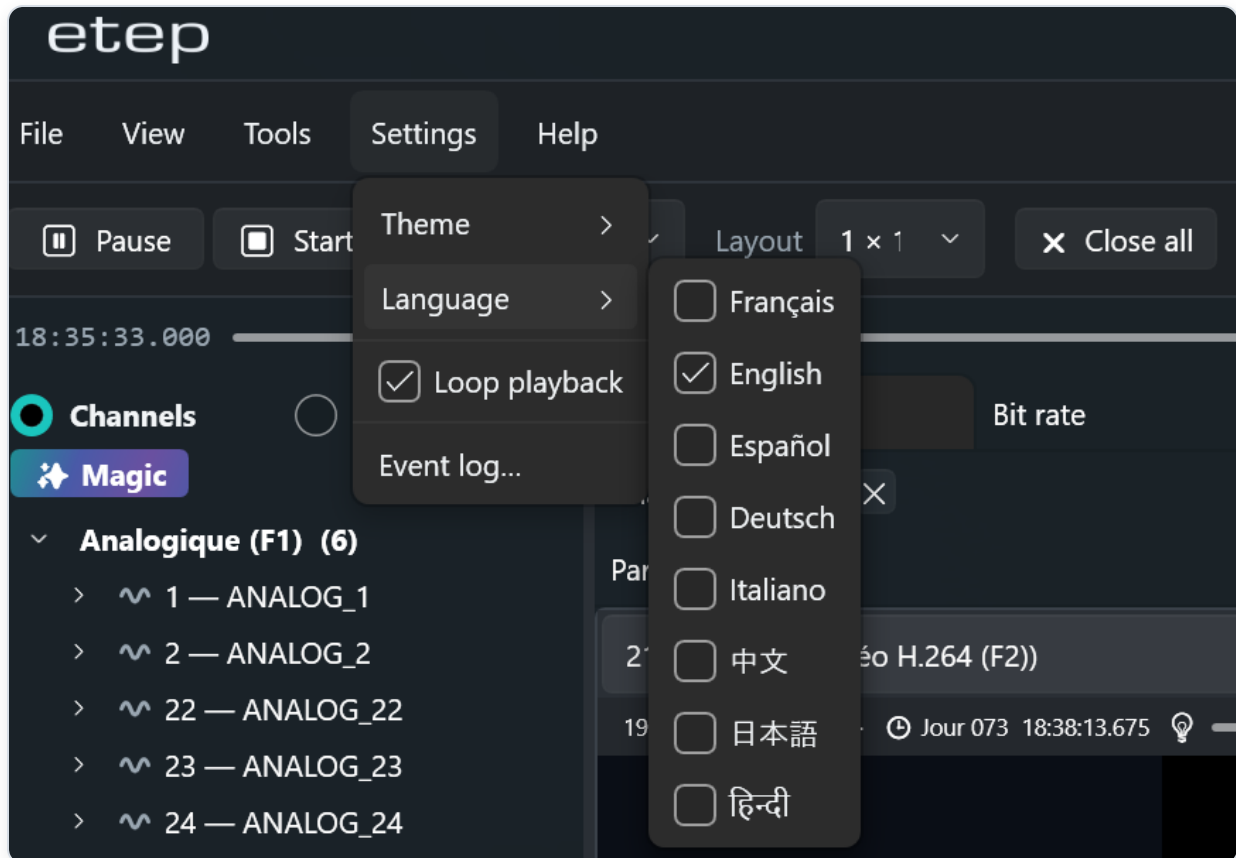
Tools ▸ Import a card descriptor (.inf)... lets you supply a descriptor file (or a whole folder of them). It:

- **fixes channels whose samples arrive swapped** — the recording does not carry that information, only the card knows;
- completes the sample rates, ranges and capabilities that the recording leaves out.

Your recording always wins

The descriptor only fills in what is missing. Any disagreement between the file and the descriptor is reported to you rather than applied silently.

18. Settings & personalization



The Settings menu.

- **Theme** — Dark, Light or follow Windows. Graph backgrounds stay dark in both themes, as on a bench instrument.
- **Language** — 8 languages, applied immediately.
- **Display density** — see the next section.
- **Per cell** — the 🎨 **Personalization** button of an analog cell sets the trace and grid colours, the brightness and the background.

All these choices, plus the window size and your workspace, are stored on your machine and restored at the next start.

19. Small screens & ground stations



Compact presentation on a 1024 × 768 panel: two oscilloscopes with their settings folded away.

On a small screen — typically the 8-inch panel of a ground station — the interface switches by itself to a **compact presentation**, which roughly **doubles** the area devoted to the curves:

- the menus fold into a single  button;
- the channel list retracts with  (and comes back the same way);
- the bars that are not needed disappear; commands that no longer fit move into ... rather than being cut off;
- the **text is never made smaller** — legibility comes first — and buttons stay large enough to be used with a finger.

Add the  button of each cell (section 9) and, on a two-graph mosaic, the height available for each trace is more than three times what it was.

You stay in control

Settings ▸ **Display density** forces

Comfortable

or

Compact

at any time. On a desktop screen, the display is exactly the same as in previous versions.

Ground station

Set Windows display scaling to

100 %

on the panel: at 125 % or 150 % a large part of the benefit is lost.

20. Help & event log

- **Manual** — this document.
- **Release notes...** — the list of additions and fixes, version by version; the installed version is highlighted.
- **About...** — version and ETEP contact details.

Event log

Settings > Event log... opens a log that is always running. It records problems, slowdowns (display, video, network, playback), abnormal closures and crashes with their reason. An indicator in the status bar tells you when something new has been logged.

Reporting an issue

Open the log, click

Copy

, and paste the content into your message to ETEP support: it usually contains the reason straight away.

21. ETEP files & preview

Recordings produced by ETEP equipment — every `.mux` file, and `.c10` files from ETEP recorders — open without any limit.

A `.c10` file from other equipment opens in **preview**: everything works, for **5 minutes of cumulative viewing per run**. When the credit runs out, playback freezes and a banner says so; restarting the application gives a new credit. Contact ETEP if you need unrestricted use with third-party recordings.

22. Privacy & offline operation

- The software works **entirely offline**. It never sends your recordings anywhere.
- The only optional network use is downloading **map tiles** for the GPS view; tiles are cached and map display is disabled by default.
- Settings, workspaces and the event log stay on your machine, in your user profile.

23. Shortcuts & tips

Action	Shortcut
Open a recording	Ctrl + 0
Switch to mosaic 1 to 9	Ctrl + 1 ... Ctrl + 9
Leave full screen	Esc
Place a channel	Double-click it in the tree, or drag and drop it into a cell
Enlarge a cell	Double-click the cell
Fold a channel's settings	⚙ in the cell header
Zoom in Panorama	Mouse wheel, or middle button held

A few habits worth taking

- Start with **Magic fill**, then adjust: it is faster than filling the cells one by one.
- Use **Panorama** as soon as you open a recording: a clipped or interrupted channel shows up in one second.
- Save your arrangement as a **.dtmuxview** workspace: you will reuse it on the next test.
- Set **A and B** around the interesting event, then extract the segment: a small file is far easier to exchange.
- On a ground station, fold the settings of the channels you have finished setting up — the traces gain the space.