PMC-DLD-00000-00001-00 · Issue 001 · 2026-11-04

Downlink Desk Operator's Manual

Operating procedures and fault isolation for the Downlink Desk ground-segment console

Applies to Downlink Desk 0.17.x. Prepared by Archie Maclean.

> **Status:** Demonstration publication. An example of structured technical documentation for an open-source hobby console; not an approved procedure for any real operation.

CAUTION

Downlink Desk is not flight software. It cannot command a spacecraft and its limits are provisional. Do not use it to make decisions about real spacecraft hardware.

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Telemetry reception – Fault isolation: no frames, or satellite may have gone silent	DMC-DLD-A-10-20-00-00A-400A-A	Fault isolation	001	2026-11-04
SatNOGS link – Fault isolation: data is not being collected	DMC-DLD-A-10-10-00-00A-400A-A	Fault isolation	001	2026-11-04
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Front matter

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Applies to Downlink Desk 0.17.x

Downlink Desk – Introduction

Purpose

This manual tells operators how to run Downlink Desk, a ground-segment operations console for satellites tracked through the SatNOGS network. It covers starting a shift, responding to alerts, changing limits, handing over, checking the audit trail and isolating common faults.

About this publication

This is a demonstration manual. It was written to show how structured technical documentation works, using Downlink Desk, an open-source hobby console, as its subject. Downlink Desk watches real satellites, but it is not used by any mission team, and this manual is not an approved procedure for any real operation.

Using this manual with the public demo

The public demo at archer7778.github.io/downlink-desk shows real telemetry, but it is a read-only snapshot rebuilt about every 6 hours. You can follow the descriptive modules and look at every screen the procedures name. Steps that sign an action, such as acknowledging or shelving an alert, completing the daily check, changing limits or signing a handover, show the message "This is a read-only demo" instead.

To carry out the procedures in full, install Downlink Desk on your own computer. Fault isolation steps marked "on the server" also need your own installation.

> **NOTE**
>
> The demo also has a training simulator at archer7778.github.io/downlink-desk/training, where you can inject faults and practise responding to them. Its screens differ from the console, and this manual does not cover it.

Who this manual is for

Operators who watch one or more satellites on a running Downlink Desk console. You do not need to know how the software works inside. For installation, see the setup guide in the Downlink Desk repository.

Applicability

This issue applies to Downlink Desk version 0.17.x running on Debian, Ubuntu or Raspberry Pi OS. Screens and commands may differ in later versions.

How the manual is organised

The manual is made of data modules. Each data module covers one topic and has its own code, issue number, date and status. There are three types:

- **Descriptive** modules explain what the system is and how it behaves.
- **Procedural** modules give numbered steps for a task, with the requirements you need before you start and the conditions when you finish.
- **Fault isolation** modules take you from a symptom to its cause through yes/no questions.

Data module codes

Each data module code follows the S1000D pattern. For example, DMC-DLD-A-20-10-00-00A-130A-A is read as:

Part	Value	Meaning
Model identification code	DLD	Downlink Desk
System difference code	A	The standard installation
System, subsystem and sub-subsystem	20-10	Alert system, alerts (see the numbering table below)
Assembly	00	Not broken down further
Disassembly code and variant	00A	Not broken down further; first variant
Information code and variant	130A	Normal operation; first variant
Item location code	A	Information about the item as installed

The system numbering used in this manual:

Number	System
00	Downlink Desk as a whole
10	Data collection: 10-10 SatNOGS link, 10-20 telemetry reception

Number	System
20	Alert system: 20-10 alerts, 20-20 channel limits
30	Operator console: 30-00 web console, 30-10 shift start, 30-20 shift handover, 30-30 audit trail

The information codes used are 005 (list of abbreviations), 006 (list of terms), 012 (safety statements), 018 (introduction), 040 (description), 130 (normal operation), 300 (examinations, tests and checks) and 400 (fault reports and isolation procedures).

Conventions

- Names of buttons, tabs and fields on screen are shown like this: **Acknowledge**.
- Commands you type on the server are shown like this: `sudo systemctl restart downlink-desk-web`. They assume Downlink Desk is installed in `~/downlink-desk`, as in the setup guide.
- Safety statements follow S1000D. A **warning** tells you about a risk of injury or death; this manual has none. A **caution** tells you about a risk of damage to equipment or data, or of an incorrect record. A **note** gives useful information.
- The console also uses **Caution** and **Alarm** as the names of its two alert severities. These are shown as screen text, and are not safety statements.
- Each data module shows its quality assurance status. **Unverified** means the procedure has been checked against the Downlink Desk source code but has not yet been carried out on a running console.

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Downlink Desk – Safety statements

Warnings

None. Downlink Desk runs on an ordinary computer and only receives data, so no task in this manual can cause injury or death.

Cautions

These cautions apply throughout the manual. Read them before you operate the console.

CAUTION

Do not use Downlink Desk alerts or limits to make decisions about real spacecraft hardware. Downlink Desk cannot command a spacecraft, it is not the mission team's own system, and its limits are provisional.

CAUTION

Check the time of a reading before you act on it. Telemetry arrives minutes to hours after a pass, so a value on screen is the latest one received, not the spacecraft's state now.

CAUTION

Enter your own call sign before you acknowledge, shelve, change limits or sign a handover. Every action is signed with the call sign at the top of the console, and an incorrect call sign makes the record name the wrong person.

CAUTION

Review limits suggested from data before you save them. They come from the satellite's own recent history, so if that history already contains a fault, the suggested limits will hide it.

Notes

NOTE

A shelved alert does not appear in the main alert list until the shelf expires. Always give a reason the next operator can act on, and shelve for the shortest time that makes sense.

> **NOTE**
>
> The audit trail is tamper-evident, not tamper-proof. Someone with access to the server's files could rebuild the chain.

DMC-DLD-A-00-00-00-00A-005A-A Descriptive Issue 001 2026-11-04 Unclassified QA: Unverified

Applies to Downlink Desk 0.17.x

Downlink Desk – List of abbreviations

Abbreviation	Meaning
API	Application programming interface
NOAA	US National Oceanic and Atmospheric Administration
SatNOGS	Satellite Networked Open Ground Station, a network of volunteer ground stations
SSH	Secure Shell, used to log in to the server from another computer
TLE	Two-line element set, the standard format for a satellite's orbit

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Applies to Downlink Desk 0.17.x

Downlink Desk – List of terms

Term	Meaning in this manual
Acknowledge	Record that an operator has seen an alert. The alert stays in the list until its condition clears.
Alarm	The higher alert severity. A value is outside its alarm limits, or a condition needs attention now.
Audit trail	The signed record of every operator action. Each entry carries a fingerprint (hash) of the one before it.
Call sign	The short identifier, usually initials, that signs every action you take.
Caution	The lower alert severity. A value is outside its caution limits, or a condition may need attention.
Channel	One telemetry value, such as a battery voltage or temperature.
Drift	A channel moving away from its learned normal for the same point in the orbit, even while inside its limits.
Eclipse	The part of each orbit in Earth's shadow.
Event	An alert about something that happened once, such as a restart, rather than a condition that continues.
Fetch	One run of the job that collects new frames from SatNOGS, every 30 minutes by default.
Frame	One packet of telemetry received by a ground station.
Handover	The signed transfer of the console from one operator to the next.
Shelve	Hide an alert for a set time, with a reason. Shelving is signed in the audit trail.
Stale	No new decoded frames for longer than the stale period, 12 hours by default.

Description

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Downlink Desk – Description

What the system does

Downlink Desk watches satellites in orbit using telemetry collected by the SatNOGS volunteer ground-station network. It decodes the telemetry, learns what normal looks like for each spacecraft, raises alerts when something departs from normal, and keeps a signed record of every operator action.

It is read-only towards the spacecraft. It receives data; it never sends commands.

How data flows through the system

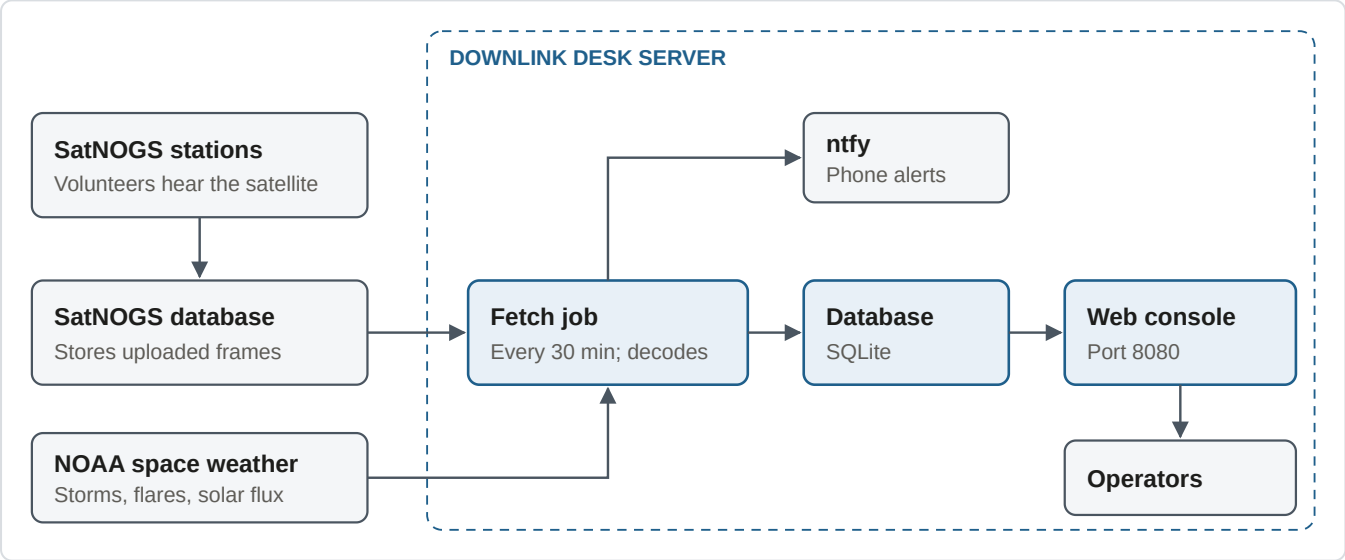


Figure 1 Data flow

The system has three running parts on the server:

- **The fetch job** runs every 30 minutes by default. It asks the SatNOGS database for new frames, decodes them, stores them, updates the learned model and sends phone alerts. It waits at least 11 seconds between requests to SatNOGS and backs off when asked.
- **The web console** serves the operator screens on port 8080 by default, and records operator actions in the audit trail. Open consoles receive new frames as soon as they are stored.
- **The updater** checks for a new version 5 minutes after boot and nightly at about 03:30, and installs it unless automatic updates are turned off. If the new version does not start, it rolls back.

Data sources

Source	What it provides	How often
SatNOGS database	Telemetry frames uploaded by volunteer stations	Every fetch, 30 minutes by default
SatNOGS network schedule	Which stations plan to listen, and when	Every 3 hours
NOAA Space Weather Prediction Center	Geomagnetic storms, solar flares and solar flux	Every 3 hours
Orbit data (TLE)	The satellite's orbit, used for position, sunlight and passes	Every 12 hours

> **NOTE**
> Data arrives only after a volunteer station has heard the satellite and uploaded the recording. Gaps of several hours are normal.

The console screen

The console has these tabs:

Tab	Use it to
Console	See spacecraft status, alerts, telemetry channels, the live globe, the daily check and the ground segment status.
Frames	Look at individual frames received from SatNOGS.
Battery	Review battery charge, eclipse depth and estimated life. Shown only when the satellite has enough battery data.
Passes & stations	See upcoming passes and which stations heard the satellite.
Audit trail	Read and verify the signed record of actions.
Shift handover	Write handover notes and sign the console over.
About	Check the version, update status and credits.

Two fields at the top of the screen control who you are: **Call sign**, which signs your actions, and **Passcode**, which appears only if the server requires a passcode for changes.

Learned normal

A small satellite warms in sunlight and cools in Earth's shadow on every orbit. For each channel, Downlink Desk learns the typical value at each point of that cycle and compares the last two days with the three weeks before. This lets it flag a channel that is drifting while it is still well inside its limits. The model needs about 25 samples and a few days of history for a channel before it judges it.

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Alert system – Description

Severities

Severity	Meaning
Alarm	A condition that needs attention now, such as a value outside its alarm limits or a satellite that may have gone silent.
Caution	A condition that may need attention, such as a value outside its caution limits.
Event	Something that happened once, such as a subsystem restart. Events do not clear; you acknowledge them.

Each channel can have four limits: alarm low, caution low, caution high and alarm high. A channel without limits shows **No limits** rather than **Nominal**, so an empty limit is never mistaken for a good value.

What raises an alert

Condition	Severity	Default threshold
Channel outside its caution limits	Caution	Set per channel
Channel outside its alarm limits	Alarm	Set per channel
No new decoded frames	Caution, then alarm	Caution after 12 hours; alarm after 24 hours
Satellite may have gone silent	Alarm	3 scheduled observations in a row deliver nothing, counting passes at least 15° high, after a 3-hour upload grace period
Server cannot reach SatNOGS	Alarm	No successful fetch for three fetch intervals (90 minutes at the default 30)
SatNOGS rejects the API key, or no key is set	Alarm	Immediately

Condition	Severity	Default threshold
Server disk getting full	Caution, then alarm	Caution below 10% or 1 GB free; alarm below 3% or 300 MB free
Subsystem restart	Event	A restart counter goes up

Channels that drift away from their learned normal are flagged on the channel and in the spacecraft status, and sent to the phone, separately from the limit alerts.

Alert states

- **Open, not acknowledged:** new. Shown at the top of the list with an **Acknowledge** button.
- **Open, acknowledged:** an operator has seen it, but the condition is still active.
- **Shelved:** hidden for a chosen time (1 hour, 6 hours, 1 day or 1 week) with a reason. Shelved alerts are listed under **Shelved** below the main list.
- **Closed:** acknowledged, and the condition has cleared.

> **NOTE**
> An alert closes only when it has been acknowledged and its condition has cleared. A condition that clears by itself without acknowledgement stays in the list, so nothing is missed between shifts.

Phone alerts

If the server has an ntfy topic set, the fetch job pushes these to the operator's phone: alarm-level limit breaks, restarts, a satellite that may have gone silent, a channel starting to drift, three failed fetches in a row and low disk space. Each event is sent once. A morning summary of the last 24 hours is also sent at the configured hour.

Operating procedures

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Applies to Downlink Desk 0.17.x

Shift start – Take the console and complete the daily check

Preliminary requirements

REQUIRED CONDITIONS

- The Downlink Desk server is running and you can reach it from your device.
- You know the console address, for example http://groundpi.local:8080.
- You have a call sign, usually your initials.
- If the server requires one, you have the operator passcode.

REQUIRED PERSONS

1 × Operator. Estimated time: about 15 minutes.

SUPPORT EQUIPMENT

- A computer or phone with a web browser, on the same network as the server

SUPPLIES

None

SPARES

None

SAFETY CONDITIONS

> **CAUTION**
>
> Enter your own call sign before you take any action. Every action is signed with it.

Procedure

1 Open the console address in a web browser.

2 Type your call sign in the **Call sign** field at the top of the screen.

2.1 If a **Passcode** field is shown, type the operator passcode.

3 Select the **Shift handover** tab. Read the **Handover report** and any notes from the previous operator.

> **NOTE**
>
> The report lists every open alert and whether it was acknowledged. Note any alert marked NOT ACKNOWLEDGED.

4 If the previous operator did not sign the console over to you, select **Take the console**.

Check that the screen shows **On duty** with your call sign.

5 Select the **Console** tab. Complete each item in the **Daily check** panel. Select an item only after you have done it; each one is signed in the audit trail.

5.1 **Overnight frames reviewed**: select the **Frames** tab and look through the frames received since the last shift.

> **NOTE**
>
> Some frames shown as unrecognised are normal. They are often amateur radio traffic or noise.

5.2 **Open alerts reviewed and acknowledged**: respond to each open alert. Refer to Alerts – Respond to an alert `(DMC-DLD-A-20-10-00-00A-130A-A)`.

5.3 **Fetcher healthy: last fetch succeeded**: in the **Ground segment** panel, check that **SatNOGS link** shows **Operational**. If it shows **Degraded**, **Down**, **Key rejected** or **No API key**, refer to SatNOGS link – Fault isolation: data is not being collected `(DMC-DLD-A-10-10-00-00A-400A-A)`.

5.4 **Limits still sensible**: look for channels showing **No limits**, and for limits that no longer fit the satellite's behaviour. To change them, refer to Channel limits – Set or change limits `(DMC-DLD-A-20-20-00-00A-130A-A)`.

5.5 **Anything unusual written in the log**: type a short note in the log note box on the **Console** tab and select **Log note**.

6 Check that the **Daily check** panel shows all five items complete, with today's date in UTC.

Requirements after job completion

- You are on duty, and the daily check is signed in the audit trail.

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Applies to Downlink Desk 0.17.x

Alerts – Respond to an alert

Preliminary requirements

REQUIRED CONDITIONS

- You are on duty, with your call sign entered.
- The alert is shown in the **Alerts** panel on the **Console** tab.

REQUIRED PERSONS

1 × Operator. Estimated time: 5 to 20 minutes for each alert.

SUPPORT EQUIPMENT

- A computer or phone with a web browser, on the same network as the server

SUPPLIES

None

SPARES

None

SAFETY CONDITIONS

> **CAUTION**
>
> The values on screen are the latest received, not the spacecraft's state now. Check the time of the reading before you act.

> **CAUTION**
>
> A shelved alert is hidden from the main list. Give a reason the next operator can act on, and shelve for the shortest time that makes sense.

Procedure

1 Read the alert. Note its severity (**Alarm**, **Caution** or **Event**), the channel or condition, and when it was raised.

2 Select **Acknowledge** on the alert.

Check that the alert now shows **Acked** with your call sign.

> **NOTE**
>
> Acknowledging records that you have seen the alert. It does not clear it. The alert closes by itself once its condition clears.

3 Find the cause.

3.1 For a limit alert, select the channel name in the alert. Look at the last 7 days of the channel on the chart.

- Grey bands show eclipse. A temperature that drops in each eclipse and recovers in sunlight is normal.
- Red ticks along the top show geomagnetic storms. Check whether the reading lines up with one.
- Coloured bands show the caution and alarm zones.

3.2 If the alert says that no new frames have arrived, or that the satellite may have gone silent, refer to Telemetry reception – Fault isolation: no frames, or satellite may have gone silent `(DMC-DLD-A-10-20-00-00A-400A-A)`.

3.3 If the alert says that the server cannot reach SatNOGS, or that the API key is missing or rejected, refer to SatNOGS link – Fault isolation: data is not being collected `(DMC-DLD-A-10-10-00-00A-400A-A)`.

4 Record what you found. Type a short note in the log note box on the **Console** tab and select **Log note**.

5 If the alert is expected and you need it out of the main list for a while, shelve it:

5.1 Select **Shelve** on the alert.

5.2 Choose how long: 1 hour, 6 hours, 1 day or 1 week.

5.3 Type a reason the next operator can act on, for example: "Battery temperature low in each eclipse since season change; within mission behaviour. Review limits Friday."

5.4 Select the second **Shelve** button, next to the reason. Check that the alert now appears under **Shelved**.

6 If a limit is wrong rather than the value, change the limit. Refer to Channel limits – Set or change limits `(DMC-DLD-A-20-20-00-00A-130A-A)`.

Requirements after job completion

- The alert is acknowledged, the cause is noted in the log, and the alert is either closed, open with a known cause, or shelved with a reason.

DMC-DLD-A-20-20-00-00A-130A-A Procedural Issue 001 2026-11-04 Unclassified QA: Unverified

Applies to Downlink Desk 0.17.x

Channel limits – Set or change limits

Preliminary requirements

REQUIRED CONDITIONS

- You are on duty, with your call sign entered.
- You have a reason for the change that another operator would accept.
- The channel is not a counter. Counters, such as restart counts, do not have limits.

REQUIRED PERSONS

1 × Operator. Estimated time: about 10 minutes.

SUPPORT EQUIPMENT

- A computer or phone with a web browser, on the same network as the server

SUPPLIES

None

SPARES

None

SAFETY CONDITIONS

> **CAUTION**
>
> Limits suggested from data come from the satellite's own recent history. If that history already contains a fault, the suggested limits will hide it. Review them before you save.

Procedure

1 On the **Console** tab, select the channel in the **Spacecraft telemetry** list. Its history and limits open in a side panel.

2 Look at the last 7 days on the chart, with the current caution and alarm zones. Decide whether the limits or the values are wrong.

3 Enter the new limits in the **Alarm low**, **Caution low**, **Caution high** and **Alarm high** fields. Leave a field empty for no limit on that side.

3.1 To start from the data instead, select **Suggest from data**. It sets caution half the normal range outside the satellite's recent values, and alarm a full range outside. Review the values it fills in.

4 Check the order: alarm low must be below caution low, and caution high below alarm high.

5 Type the reason for the change in the reason field.

6 Select **Save limits**.

> **NOTE**
>
> New limits apply from now on. Past readings are not re-judged.

7 Select the **Audit trail** tab and check that the change is recorded with your call sign and reason.

Requirements after job completion

- The new limits are shown on the channel and signed in the audit trail.

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Applies to Downlink Desk 0.17.x

Shift handover – Hand over the console

Preliminary requirements

REQUIRED CONDITIONS

- You are on duty, with your call sign entered.
- You know the call sign of the incoming operator.

REQUIRED PERSONS

1 × Operator. Estimated time: about 10 minutes.

SUPPORT EQUIPMENT

- A computer or phone with a web browser, on the same network as the server

SUPPLIES

None

SPARES

None

SAFETY CONDITIONS

> **CAUTION**
>
> The report shows the console as it is when you sign. Acknowledge or deal with alerts first, so the incoming operator does not inherit work you could have finished.

Procedure

1 On the **Console** tab, acknowledge every open alert you have seen. Refer to Alerts – Respond to an alert (DMC-DLD-A-20-10-00-00A-130A-A).

2 Select the **Shift handover** tab. Read the **Handover report**. Check that it matches what you know of the shift.

3 In **Notes for the next operator**, write what the incoming operator needs to know. Include:

   - anything you are still investigating;
   - any alert you shelved, and why;

- anything to check at a set time, such as a pass or a limit review.

> **NOTE**
>
> Notes are shared and saved as you type.

4 Type the incoming operator's call sign in **Incoming operator**.

5 If the team keeps handover reports elsewhere, select **Copy** and paste the report where it is needed.

> **NOTE**
>
> Do this before you sign. Signing clears the notes field.

6 Select **Sign handover**.

Check that the message confirms the incoming operator is on duty.

> **NOTE**
>
> Signing writes a fingerprint of the report, your notes, both call signs and the number of unacknowledged alerts to the audit trail.

Requirements after job completion

- The incoming operator is shown as on duty, and the handover is signed in the audit trail.

DMC-DLD-A-30-30-00-00A-300A-A Procedural Issue 001 2026-11-04 Unclassified QA: Unverified

Applies to Downlink Desk 0.17.x

Audit trail – Verify the chain

Preliminary requirements

REQUIRED CONDITIONS

- You can reach the console.

REQUIRED PERSONS

1 × Operator. Estimated time: about 2 minutes.

SUPPORT EQUIPMENT

- A computer or phone with a web browser, on the same network as the server

SUPPLIES

None

SPARES

None

SAFETY CONDITIONS

CAUTION

A successful check shows that the record has not been edited through normal means. It does not prove that nobody with access to the server's files rebuilt the whole chain.

Procedure

1 Select the **Audit trail** tab.

2 Select **Verify chain**.

3 Read the result:

Result	Meaning	Action
Chain intact, with the number of signed entries	Every entry matches its fingerprint and links to the entry before it.	None.

Result	Meaning	Action
Problems found: content changed after signing	An entry was edited after it was written.	Go to step 4.
Problems found: does not link to the entry before it	The chain has been broken or rebuilt.	Go to step 4.
Problems found: entries missing	One or more entries were deleted.	Go to step 4.
Could not verify	The console could not reach the server.	Refer to Web console – Fault isolation: the console does not open `(DMC-DLD-A-30-00-00-00A-400A-A)`.

4 If problems were found, write down the entry numbers shown. Do not take further actions on the console. Report the result to whoever is responsible for the server.

Requirements after job completion

- The chain is intact, or a problem has been reported.

Fault isolation

DMC-DLD-A-10-20-00-00A-400A-A Fault isolation Issue 001 2026-11-04 Unclassified QA: Unverified

Applies to Downlink Desk 0.17.x

Telemetry reception – Fault isolation: no frames, or satellite may have gone silent

Fault description

One of these alerts is open:

- **No decoded frames for** a period of time (caution after 12 hours, alarm after 24 hours by default).
- **Scheduled observations in a row produced no frames** (alarm). The message may include the chance that the satellite has really gone quiet.

> **NOTE**
>
> Frames arrive only when a volunteer station has heard the satellite and uploaded the recording. Gaps of several hours are normal. Most of these alerts are caused by the ground network, not the spacecraft.

Preliminary requirements

REQUIRED CONDITIONS

- An alert or symptom described above is present.

REQUIRED PERSONS

1 × Operator. Estimated time: 10 to 30 minutes.

SUPPORT EQUIPMENT

- A computer or phone with a web browser, on the same network as the server
- Terminal access to the server, for example over SSH, for steps on the server

SUPPLIES

None

SPARES

None

SAFETY CONDITIONS

None

Isolation procedure

Step 1

Look at the other open alerts on the **Console** tab.

Is there also an alert that the server cannot reach SatNOGS, or that the API key is missing or rejected?

Yes go to Result A **No** go to Step 2

Step 2

Find the satellite's page on db.satnogs.org and look at its most recent frames.

Has any station uploaded frames for the satellite since the last frame shown in Downlink Desk?

Yes go to Step 3 **No** go to Step 4

Step 3

Select the **Frames** tab and look at the newest frames.

Are the new frames listed, but shown as unrecognised or not decoded?

Yes go to Result B **No** go to Result C

Step 4

Select the **Passes & stations** tab. Look at the stations that missed the satellite and their **Hit rate (30 d)**.

Do the stations that missed usually hear the satellite (a high hit rate), and is the alert's stated chance of silence high?

Yes go to Result E **No** go to Result D

Results

Result A

The cause is on the ground side: Downlink Desk is not collecting data. Go to SatNOGS link – Fault isolation: data is not being collected `(DMC-DLD-A-10-10-00-00A-400A-A)`.

Result B

The satellite is transmitting, but its frames cannot be decoded. The satellite may have changed its telemetry format, or the frames may be other radio traffic. Write a log note with the time of the first undecoded frame. Report it to whoever maintains the server, so the decoder can be checked.

Result C

The frames exist on SatNOGS but have not been collected yet. Wait for the next fetch, which runs every 30 minutes by default. If you have access to the server, you can fetch now with `cd ~/downlink-desk && .venv/bin/python -m downlink_desk.fetch --force`. If the frames still do not appear, go to SatNOGS link – Fault isolation: data is not being collected `(DMC-DLD-A-10-10-00-00A-400A-A)`.

Result D

The misses are most likely from stations that often miss the satellite, not a silent spacecraft. Acknowledge the alert. Write a log note naming the stations. If the alert will keep firing until the next good pass, shelve it for 6 hours with that reason. Check again after the next scheduled pass by a reliable station.

Result E

The satellite may have gone silent. Acknowledge the alert and leave it open. Write a log note with the time of the last decoded frame and the stations that missed. Check the space weather panel for a storm at that time, and check the satellite team's public channels for planned downtime. Downlink Desk is not the mission's own system: do not report the satellite as lost on the basis of this alert alone. Hand the alert over at the end of the shift.

Requirements after job completion

- The cause is found and recorded in the log, or the alert is handed over with notes.

DMC-DLD-A-10-10-00-00A-400A-A Fault isolation Issue 001 2026-11-04 Unclassified QA: Unverified

Applies to Downlink Desk 0.17.x

SatNOGS link – Fault isolation: data is not being collected

Fault description

One of these alarms is open:

- **No SatNOGS API key on this server yet.**
- **SatNOGS rejected the API key.**
- **The server hasn't reached SatNOGS since** a given time, or **has not completed a fetch yet**.

You may also have received a phone alert that the last three fetches failed.

> **NOTE**
>
> Steps marked "on the server" need a terminal on the Downlink Desk server, for example over SSH. If you do not have access, report the alarm to whoever maintains the server.

Preliminary requirements

REQUIRED CONDITIONS

- An alert or symptom described above is present.

REQUIRED PERSONS

1 × Operator. Estimated time: 10 to 30 minutes.

SUPPORT EQUIPMENT

- A computer or phone with a web browser, on the same network as the server
- Terminal access to the server, for example over SSH, for steps marked "on the server"

SUPPLIES

None

SPARES

None

SAFETY CONDITIONS

None

Isolation procedure

Step 1

Read the alarm message.

Does it say there is no SatNOGS API key on the server?

Yes go to Result A **No** go to Step 2

Step 2

Read the alarm message.

Does it say SatNOGS rejected the API key?

Yes go to Result B **No** go to Step 3

Step 3

On the server, read the fetch log: `journalctl -u downlink-desk-fetch -n 50`.

Does the log say the system clock is behind the newest stored data?

Yes go to Result C **No** go to Step 4

Step 4

On the server, check the internet connection: `curl -sI https://db.satnogs.org`.

Does the command return a response from SatNOGS?

Yes go to Step 5 **No** go to Result D

Step 5

On the server, run a fetch now: `cd ~/downlink-desk && .venv/bin/python -m downlink_desk.fetch --force`.

Does it finish with a line saying how many new frames were stored?

Yes go to Result E **No** go to Result F

Results

Result A

Add the key. Get a SatNOGS DB API key from db.satnogs.org (your avatar, then Settings / API Token). On the server, save it with `echo YOURKEY > ~/downlink-desk/secrets/satnogs_token`. The next fetch uses it.

Result B

The key is wrong. The most common cause is a SatNOGS Network key instead of a SatNOGS DB key; they are different. The other cause is extra characters pasted with the key. Get the DB key again and save it as in Result A.

Result C

The server's clock has not synced since boot. A Raspberry Pi has no clock battery, so this can happen after a power cut. Check the network connection. The fetch resumes by itself once the clock is set.

Result D

The server has no working internet connection. Check its network cable or Wi-Fi, and the router. Once the connection is back, the next fetch resumes collection.

Result E

Collection is working again. The alarm clears once the console sees a successful fetch. Write a log note with the cause, if known.

Result F

SatNOGS may be unavailable, or may be limiting requests. Downlink Desk waits and retries by itself. Do not shorten the fetch interval: SatNOGS is run by volunteers. Write a log note, check again after the next fetch, and report it if the alarm is still open at handover.

Requirements after job completion

- The cause is found and recorded in the log, or the alert is handed over with notes.

DMC-DLD-A-30-00-00-00A-400A-A Fault isolation Issue 001 2026-11-04 Unclassified QA: Unverified

Applies to Downlink Desk 0.17.x

Web console – Fault isolation: the console does not open

Fault description

The console address does not open in the browser, or the console says it cannot reach the server.

Preliminary requirements

REQUIRED CONDITIONS

- An alert or symptom described above is present.

REQUIRED PERSONS

1 × Operator. Estimated time: 10 to 30 minutes.

SUPPORT EQUIPMENT

- A computer or phone with a web browser, on the same network as the server
- Terminal access to the server, for example over SSH, for steps on the server

SUPPLIES

None

SPARES

None

SAFETY CONDITIONS

None

Isolation procedure

Step 1

Check that your device is on the same network as the server, or connected through the team's private network.

Is your device on the right network?

Yes go to Step 2 **No** go to Result A

Step 2

Check whether a VPN is running on your device.

Is a VPN running?

Yes go to Result B No go to Step 3

Step 3

Try to connect to the server over SSH, for example `ssh yourusername@groundpi.local`.

Does the server answer?

Yes go to Step 4 No go to Result C

Step 4

On the server, check the console service: `systemctl status downlink-desk-web`.

Does it show the service as active (running)?

Yes go to Result E No go to Result D

Results

Result A

Connect your device to the server's network, or to the team's private network, and open the console address again.

Result B

The VPN is probably blocking local traffic. Turn on its option to allow local network access, or disconnect it, and open the console address again.

Result C

The server is off, has lost power or is not on the network. Check its power supply and network connection. A Raspberry Pi needs a proper 5 V, 2.5 A supply; a weak one causes random crashes. After power returns, the console starts by itself within a few minutes.

Result D

Restart the console service: `sudo systemctl restart downlink-desk-web`. If it does not stay running, read its log with `journalctl -u downlink-desk-web -n 50` and report the error to whoever maintains the server.

Result E

The service is running, so the problem is between your device and the server. Check the address and port (8080 by default), and try the server's IP address in place of its name. If an update ran recently, check the **About** tab once you are in.

Requirements after job completion

- The cause is found and recorded in the log, or the alert is handed over with notes.