

Cumulus

A Linux-based flight navigation program for the soaring community

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Cumulus



Cumulus is a program designed for the soaring community. It provides a moving map display with all the information you need to make navigation easier while flying, yet requiring a minimum of user interaction. Navigation during flight is based on the processing of standard NMEA records delivered by a GPS receiver. Additionally, the proprietary NMEA sentences of some logger devices can be included in the processing.

Cumulus features a full colour moving map with information on terrain, point data, airspace, (rail-) roads, water, cities and many other details. It handles waypoints, IGC logging and tasks in cooperation with KFLog. Wind determination, reachable sites, final glide, sunrise and sunset calculations, retrieving of airport weather reports (METAR and TAF), live tracking of flights as well as automatic task point switching are also supported.

Software license agreement

Cumulus is distributed as open source under the GPLv3 license. See [here](#) for the license conditions.

Important hint to all program users

This program comes with ABSOLUTELY NO WARRANTY!

Do not rely on this software program as your primary source of navigation. As pilot in command you are responsible for using official aeronautical charts and proper methods for safe navigation. The information presented by this application may be outdated or incorrect.

This software may not be used as a traffic and collision-warning system!

You use this program at your own risk. If you don't agree, don't use this software!

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Getting Started

To take full advantage of Cumulus, you need a PDA with either an internal or an external GPS receiver and a set of map files. Currently Cumulus supports the following hardware devices:

- Android devices up release level 2.2.x (FroYo) and higher with a screen resolution 800x400 and higher in landscape mode
- PC Linux desktop running Debian or Ubuntu

When you start Cumulus, it will create all the necessary data directories by itself, if they do not already exist. Furthermore you will be asked once whether you want to download missing airfield or map files from the Internet. Your decision is valid until to the termination of the program. If Cumulus is moving no file downloads are executed. Only enable the automatic download if you have an active Internet connection running!

PDA

As long as the program runs on the PDA and you are on the move, the automatic shut-down of the screen to save battery life is deactivated. If you move slower than the defined speed limit, the screen is switched off after a certain time. If you then move faster, the screen is automatically switched on again. The speed limit can be configured in the [Look&Feel](#) settings.

For operation over several hours you need to supply external power to your PDA. Furthermore, it is recommended that you switch off all automatic connection or update attempts (WLAN, version updates, ...) before take-off, as these can rob Cumulus of resources, slowing it down for a while and irritating you with popup dialogs.

Android Hints

Please notice, that some functions under Android are only reachable via the *Android Menu Key* and not over the internal Cumulus menu. That concerns the GPS receiver and the barometric sensor. After every startup of Cumulus you must switch on again these functions! The previous state is not saved.

Android's Barometric Sensor

If your Android device has a built in pressure sensor, you can activate it, that it delivers air pressure data. If you want to use these data in Cumulus, you have to switch the [altimeter display](#) to Baro. Furthermore you have to adjust the altimeter to the correct MSL altitude.

Please notice, that in this case no other external connected devices deliver barometric altitude data, otherwise you can get displayed wrong values.

Possibilities to connect to external GPS devices

Cumulus can be operated with build-in or external GPS devices. A GPS device can be connected via Serial (RS232), USB or Bluetooth from Cumulus. The following variants are possible for connection to a GPS

receiver:

- **Linux PC**
 - Serial (RS232)
 - USB
 - Bluetooth
 - WiFi
- **Android device**
 - Build-in GPS
 - Bluetooth
 - USB-IOIO
 - WiFi

GPS Hardware

Many flight recorder and also Flarm provide only a serial interface as link to other devices. To connect to such devices you need an adapter. Cumulus supports the following adapters:

- Serial-USB adapter (not for Android)
- Serial-Bluetooth adapter
- USB IOIO Uart board (only for Android)

Examples for such adapter:

- Serial-Bluetooth adapter
 - [K6-Team](#)
 - LM TECHNOLOGIES - LM048V2 adapter
- USB IOIO Uart board, firmware 4.0 and higher (only for Android)
 - [SoarTronic's IOIO UART interface board](#)

GPS Activation

Once you manage to connect your GPS to Cumulus, select the correct device and baud rate in the [GPS Settings](#). Refer to your GPS manual for the correct settings. The most common devices are:

- `/dev/ttyS0` - Serial (RS232) device
- `/dev/rfcomm0` - Bluetooth device
- `/dev/ttyUSB0` - USB device

The default NMEA connection speed is 4800 bps on a RS232 serial channel.

If you have an **Android** device with a built in GPS nothing has to be setup. To external GPS devices is only a connection possible via Bluetooth radio or an USB IOIO Uart board. A USB IOIO Uart board must be configured and activated via the Android menu before you can use it. See [GPS Settings](#) for more information.

Note the following exception! After every startup of Cumulus under Android the GPS receiving **must be enabled by hand**. To do that, press the **Android Menu key**, select the entry *GPS on* and choose the desired device (internal, Bluetooth or IOIO). Bluetooth devices must be paired before Cumulus is started. Cumulus does not support BT pairing!

Once your GPS device is set up, press the key **G** or click on the GPS status indicator in the status bar to check the GPS status. You can remove the GPS status page with the Escape key or with the close button.

Personal

In Personal Settings you define the coordinates of your home position in the area in which you fly. The setting is important to ensure an unskewed map rendering! See [Personal Settings](#) for more details.

Glider

Define your preferred gliders in Glider Settings. See [Glider Settings](#) for more details.

Maps

Cumulus uses the same maps as *KFLog*, the KDE Flight Logger. Needed airfield and map files are downloaded automatically by Cumulus, if you enable this option at start-up. To install all the maps around your home position, see [here](#) for more information.

Waypoints

Cumulus uses waypoints to facilitate navigation. You can either edit the waypoint files on the PDA or prepare them on a PC using *Cumulus* and then transfer them to the PDA. See [waypoints](#) for more details.

Tasks

Cumulus also supports the definition of flight tasks. You can either create and edit a task file on the PDA or prepare it first on your PC using *Cumulus* before transferring it to the PDA. See [here](#) for more details on tasks.

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Maps

Cumulus uses the following sets of maps:

- **Ground and Terrain Maps** with streets, highways, cities, rivers, lakes, ... and terrain data with elevation information. These cover the entire world. Cumulus is able to download all the map files that you need. See [Map-Settings](#) for more information.
- **Airspaces:** Cumulus supports the *OpenAir* and the *openAIP* file format for airspace structures. Further hints you can find [here](#).
- **Point Data:** Source for airports, airfields, nav aids, airport reporting points and thermal hotspots is the [openAIP](#) project.

The maps are installed in different places depending on the used device:

OS	Map root directory
Linux Desktop	\$HOME/Cumulus/maps
Android	/sdcard/Cumulus/maps (internal or external SD-card)

These are the default locations.

Please note! The map files have to be stored in different subdirectories under the root map path.

Directory	Map kind
.../maps/landscape	The ground and terrain data files
.../maps/points	POI data files like airfields, outlandings, nav aids and hotspots
.../maps/airspaces	The airspace files

If you want to install the maps elsewhere than the known locations, you must give the path to the new map root directory on the [Map Settings](#) configuration page. Use the [Maps](#) button to navigate to the appropriate root directory under which the expected maps' subdirectories are to be found.

Note! Under Android you cannot change the map root directory.

Only load the point data and the airspace maps for the area you need. This will make Cumulus faster and save runtime memory. If you experience memory problems running Cumulus, you can choose not to install certain map sets. You

could, for instance, skip the terrain maps. This will disable the display of terrain features (the isolines) but it will also save memory and reduce the time used for map loading and drawing. It is advisable to use at least the Ground maps because otherwise you will end up with a blue background, which is not very helpful for navigation.

The maps you install are not projected. This work is done on loading. Because this is a computationally complex operation, the resulting maps are stored again with a *.kfc*, *.jsonc* or *.txc* extension. For many maps, these files are a bit smaller than the original files. The next time Cumulus needs to load the file, it first tries to load this *compiled* file to improve speed. In the [Map Settings](#) page you can modify the behaviour of Cumulus for map projection and map compilation.

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Maps - Airspace

Cumulus supports two different source formats:

- OpenAir
- openAIP

as database for airspaces.

OpenAir

OpenAir files must be downloaded manually from the Internet and installed in Cumulus. Addresses where you can find *OpenAir* airspace files are:

- [Soaring Services - Airspace](#) for many countries of the world
- [Airspace Data Germany \(Deutschland\)](#) published by the DAeC

openAIP

[openAIP](#) airspace files can be found on the openAIP website, where this project is hosted. The download and installation of openAIP airspace files is supported by Cumulus. See [here](#) for further help.

Installation Directory

Just put your airspace files in the directory **.../maps/airspaces** and make sure, that OpenAir files have the *.txt* extension while openAIP files uses the *.json* extension. The extension spelling is not case sensitive for *.txt* files.

Because you can have a lot of airspace files in the airspace directory, maybe one for every country, it is useful to define, which files should be loaded only to save run-time memory. That can be done in the configuration setup for [Airspaces](#). Press the Load button on that page and select the airspace files in the displayed list to be loaded.

Mapping Services

Certain OpenAir/openAIP airspace elements are not unique mapable to Cumulus airspace elements. Therefore Cumulus provides additional mapping services.

- One global mapping file
- Special mapping files, related to one airspace file

The mapping files must be placed in the same directory as the airspace files are installed. Their rules overwrite the default Cumulus mapping rules.

Global Mapping File

The global mapping file is applied first to all read airspace file. The name of the file is *airspace_mappings.conf*.

Special Mapping Files

Special mapping files can be applied only once to a related airspace file. Such a file consists of the basename of the airspace file without the extension *.txt* or *.json*, extended by the string *_mappings.conf*.

Example: SourceFile=*openair.txt*, MappingFile=*openair_mappings.conf*

Cumulus knows the following airspace types:

- AirA
- AirB
- AirC
- AirD
- AirE
- AirF
- AirUkn
- Ctr
- Danger
- Prohibited
- Restricted
- Sua
- Rmz
- Tmz
- GliderSector
- WaveWindow

The syntax used in the mapping file is very simple. Lines starting with *#* or *** are ignored and can be used for comments. Empty lines are also ignored. The rest of the lines should contain entries in the form *key = value*, one entry per line. The key is the airspace type in the OpenAir/openAIP file you wish to map, and the value is the corresponding Cumulus type you wish to assign.

Default mapping for OpenAir

- A = AirA
- B = AirB
- C = AirC
- D = AirD
- E = AirE
- F = AirF
- CTR = Ctr
- GP = Restricted
- P = Prohibited
- Q = Danger
- R = Restricted
- RMZ = Rmz
- TMZ = Tmz

- TRA = Restricted
- GSEC = GliderSector
- UKN = AirUkn
- W = WaveWindow

Default mapping for openAIP

- A = AirA
- B = AirB
- C = AirC
- D = AirD
- E = AirE
- F = AirF
- DANGER = Danger
- PROHIBITED = Prohibited
- RESTRICTED = Restricted
- CTR = Ctr
- TMA = Ctr
- RMZ = Rmz
- TMZ = Tmz
- GLIDING = GliderSector
- OTH = AirUkn
- WAVE = WaveWindow

Note! You only need to define the values you actually want to change in the read airspace file. These instructions will overwrite the default mappings.

Example: *CTR=AirC*

This statement changes the default assignment for *Control Zone* to *Airspace C*.

Remember that the mapping definitions are case-sensitive! Otherwise the mapping rules will fail.

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openAIP - Navigation Data

[openAIP](#) has the goal to deliver free, current and precise navigational data to anyone. *openAIP* is a web-based crowd-sourced aeronautical information platform that allows registered users to add, edit, download and comment aeronautical data in many common formats used in General Aviation. You should register yourself by the [openAIP](#) project, that you can correct and update their provided data or that you can add new data.

Please read and accept the used [license](#) by openAIP, before you download and use their data in Cumulus.

Caution! Please note, that all openAIP files carry the extension **.json**. You should never change that extension otherwise Cumulus cannot recognize these files.

openAIP point data

Cumulus can download and install on user request *openAIP* airfield, navaid, hotspot and other point data files. Go to the [Settings/Point Data - openAIP](#) page and make there your desired settings.

openAIP Airspace Data

Cumulus can download and install on user request *openAIP* airspace files. Go to the [Settings/Airspaces](#) page and make there your desired settings.

Please help to improve the *openAIP* data. If you found mistakes, correct them. If you miss something, add it to the *openAIP* data base.

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Settings

Press the key **s** to open directly the settings page. The normal way is, to press the menu button or the **m** key on the PDA to open the pop up menu. Then navigate to *Setup->General*.

The opened table contains all basic configuration pages of Cumulus. It is separated into 16 sections:

- [Personal](#)
- [GPS](#)
- [FLARM](#)
- [FlarNet](#)
- [Gliders](#)
- [Maps](#)
- [Map Objects](#)
- [Terrain Colors](#)
- [Task](#)
- [Lines](#)
- [Point Data](#)
- [Airspaces](#)
- [Units](#)
- [Wind](#)
- [Information](#)
- [Look&Feel](#)

Note! If you have done modifications on a single setting window and you want to make them permanent you must leave this window by pressing the green *Ok* button. To cancel all done modifications, use the red *Cancel* button instead of.

FYI, all internal configuration data are stored by Cumulus in the user directory *\$HOME/.config* in the file *Cumulus.conf*. Under Android this file is to find in the directory */sdcard/Cumulus/Settings*. Do only modifications there, if you know what you do and Cumulus is not running!

WARNING: Make your settings while safely on the ground, not while flying!

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Settings - Personal

On this page you can enter and define your personal data.

Pilot name

This data is used as pilot's name for the IGC logfile.

Language

Select the language which you do prefer. English is always the default also in case if your selection do fail. After a language change you must restart Cumulus to get a complete translated surface.

Home site country

The home site country has to enter as two letter code according to ISO 3166. It is used as default setting, if the waypoint editor is opened to create a new waypoint. The country code is set too, if a new home position is selected in one of the overview lists.

Home site name

Enter here the name of your home site. This value is displayed in the *To* box, if you navigate to your home site.

Home site elevation

Enter here the elevation of your home site. This value is taken into account if you select AHL (above home level) in the altitude dialog. In this case the displayed altitude is related to your home base also referred as QFE.

Home site coordinates

The home site coordinates are used for:

- The [Map Projection Settings](#)
- The [Manual Navigation](#)
- As center point for the point data to be read, when the [radius option](#) is set.
- As predefined center point for the map download procedure.

The home site coordinates can also be set in the airfield and waypoint pages. In this case the data are taken over from these pages and a manually entry is superfluous. The default home position is set at the Brandenburger Tor, in the center of Berlin (Germany).

Data Directory

With the Button **Data Directory** and the text entry field beside you can define a new storage place for your waypoint, task and IGC logger files. The default storage place of Cumulus is:

- **\$HOME/Cumulus** on the Linux desktop PC

- **/sdcard/Cumulus or similar** under Android (internal SD card not changeable)

When you press the Data Directory button, a directory dialog is opened and you can navigate to another directory storage place. The directory dialog shows only existing directories. If you want to create a new subdirectory you have to add the new pathes in the text field by hand. Cumulus tries to create the new subdirectories, if you leave the settings dialog with the Ok button.

If you change the data directory no files will be transferred automatically by Cumulus to the new area. Such moves must be done alone by your self, if Cumulus is **not running!**

Notice! The data directory is not changeable under **Android**. It is always located at the internal SD card. In the display field you can see where the real place is of it.

Proxy

If you can access the Internet only via a Proxy, press the button *Proxy* and define it there.

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Settings - GPS and other peripheral devices

This page is used for entering the connection information for the primary GPS device used by Cumulus for navigation. Please refer to your GPS manual for these connection values. Cumulus can also accept and process data from other peripherals such as Cambridge, Volkslogger, Flarm, LX Navigation and XCVario.

Android Hints

Under Android this page is nearly empty and shows always three possible configuration items for WiFi connection via Tcp. Please use the Android menu key and the GPS menu to switch on/off your desired GPS device. There are exist different possibilities according to the provided hardware of your Android device.

GPS Connections

- Use of build-in GPS.
- Connection establishment via Bluetooth to a GPS device. If the GPS device does not support Bluetooth you will need an adapter to connect the device.
- Connection establishment via an USB IOIO Uart board to a GPS device with a serial interface. Cumulus supports that at the moment only for IOIO boards with firmware 4.0 or higher and for only one Uart. The IOIO uart to be used and its connection speed have to setup via the Android menu key, Setup, IOIO GPS. If you use an **Android** device with **OS release < 4.1** you have to **switch on USB debugging** in the developer options. If the **OS release is >= 4.1 USB debugging must be switched off**. Otherwise you will never get a connection running.
- Connection establishment via a WiFi access point. You can define up to three different connections. Per connection you have to configure the IP address and the related port. The connection is marked for usage by checking the check box at the left side. The WiFi pairing with the external device must be executed via the OS before you can use these Tcp interfaces under Cumulus. Under Android you have to activate the usage of the WiFi channels via the menu:

Settings->Hardware->GPS->GPS on->WiFi GPS

Have also a look into the user guide of the [XCVario](#) device for further information.

Cumulus can provide you with some status information concerning your GPS reception. If you want to know what satellites are in view, where they are, how strong their signal is, or if you want to take a look at the raw NMEA stream of your GPS, use the **G** key or click on the GPS status indicator in the status bar. This will open a status dialog for the GPS. The dialog can be closed with the

"close" button.

GPS Device

In the combo box you can select the connection type to be used for your GPS or peripheral connection. The following alternatives are available:

Item	Description
GPS Location	only for using the Location Service provided by the Internet Tablets N8x0/N900. Users of the N8x0 or N900 can make use of the option in the tablet's own Settings/Control panel/GPS location to use either the built-in GPS receiver or an external Bluetooth GPS device.
BT Adapter	for direct connection to an external Bluetooth device, which has been paired with the OS BT manager before. In this case Cumulus will automatically scan your environment for a reachable device, and, if it finds one, will open up a combo box dialog from which you can make the appropriate selection. A wrong selection will mean that you will have to restart Cumulus!
/dev/ttyS[0...3]	for a serial GPS device like Flarm, using an RS232 interface. Note! On a Linux desktop, e.g. Ubuntu, it is required, that the Cumulus user must be a member of the Linux group <i>dialout</i> . Otherwise the device ttyS0 cannot be opened. Execute the following command to enable that: <code>sudo gpasswd --add <cumulus_user> dialout</code>
/dev/ttyUSB0	for a USB GPS device or, e.g., a USB-serial adaptor
WiFi-1, WiFi-2, WiFi-KRT2	for a WiFi connection to an external device. You can use up to three channels. Per channel you have to add an IP address and the related port. The coupling to the external device have to be done by using the WiFi manager of your OS. E.g. to connect to an XCVario you have to enter the following values: WiFi-1 IP:Port 192.168.4.1:8880 (XCVario data channel) WiFi-2 IP:Port 192.168.4.1:8881 (Flarm data channel) WiFi-KRT2 IP:Port 192.168.4.1:8882 (KRT2 radio channel) The desired channel is activated by checking the check box. See here for further information.
/tmp/nmeasim	for the Cumulus NMEA Simulator

Serial devices and RS232-USB adapters also need to be given a speed rate for their operation. The default serial NMEA connection speed is 4800 bps but we

recommend always to use the maximum supported speed.

If your device is not found in the selection list, you can change one of the predefined entries to what you need, e.g. /dev/ttyS0 for an RS232 serial.

Speed (bps):

This will have the greyed-out default value unless e.g. the connection selected above is to a device whose speed can be manually set.

Altitude Reference

Item	Description
GPS	The default selection is GPS. Most GPS devices send MSL (mean sea level) altitudes, but some send HAE (Height above ellipsoid).
Pressure	Some external devices, e.g. Flarm, XCVario can deliver altitude values derived from a pressure sensor. If you want to use these pressure data, select this alternative. Please note! If you have selected the pressure item, Cumulus expects to receive the appropriate NMEA records from the connected peripheral device. Without these you will not get any altitude data displayed at all, nor will you get a variometer reading, unless this information is supplied separately by the peripheral!

If your displayed altitude always deviates by a constant factor from the expected value, you can correct this in the altitude dialog. This is opened by tapping on the altitude display in the map view. Add your correction value in the box labelled with *QNH Altitude*. Positive values will be added to and negative values subtracted from the delivered altitude value. For pressure values, the correction will be applied immediately after pressing Ok. For GPS values, the correction will only be applied when a GPS fix is established.

Processed data from supported devices

Cumulus processes additional data from the devices listed below, if they are connected, but only if the data sentences have a valid checksum. Data from external devices are the first choice for Cumulus before its own calculation is started. This means that the wind, variometer and MacCready data from these peripheral devices will be accepted and used automatically, if they are available. The MSL and STD altitudes derived from a pressure sensor, however, are only made use of if specifically asked for, i.e., "Pressure" must be selected in the menu.

Device	Processed data
Cambridge	This device can deliver altitude values (MSL and STD) derived from a pressure sensor. Cumulus also uses the QNH, wind and McCready data from the Cambridge !w proprietary

	sentence (see below).
Volkslogger	This device can deliver the STD altitude derived from a pressure sensor. To get the right MSL altitude, you have to set the correct QNH value in the Cumulus Preflight Settings/Common or in the altitude dialog. Furthermore, in the Volkslogger setup menu, you have to enable the sending of PGCS records.
LX Navigation	This device can deliver altitude values derived from a pressure sensor and wind data. Some devices can also deliver McCready and variometer data. Enable the sending of LXWP records in the LX setup menu, as follows (e.g. on an LX20 device you will have to enter the password - the default is 96990): go to the NMEA menu, where you should set the entry LXWP? to 'Y'. Set the transfer speed in Cumulus to 4800 bps - the LX20 device uses this speed for NMEA transfer regardless of the selected PC transfer speed.
Classic FLARM and PowerFLARM	This device can deliver altitude values derived from a pressure sensor, as well as aircraft and ground obstacles information. Enable the sending of these data in the FLARM setup menu. Look also at the page Cumulus Flarm for more information.
XCVario	It delivers MSL altitude, IAS, variometer, Mc, bugs and temperature data. If a magnetic sensor is connected and activated, magnetic heading is delivered.

Save NMEA Data

If the option *Save NMEA Data* is activated, the received NMEA data stream is logged into a file. The file is stored in the user's data directory and it has the name *CumulusNmea_[date].log*. After each new start of Cumulus and if this option is activated in the setup menu, a new log file is opened. Please consider this, if you activate this option. You can use this option to save the GPS NMEA data for a later analyze or any other post-processing. We recommend to use this option only for special purposes because it has also influence to the performance in general.

GPS Source

With the selection box *GPS Source* you can define the GPS system, from which the default sentences should be processed. The following choice is possible:

- \$GP GPS (USA)
- \$BD GPS Beidou (China)
- \$GA GPS Galileo (Europe)
- \$GL GPS Glonass (Russia)
- \$GN combined GPS Systems

Processed GPS sentences

Cumulus processes the following NMEA and proprietary sentences:

NMEA Id	Description
\$[BD GA GL GN GP]RMC	Recommended Minimum Specific GNSS Data
\$[BD GA GL GN GP]GLL	Geographic Position - Latitude and Longitude
\$[BD GA GL GN GP]GGA	Global Positioning System Fixed Data
\$[BD GA GL GN GP]GSA	GNSS DOP and Active Satellites
\$[BD GA GL GN GP]GSV	GNSS Satellites in View
\$GPDTM	Map datum
\$PGRMZ	Garmin and FLARM proprietary sentence with barometric or GPS altitude data
\$PFLAU	FLARM proprietary sentence with status, intruder and obstacle data
\$PFLAA	FLARM proprietary sentence with data about other aircraft around
\$PCAID	Cambridge proprietary sentence with STD altitude
!w	Cambridge proprietary sentence with MSL altitude, QNH setting, wind direction, MacCready value, wind speed and variometer data
\$PGCS	Volkslogger proprietary sentence with STD altitude
\$LXWP0	LX Navigation proprietary sentence with MSL altitude, variometer and wind data
\$LXWP2	LX Navigation proprietary sentence with McCready data
\$POV	OpenVario proprietary sentence.
\$PXCv	XCVario proprietary sentence.
\$HCHDM	Magnetic compass proprietary sentence, magnetic heading.
\$HCHDT	Magnetic compass proprietary sentence, true heading.
\$Android	Cumulus internal proprietary sentence, if the Android device delivers only own location updates and no NMEA data.

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Settings - FLARM

This configuration page is only available, if Cumulus is not moving.

Cumulus supports two types of FLARM.

- Classic FLARM
- PowerFlarm

The FLARM setup page is organized as a table with the following columns from left to right:

Column	Description
CMD	Get command for the listed item
CMD	Set command for the listed item
Item	Configuration item name
Value	Configuration item value

Note! If you want to change items, please inform you before about the possible values of the items. Some SET commands are clearing the FLARM device. If you do not know what are the consequences of a SET command, do not execute it. In every case you should have read the document **FTD-014, FLARM CONFIGURATION SPECIFICATION**. You can find it [here](#).

Column CMD GET

If the CMD GET button is pressed, the value of the listed item is requested from the FLARM device.

Column CMD SET

If the CMD SET button is pressed, the value of the listed item is transferred to the FLARM device.

Column Item

Under the column *Item* the FLARM configuration items are listed. Read only items have only a GET button, Read-Write items have a GET and a SET button, Write only items have only a SET button.

Clicking on the item header will sort the item list. Double and single clicking of an Item field opens a little help dialog. Tipping at the help box will close it. After 30s the help box is closed automatically.

Column Value

Under the column *Value* the values of the FLARM configuration items are listed. Clicking of an item Value field of a configuration item, which is writable, opens a little editor where you can modify the item value.

Button Load

Clicking the button *Load* (lower right corner), will request all supported item values from the FLARM device.

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Settings - FlarmNet

This download button is only available, if Cumulus is not moving.

Cumulus may use data in the Flarm display for Flarm objects, if it is configured in that way. To get more information about that, please have a look at the webpage of [FlarmNet](#).

The FlarmNet configuration window consists of the following elements:

use FlarmNet Data

If the checkbox is activated, FlarmNet data will be used, if they are installed, otherwise not.

FlarmNet URL

This entry shows the current used URL by Cumulus to download FlarmNet data. Here you can adapt the URL, if it has been changed.

Note: Cumulus can process only the FlarmNet file, which is provided for *XCSoar*.

FlarmNet Filter

If you don't want to load the whole FlarmNet data by Cumulus during run-time, you can define here, which subset of data should be loaded. A single filter item is a substring of the airplane registration. If the filter item matches the beginning of the registration sign during load, this FlarmNet record is loaded, otherwise not. You can define several filter items divided by space or comma. Note, that the filter comparison works context sensitive.

Example:

If the filter item *D* is defined, all data records, which airplane registration starts with *D* will be loaded.

Button Count

If you press the *Count* button, you can test, how many FlarmNet data records will be loaded by the defined filter.

Button Download

If you press the *Download* button, Cumulus tries to download the FlarmNet file by using the FlarmNet URL, defined above. Preconditions is, that an active Internet connection exists.

Button Default

If you press the *Default* button, all configuration items of the window will be set to their default values. That means:

- The checkbox *use FlarmNet Data* is deactivated.
- The URL will be set to the value, stored internally in Cumulus.
- All filter items are cleared.

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