



ADL200

User and Installation Manual

Version 0.90

14.08.2018

1 Version History

Version 0.90 published 14.08.2018

2 Page Index

This manual contains numbered pages 1 to 19.

3 Emergency procedures

If you suspect any malfunction of the ADL200 or interference with other aircraft systems, deactivate the device by pulling / deactivating the aircraft circuit breaker for the device or pulling the cigarette lighter plug whichever is applicable. Do not reactivate the device until the problem has been investigated and resolved on the ground.

In case of a generator failure or similar situation requiring electric load shedding, deactivate the ADL200 by pulling / deactivating the aircraft circuit breaker for the device or pulling the cigarette lighter plug whichever is applicable.

4 AHRS Warning

The ADL200 comes with a non certified experimental AHRS. THIS AHRS IS NOT DESIGNED OR SUITABLE TO CONDUCT ANY IFR/IMC FLIGHT. IT IS DESIGNED FOR ENTERTAINMENT PURPOSES ONLY, DRIVING SYNTHETIC VISION IN SUITABLE iPad APPS AND SIMILAR.

DO NEVER FLY THE AIRCRAFT BASED ON THE ADL200 AHRS! USE ONLY OTHER CERTIFIED INSTRUMENTS FOR THIS TASK.

5 ADS-B Traffic Warning

The ADL200 comes with a non certified 1090 MHz ADS-B receiver. Not all aircraft are broadcasting 1090 MHz ADS-B and the non certified nature of the ADL200 means that due to antenna installation etc. it could even miss signals from aircraft broadcasting ADS-B. **NEVER RELY ON THE ADL200 FOR COLLISION AVOIDANCE!**

6 Weather Warning

While we do everything we can to ensure quality the ADL200 devices might not work at any time. In addition the system may display false information. **NEVER PENETRATE WEATHER BASED ON THE INFORMATION PROVIDED BY THE ADL200** This information is for situational awareness only. The device features a GPS moving map system. This system is designed to display the aircraft position in relation to the weather data. **THE ADL200 IS NOT SUITABLE AS A MEANS OF PRIMARY NAVIGATION.** Especially the build in database is not updated in a regular aviation cycle. It is also not maintained to the standards of certified aviation databases

7 General Description

The ADL200 is a satellite weather receiver with additional 4G/LTE, ADS-B 1090 MHz traffic and AHRS. The 4G/LTE link is used in order to reduce satellite transmission costs when flying slow and low enough to get a connection.

8 Certification ADL200

Currently there is no certification paperwork available for the ADL200.

9 Disclaimer

The ADL200 is provided as a non certified component. It is the sole responsibility of the user and installer that is installed and used in a legal way. The device may stop working at any time. Do not undertake flights you would not undertake without the ADL200.

10 The Iridium satellite service

Before you can use the ADL200 you have to subscribe to one of our Iridium satellite service plans. Please login to the ADL customer portal to order the different service plans:

<https://www.ing-golze.de/login.jsp>

If you have no login yet please contact us by email at adl@ing-golze.de.

PLEASE NOTE: The ADL200 will show satellite signal even without an active satellite service plan and will be able to transmit data. But this data will not be processed and the device will receive no answer.

11 Dimensions and Mounting Details

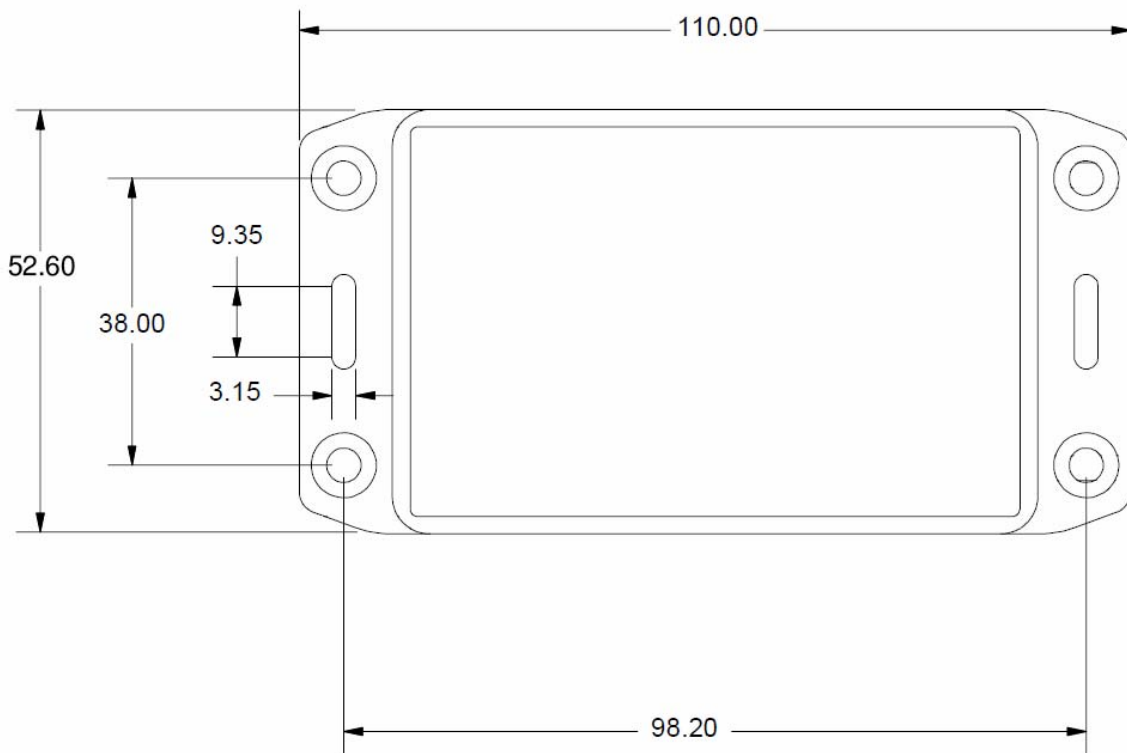


Figure 1 ADL200 footprint (all measurements in millimeters)

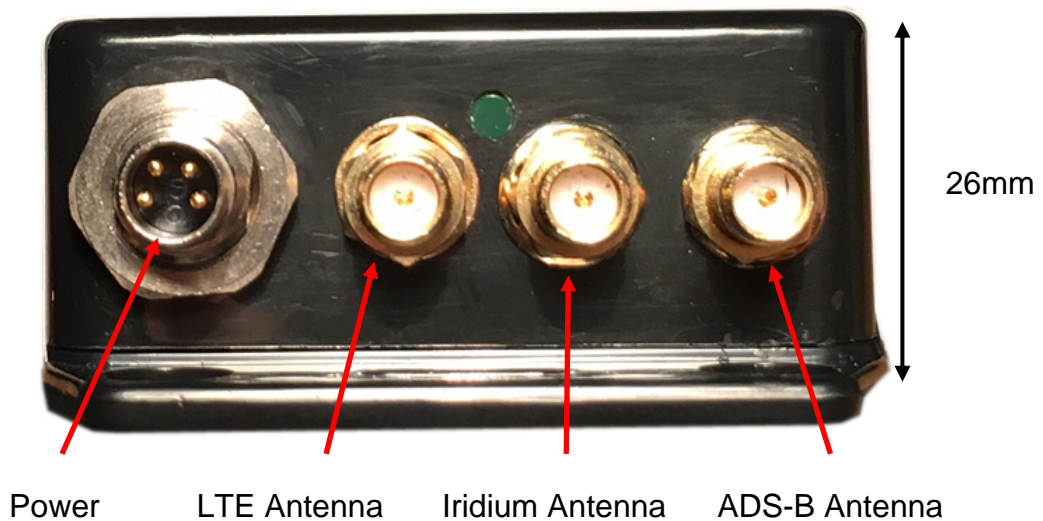


Figure 2 ADL200 side view

Attach the ADL200 with four M4 screws or similar imperial mounting hardware. A big patch of high quality Velcro on the bottom side of the enclosure usually also provides a solid fit. Pay attention not to interfere with any other aircraft systems like steering, wiring etc. Make sure the device is sufficiently attached so it can not become loose in flight.

12 AHRS Mounting Considerations

The ADL200 contains an AHRS which can sense the attitude of the aircraft. Therefore a firm connection between the ADL200 and the airframe is required. Attaching it to any moving parts like seatbacks and similar will interfere with the AHRS. The ADL200 AHRS can later be calibrated, thus it can be installed in any possible orientation.

13 Power Connector

The ADL200 requires four connections, the power supply and three antennas. The device has to be connected to a continuous power source. It will accept 7-36 Volt and consumes about 5 Watt. The ADL200 has got an internal emergency fuse but it should be protected externally, typically by a 1 Amp circuit breaker. This circuit breaker should also be accessible in flight so the crew can deactivate the ADL200 if any malfunction is suspected.

As an alternative a portable cigarette lighter power cable is available. Those power cables are identical to ADL140/ADL150 power cables. The picture below shows such a cable. The normal length is 2m and there is a side socket for iPad charging and other parallel applications. On demand we can also manufacture longer cables and other special solutions for 110V supply etc.



Figure 3 Cigarette lighter cable for ADL140/150/200

The green LED on the ADL200 enclosure will illuminate if power is supplied.

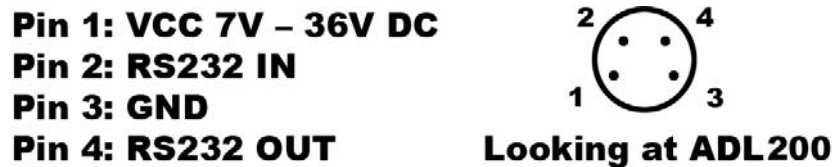


Figure 4 ADL200 power connector pins

As an option the ADL200 can be supplied with RS232 Aviation data or NMEA data from an on board navigation system. If "FPL IN" is activated in the ADLConnect app the ADL200 will read the current flight plan from the RS232 source. The NEMA signal should be 9600 8N1. There is also a RS232 output for future use but the current firmware does not output any data.

The connector on the ADL200 is called "RSMHL 4" and a matching connector for installation purposes would be "RKMCK 4" from Belden or an equivalent from another vendor.



Figure 5 RKMCK 4 connector

14 Antennas - Do not switch!

The ADL200 uses three antennas. One antenna for ADS-B, Iridium and LTE. The ADS-B and LTE antennas are usually the same type but the Iridium antenna (middle connector) is different. **DO NOT CONNECT THE LTE/ADS-B ANTENNA TO THE IRIDIUM SOCKET. AS A CONSEQUENCE OF THE WRONG CONNECTION IN SOME RARE CASES WE HAVE SEEN DAMAGE TO THE DEVICE.**

15 LTE Antenna Considerations

The antenna supplied with the ADL200 looks similar to the one shown below:



Figure 6 LTE Antenna

As an alternative any other LTE wide band antenna can be used. The antenna must be designed for approximately 800Mhz to 2GHz. The connector on the ADL200 is an SMA connector.

We suggest gluing this antenna vertically to the border of any cabin window. We have seen good results on side and front windows. Remember LTE is a means of satellite cost saving. Therefore a basic antenna installation is sufficient. Any advanced external LTE antennas could provide an advantage by would probably never pay off in less satellite downloads.

16 Iridium Antenna Considerations

The antenna supplied with the ADL200 looks similar to the one shown below:



Figure 7 Iridium Antenna

This is an Iridium patch antenna. Please note that it will radiate only upwards. Therefore the antenna should be placed with the flat side down as horizontally as possible. In most aircraft a location below the front window on the glare shield all the way to the front works well. The picture below shows the antenna in an aircraft in flight on the glare shield.



Figure 8 Iridium Antenna in Flight

If the aircraft is equipped with an external Iridium antenna that antenna can also be used for the ADL200 Iridium link. It will probably provide a signal which is a bit better than the antenna on the glare shield. But usually the small advantage in signal quality will not justify the expensive installation of such an antenna if it is not already installed.

Avoid putting the antenna up side down. The rounded corners of the antenna must face upwards. Else the signal reception will be very poor.

17 ADS-B Antenna Considerations

The antenna supplied with the ADL200 looks similar to the one shown below:



Figure 9 ADS-B Antenna

This is the same part used for 4G/LTE. ADS-B signal reception is very sensitive to antenna and cable performance. If you have an antenna on the outside of the hull available, we recommend you use it. The supplied antenna usually works best when installed vertically in the cockpit area. The picture below shows the antenna attached to the corner of the front screen.



Figure 10 ADS-B Antenna Example

Please note that besides the antenna itself the quality and length of the cable plays a big role in ADS-B performance. Thus, shortening the ADS-B antenna cable as much as possible makes a huge difference. We can also assist you with shorter cables etc. if required. As a guideline the relatively thin RG174 cable on the supplied antenna works best if shorter than 1m. For more than 2m we recommend using much thicker cable like RG400 which has shown to work well over 6m and more.

18 Connecting your iPad/iPhone/Android device to the ADL200

After powering up the ADL device you have to connect your portable device to the WI-FI access point provided by the ADL device. Go to the settings screen of your device. We show this step for the Apple iPad but other devices will work in a similar way. Choose “Wi-Fi” on the left side. Then on the right side you will see the network “ADL Connect”. Choose this network and make sure the iPad really connects to the ADL Connect wireless network.



Figure 11 iPad Wi-Fi settings

19 Installing the ADLConnect App

Before you can start to use the ADL with your mobile device, you have to install the ADLConnect iPad app. On Apple devices open the app store and search for "ADLConnect" and install the free app. On Android devices please open the Google play store and also search for "ADLConnect".

20 Starting the ADLConnect app

Start the ADLConnect app. The top status bar will indicate if the app is connected to your ADL device. When connected the Iridium, GPS and LTE signal quality will be displayed in the top left corner.

If the app displays "Internet mode", "WWW" or "Offline" in the top status bar it is not properly connected to the ADL200. In this case please check your WiFi settings.



Figure 12 iPad ADLConnect user interface

21 Entering your Login Details

At the top part of the Config page you have to enter your login details. This is the same email/password combination as used for your login at www.ing-golze.de.

Please note: In the past a "Deutsche Wetterdienst login" was required. This is no longer the case.

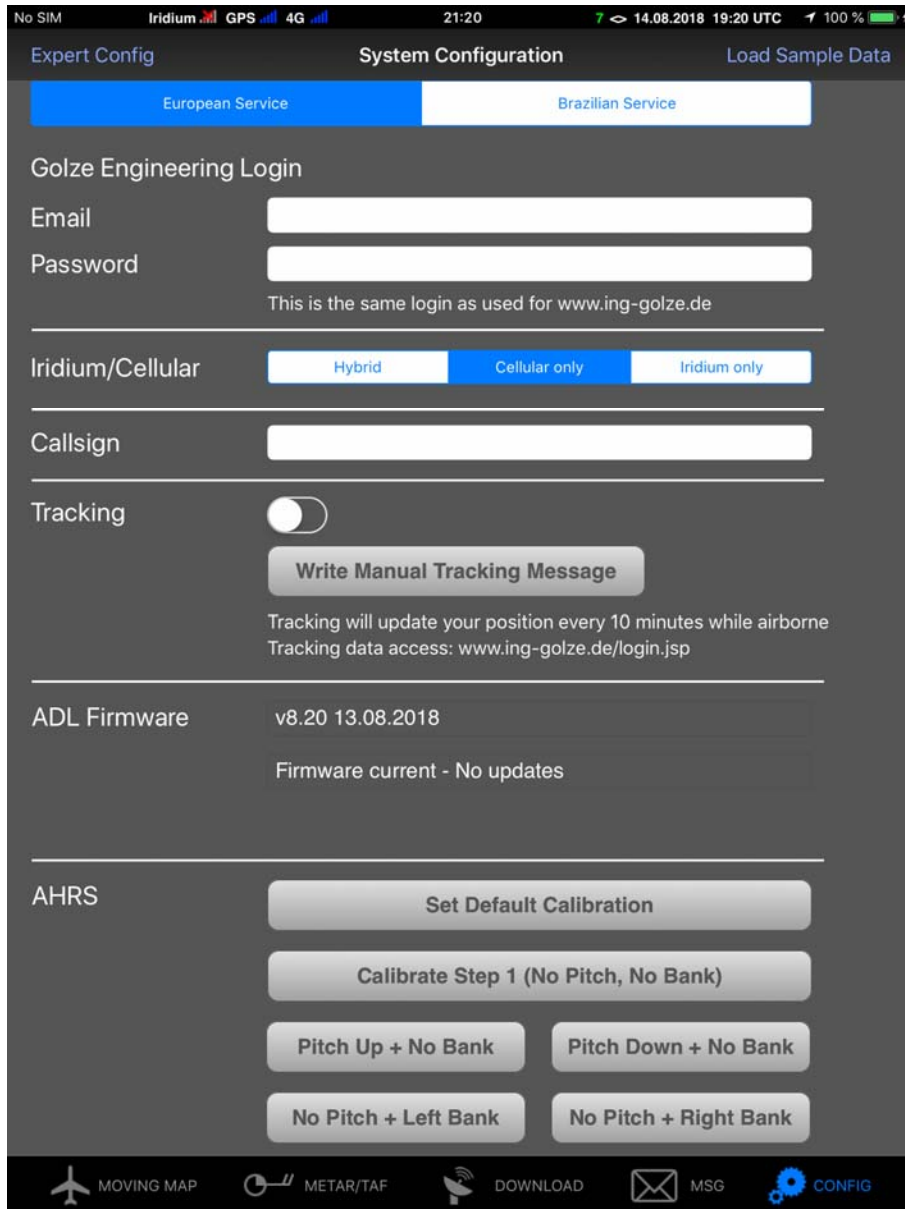


Figure 13 Entering the login details on the Config page of the iPad app

22 Configuration Options

In addition to the login details the config page allows you to make several configuration changes:

First you can select between European and Brazilian server depending on which part of the world you fly in.

Then you can select between Hybrid, Cellular Only and Iridium Only mode. This allows you to control which means of communication the ADL200 is using for weather downloads. Under normal conditions we recommend to leave this setting on Hybrid.

The callsign field allows you to enter the callsign of your own aircraft. If the aircraft is transmitting 1090 MHz ADS-B out this signal will then be removed from the traffic reports in order to avoid false alerts and the transmitted baro altitude will be used instead of GPS altitude.

The tracking slider allows activating and deactivating the 10 minute tracking feature. There are no costs involved for you as the end user so we recommend leaving the tracking on at all times. It improves the general satellite reception because the device communicates with the satellite more often.

The firmware control allows updating the ADL200 firmware. The ADL200 does not have any external USB port. Firmware updates are loaded only by WiFi.

Finally the AHRS buttons allow calibrating the AHRS. Please refer to the AHRS section for more details.

23 Your first weather download

Go to the Download page. Select Radar / Infrared / Strikes / Minima: Download and Wind / Temps: Download. Select an appropriate flight level range for the wind data. Finally select one or more ICAO codes for which you would like to download the METAR and or TAF. Then press "Single ADL Download" and the download will start. A satellite download will take an average of 2 minutes but this can vary a lot depending antenna and satellite position etc.

Please note that Iridium satellites move very fast over the sky. Thus, the reception will vary all the time and a bad or good connection at a single moment does not say much about the general quality of the reception.

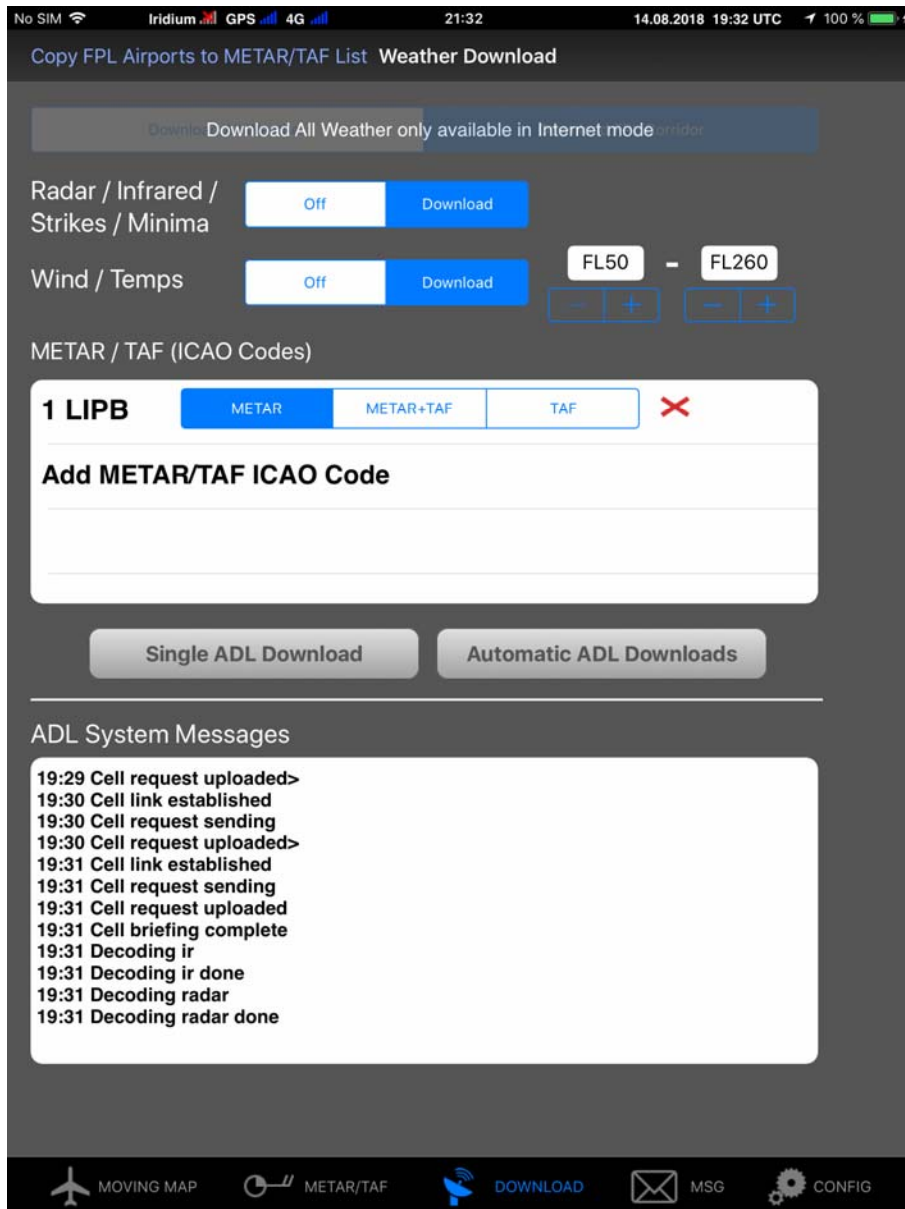


Figure 14 Download Page

Finally you can see the weather information on the moving map page. Please note that the weather information is downloaded as a corridor along the flight plan you did enter. Therefore enter at least the destination of your flight in the flight plan table right to the moving map to get the weather for your whole flight path.

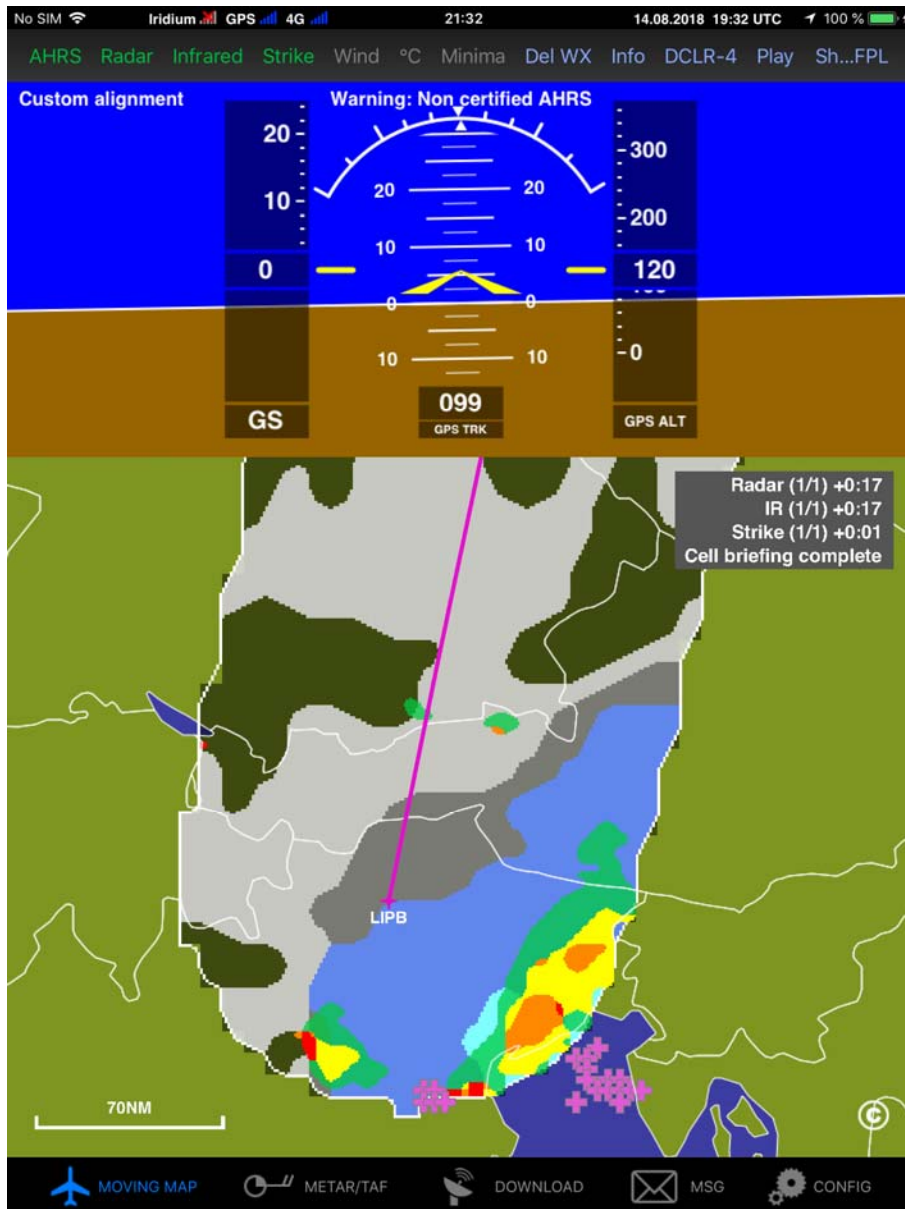


Figure 15 Latest weather information shown on the moving map page

For a more detailed description please consult our tutorial video showing how to use the ADLConnect which is available from the website <http://www.ing-golze.de>

24 ADS-B

Any ADS-B target detected will show up on the ADLConnect moving map. Below is a sample. If you zoom out some of the details will be hidden.



Please note if the own aircraft is broadcasting ADS-B and the proper callsign for the own ship has been set on the config page, the relative altitude will be calculated based on the reported baro altitude. If this data is not available GPS altitude will be used which can be several hundred feet off depending on atmospheric conditions.

25 AHRS

Please remember to never use the ADL200 AHRS for any IFR/IMC flying! The ADL200 AHRS will have to be calibrated after it has been installed or if its location in the aircraft changed. This is two step processes. This calibration is done in flight as the aircraft attitude on the ground will be different than in flight depending on strut inflation etc. **WATCH OUT FOR OTHER TRAFFIC AND KEEP THE AIRCRAFT UNDER CONTROL AT ALL TIMES WHILE DOING THE CALIBRATION. IF POSSIBLE TAKE ALONG A CO PILOT!**

Step 1: First fly straight and level. For good results the air has to be smooth. If the flight is too bumpy calibration results will be poor. If available use the autopilot to keep the aircraft straight. Try to use a normal power setting which results in a typical pitch attitude. Then press the "Calibrate Step 1 (No Pitch, No Bank)" button on the Config page of the ADLConnect app.

Now the AHRS on the Moving Map page should show a no pitch no roll situation. If it does not, try this calibration step again.

Step 2: You have to teach the ADL200 in which direction it was installed. If the connectors face exactly backwards this step might not be required as this is the default orientation. In all other cases you have to pitch or bank the aircraft precisely and then press one of the four buttons appropriate to your situation. This will teach the ADL200 its orientation. You can repeat this step without repeating step 1. But if you go back to step 1 all data for the orientation is lost and you will have to repeat also step 2. The more angle you have the better the ADL200 can sense its orientation. Therefore in most cases a precise bank is better for calibration than a pitch as high pitch angles

might be difficult to produce and might be dangerous. **REMEMBER ALWAYS TO KEEP THE AIRCRAFT UNDER CONTROL WHILE DOING THIS CALIBRATION AND TO WATCH OUT FOR OTHER TRAFFIC!** If available again try to use the autopilot and command a level turn to get a bank with no pitch attitude.

Finally if both steps are done correctly the AHRS on the moving map should show the correct pitch and bank while doing mild maneuvers.

We appreciate any reports an AHRS performance. In general the AHRS will perform best in smooth air and might come to its limits in extremely bumpy air. The electronic gyroscopes will always experience some drift error and the ADL200 will correct those small errors when the aircraft is flying level. If the aircraft is never flying close to level at all over a longer period, the gyro errors could accumulate resulting in false indications.

26 ADL200 Technical Data

- WiFi Interface for iPad/iPhone interconnect
- External Iridium antenna required
- No battery, external power supply (7-36V, 5W) required
- Dimensions: 110 x 53 x 26mm (with latches)
- Dimensions: 84 x 55 x 26mm (without latches)
- Mass: 135g

27 ADL200 Label


Below is a copy of the label printed on the top of every ADL200 device for reference

Power


ADL200 - Traffic and data link receiver

1 Pin assignment

- Pin 1: VCC 7V – 36V DC
- Pin 2: RS232 IN
- Pin 3: GND
- Pin 4: RS232 OUT



Looking at ADL200



Golze Engineering
In flight data link weather

4G

2 Usage

- Install the ADLConnet iPad/iPhone app
- Connect the power supply and verify green LED is on
- Make sure antennas are connected. Remember the square antenna is the Iridium antenna
- Connect your iPad/iPhone with the WiFi "ADL Connect"
- Open the ADLConnect app to control the ADL200
- Satellite subscription required for weather downloads


Iridium

3 Limitations

- Never use as a primary means of navigation, attitude information, traffic or weather avoidance!
- Operating temperature range -20°C to 60°C

ADS-B

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Made in Germany

Figure 17 ADL200 Label

28 Contact

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