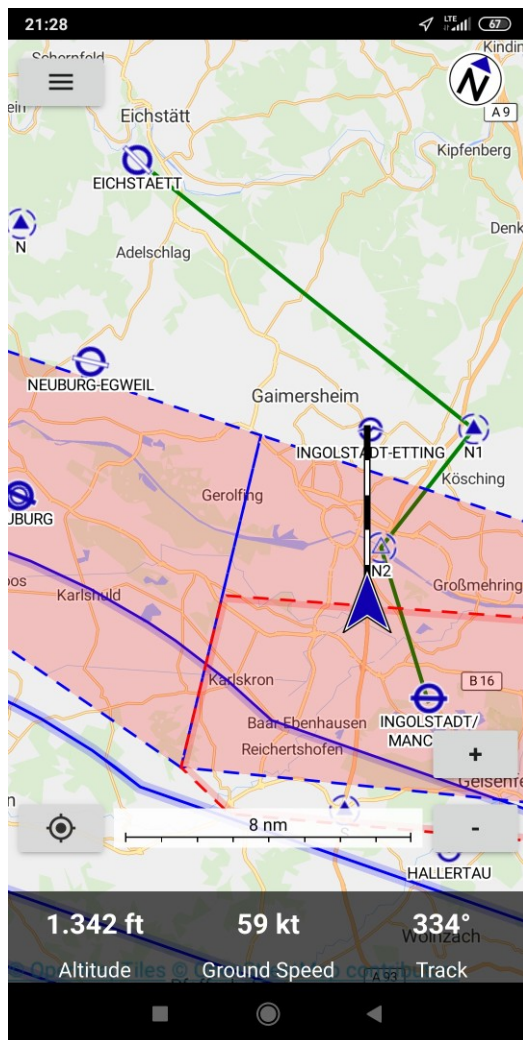# Enroute Flight Navigation Version 1.7.0. User Guide

Preliminaries

Copyright

This document is Copyright © 2020 by the development team. Contributors are listed below. You may distribute it and/or modify it under the terms of either the GNU General Public License (http://www.gnu.org/licenses/gpl.html), version 3 or later.

All trademarks within this guide belong to their legitimate owners.

Contributors

Stefan Kebekus
Michael Horbaschk

Feedback

Please direct any comments or suggestions about this document to the development team via the link given in the App.

Publication date and software version

Published June 2020. Based on Enroute Flight Navigation 1.7.0.

Tabelle 1: List of Revisions

Version	Date	Description	Author
1	20.06.2020	Initial Version	MH

Contents

General Information

Definitions

The following convention for special Information are made for this Manual:

Warning

    Indicates a hazardous situation that, if not avoided, could result in severe equipment damage, death or serious injury.

Caution

    Indicates a hazardous situation that, if not avoided, could result in equipment damage, minor or moderate injury.

Note

    Indicates information considered important but not hazard related.

Tip

    Indicates information considered helpful for use of the software.

Chapter 1
Introducing Enroute Flight Navigation

What is Enroute Flight Navigation?

Enroute Flight Navigation is a free flight navigation app for Android and other devices. Designed to be simple, functional and elegant, it takes the stress out of your next flight. The program has been written by flight enthusiasts, as a project of Akaflieg Freiburg, a flight club based in Freiburg, Germany.

Enroute Flight Navigation features a moving map, similar in style to the official ICAO maps. Your current position and your flight path for the next five minutes are marked, and so is your intended flight route. A double tap on the display gives you all the information about airspaces, airfields and navaids – complete with frequencies, codes, elevations and runway information.

Our free aeronautical maps can be downloaded for offline use. In addition to airspaces, airfields and navaids, selected maps also show traffic circuits as well as flight procedures for control zones. The maps receive near-weekly updates and cover large parts of the world.

While Enroute Flight Navigation is no substitute for full-featured flight planning software, it allows you to quickly and easily compute distances, courses and headings, and gives you an estimate for flight time and fuel consumption. If the weather turns bad, the app will show you the closest airfields for landing, complete with distances, directions, runway information and frequencies.

Limitations

Warning

Always use official flight navigation data for flight preparation and navigate by officially authorized means. The use of non-certified navigation devices and software like Enroute Flight Navigation as primary source of navigation may cause accidents leading to loss of lives.

Enroute Flight Navigation is not an officially approved flight navigation tool nor do consumer electronic devices provide certified aeronautical navigation data.
The navigational data and airspace information provided by Enroute Flight Navigation is provided as is without any official validation, certification or warranty.
The use of Enroute Flight Navigation does not fulfill the requirement of REGULATION (EU) No 923/2012:
SERA.2010 Responsibilities:

(b) Pre-flight action Before beginning a flight, the pilot-in-command of an aircraft shall become familiar with all available information appropriate to the intended operation.

Enroute Flight Navigation may just be used to increase the comfort of operation, but the information given has always to be validated using an official navigation and airspace data source.
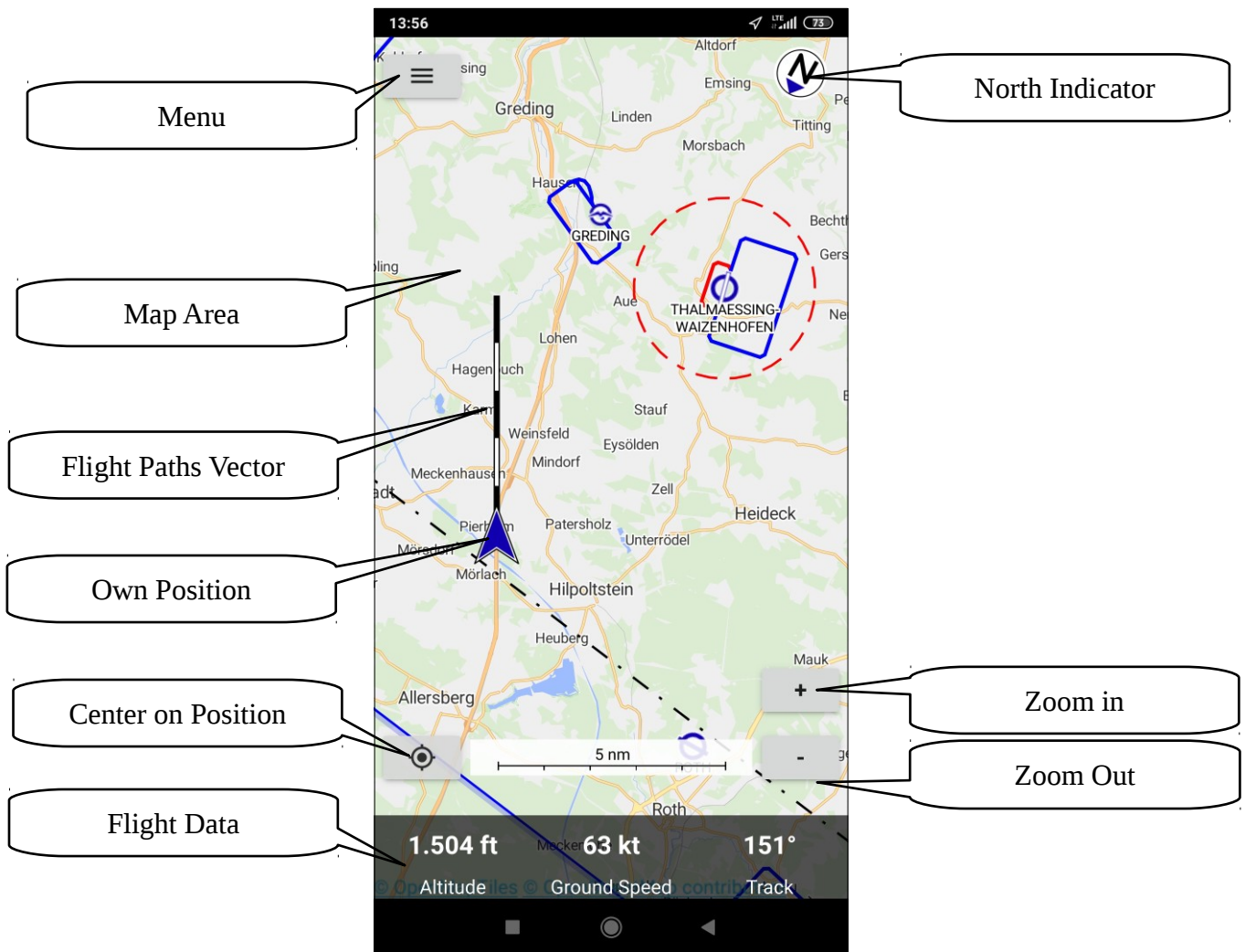
Parts of the main window

Figure 1: Main Window

When you start Enroute Flight Navigation it will automatically go to the main window.

The main Window is shown in two modes:

➢ **Ground Mode**

→ The Ground Mode is shown when the sensed speed is below the threshold

➢ **Flight Mode** Figure 1: Main Window

→ The Ground Mode is shown when the sensed speed is above the threshold

Note

The threshold to switch from Ground Mode to Flight Mode is 30 knots

The elements of the Main Window have the following function:

➢ **Menu**

→ The Menu offers a selection of additional functions

➢ **Map Area**

→ The Map Area shows the aeronautical Map information

➢ **Flight Paths Vector**

→ The flight pats vector shows the current flight Vector for the next 5 minutes

The flight paths vector calculation is based on current sensed velocity vector.

Each segment of the flight paths vector has the lengths of the distance traveled during one minute.

Note

The Flight Vector is only shown in Flight Mode

➢ **Own Position**

→ The Own Position is shown based on GPS.

The color of the own position symbol will be

- Grey when no valid GPS position is available

- Blue when a valid GPS position is available

Note

The Symbol for the own position changes between Ground Mode and Flight Mode

➢ **Center on Position**

→ Touching the Center on Position Symbol will center the Map on the own Position and turn the Map to North Up.
The Center on Position Symbol is only shown after the screen has been moved.

➢ **Note**

The screen may be moved by shifting one or more fingers on the display.

➢ **Flight Data**

→ The Flight Data line will give the following information:

- Altitude in feet

- Ground speed in knots

- Current True Track

➢ **North Indicator**

→ The North Indicator will show the True North Direction

➢ **Zoom in**

→ Touching the Zoom in will switch the scale to the next higher level of detail

➢ **Zoom out**

→ Touching the Zoom in will switch the scale to the next lower level of detail

➢ **Note**

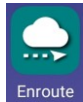The actual Zoom level is given by the scale bar next to the Zoom controls

➢ **Note**

The Zoom level may also be changed by touching the display with two fingers and increasing or decreasing the distance between the fingers.

Chapter 2
Operation of Enroute Flight Navigation

Starting Enroute Flight Navigation

To start Enroute Flight Navigation touch the Enroute Symbol on the Screen of your mobile device.

Ground Mode

On the ground Enroute Flight Navigation may be used to display the map data or pre-plan a route.
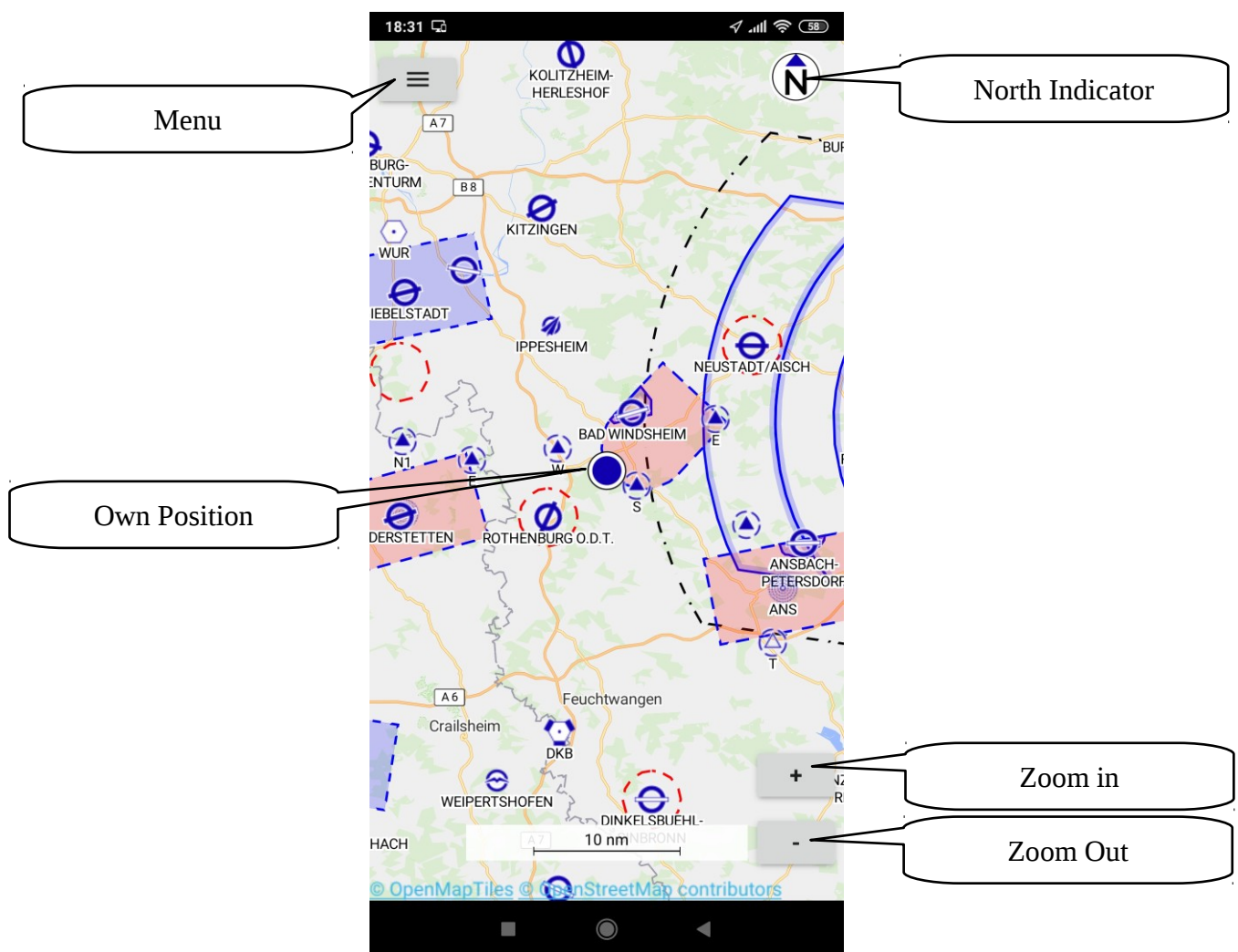

Figure 2: Ground Mode

Flight Mode

Whenever Enroute Flight Navigation senses a speed above the threshold it will automatically switch to flight mode.
For the displays given in flight mode refer to Figure 3: Fllight Mode
In flight mode the following additional items will be displayed:
➢ The own position will be changes from a dot to an arrow
➢ A segmented flight path for the next 5 minutes will be indicated
➢ A flight data line will indicate the following GPS data:
    → Altitude in feet
    → Ground Speed in knots
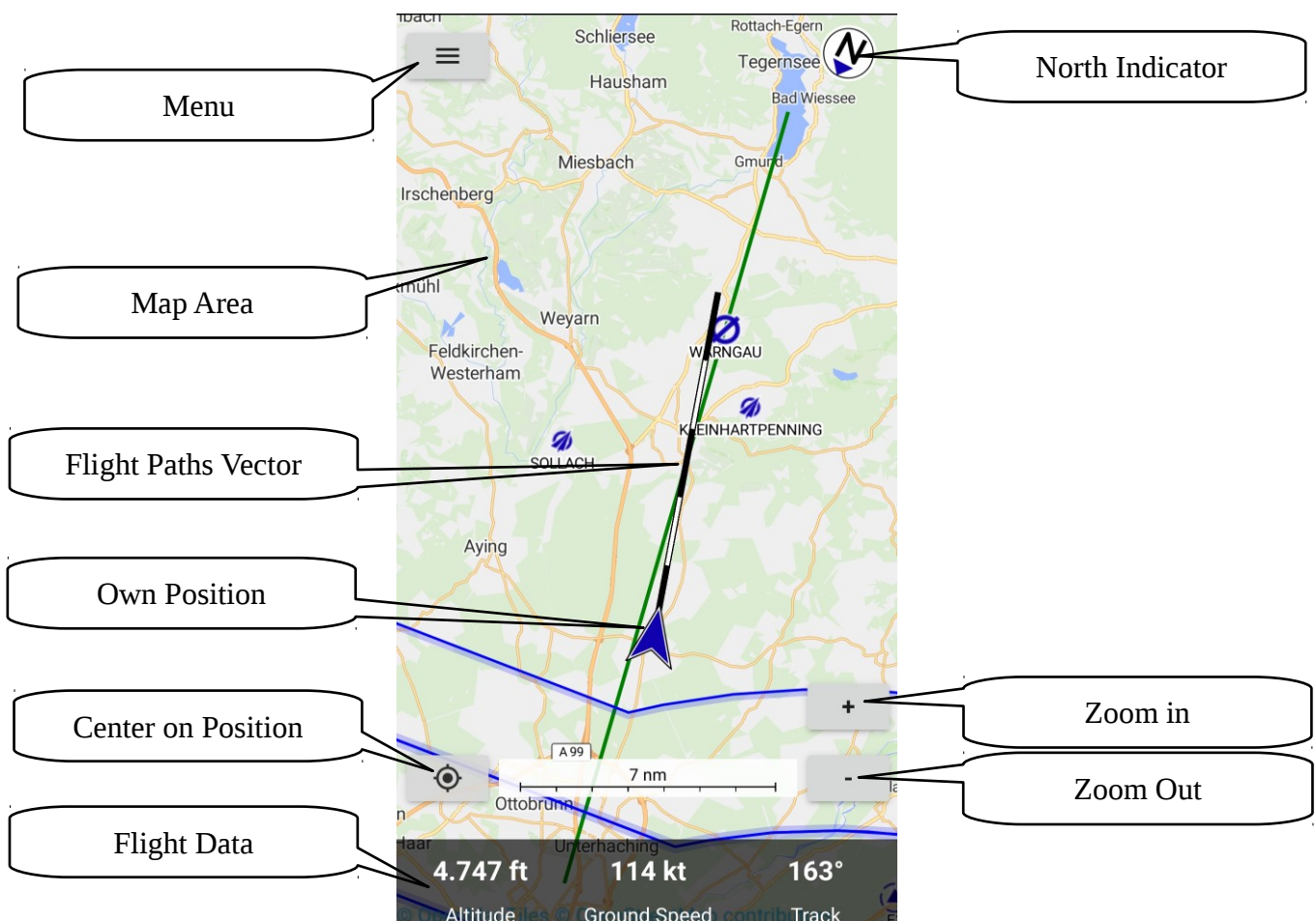   → Track in reference to true north

Figure 3: Fllight Mode

Waypoint Selection

Whenever Enroute Flight Navigation senses double clicking a point on the map display the Waypoint data is opened.

A waypoint may be any position on the map. In case any aeronautical designation is applicable to the waypoint it will be named accordingly. All way points without designation will be named "waypoint".
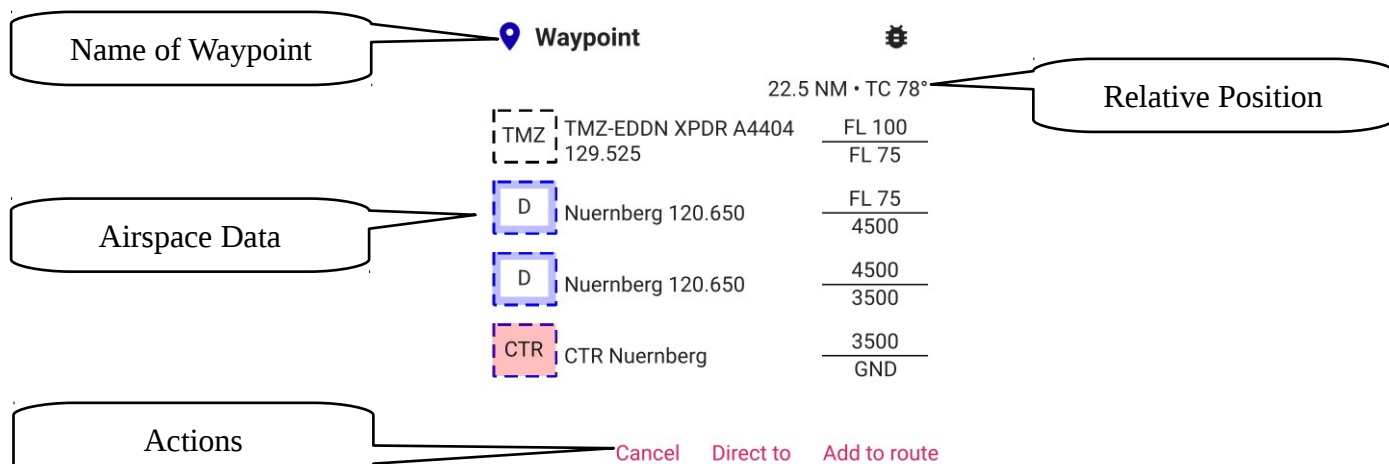
Figure 4: Waypoint

➢ **Name of Waypoint**

→ The name of the Waypoint is given if applicable. For points without any designation "Waypoint" is used

➢ **Airspace Data**

→ The airspace data for the position is listed giving:

  ◆ Airspace category

  ◆ Airspace designation

  ◆ Control Frequency and IFF Mode 3 code if applicable

  ◆ Upper and lower altitude limit

➢ **Relative Position**

→ The relative position to the selected point is indicated giving

  ◆ Distance in NM

  ◆ True Course

➢ **Actions**

→ Cancel

  ◆ Pressing cancel will close the waypoint window without any further changes.

→ Direct to

  ◆ See Direct Navigation

→ Add to Route

  ◆ See Route Planning

Airport Selection

Whenever Enroute Flight Navigation senses double clicking on the position of an airport on the map display the Airport data is opened.

Figure 5: Airport

For Airports additionally to the information given for a waypoint the following data is given.

➤ **Airport Name and Type**

→ The airport symbol gives the type of the airport and the direction of the main runway

→ The Airport Name

→ The Airport ICAO identifier is given below in the field "ID"

➤ **Airport Data**

→ ID

→ COM: Callsigns and communication frequencies

→ NAV: Navaids with type and frequency

→ RWY: Available Runways with:

  ◆ Orientation

  ◆ Dimension

  ◆ Surface type

  ◆ Magnetic Orientation

Direct Navigation

Direct Navigation is the most simple way to determine a course line and basic navigational data to a desired waypoint.

When you to have selected a waypoint on the map the lower line of the waypoint data will show the field "Direct to". By clicking "Direct to" a green line showing the paths from the actual position to the waypoint will appear on the map. The following navigation data between the current position and the waypoint is shown in the Route page:

→ Distance

→ Time calculated using the cruise speed set in the "Aircraft and Wind" page

→ True Course

→ True Heading

Route Planning

Enroute Flight Navigation provides direct planning of one Route. A Route can not be saved, however the Route will remain present until it is cleared.
Route planning is entered via the Menu point Route. The Menu is entered via the Menu Symbol in the upper left corner of the map area. Then the Route Symbol has to be touched to go to the Route area.

Figure 6: Route Symbol

A Route may be planned in the following ways:

→ "Direct to" in the waypoint window will provide a Route between current position and desired waypoint

→ "Add to Route" in the waypoint window will add the waypoint to the last position of the Route.

→ Add to Route" in the Route window will open a selection window for a waypoint and add the selected waypoint to the route.

The Route Display will show the following information:

→ Symbol of the waypoint

→ Designation of the waypoint

→ Route Point Menu

→ Navigation Data

  ◆ Distance between way points

  ◆ Time calculated between way points using the cruise speed set in the "Aircraft and Wind" page

  ◆ True Course between way points

  ◆ True Heading between way points
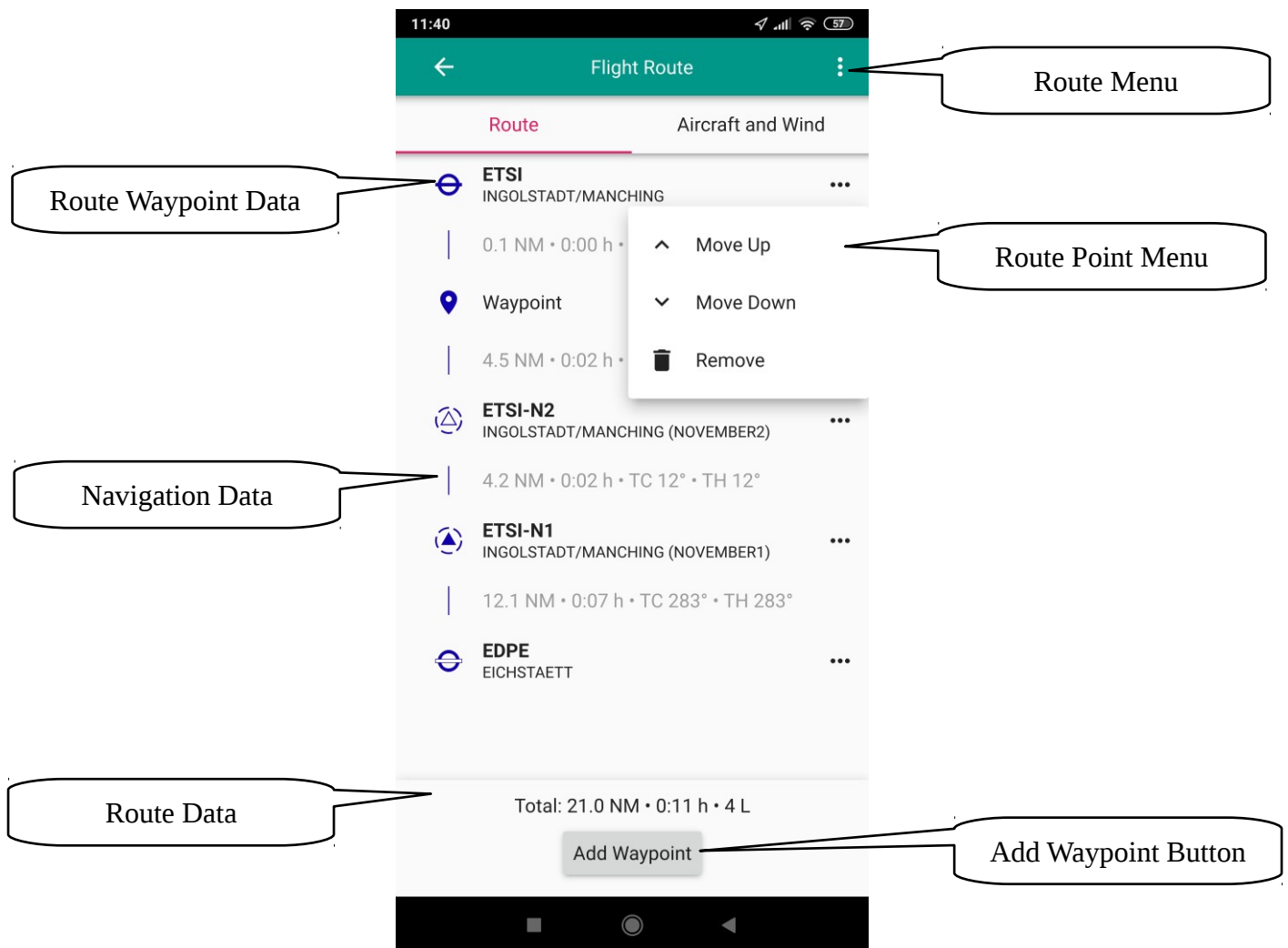
Figure 7: *Route Page*

The Route Point Menu provides the option to:

→ Move a waypoint up in the Route

→ Move a waypoint down in the Route

→ Delete a waypoint from the Route

The Route Menu is entered by touching the Route Menu Symbol on the Route page.

The following options are available from the Route Menu:

→ Open a previously stored route from the library

→ Save the current route to the library

→ View the route library

→ Send the Route in JSON or GPX format

→ Open the Route in another APP using the JSON or GPX format

→ Clear Route

→ Reverse Route

Open from library …	
Save to library …	
View Library …	
Send …	▶
Open in other app …	▶
Clear	
Reverse	

Figure 8: *Route Menu*
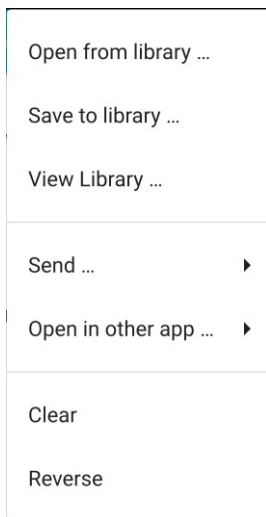
The previously created and stored routes will be kept in a data base within Enroute Flight Navigation. Routes consist of the data for the selected way points. The Route data may be exported for use in other applications.

Route – Aircraft and Wind

The Aircraft and Wind sub-page of the Route page allows to enter aircraft performance and wind data required for navigational calculations.

The Aircraft Data will be used to determine the distance of the flight and the true course.

The Wind data will will be used to calculate the true heading and duration of the flight. The duration of the flight will determine the fuel used.

Enroute Flight Navigation only offers a very superficial flight planning and cannot replace a full flight planning, but is only intended to provide quick reference.

Warning

Always perform a full flight preparation in accordance with the flight manual of the aircraft used. The use of Enroute Flight Navigation as primary flight planning may cause accidents leading to loss of lives.

The Aircraft and Wind sub-page of the Route page offers the following input fields:

→ Aircraft

  ◆ Cruise Speed: Average Speed for Route

  ◆ Descent Speed: Allows to enter a different speed for the descent phase (Currently not used)

  ◆ Fuel Consumption: Average Fuel consumption per hour

→ Wind

- ◆ Direction in degrees
- ◆ Speed in knots

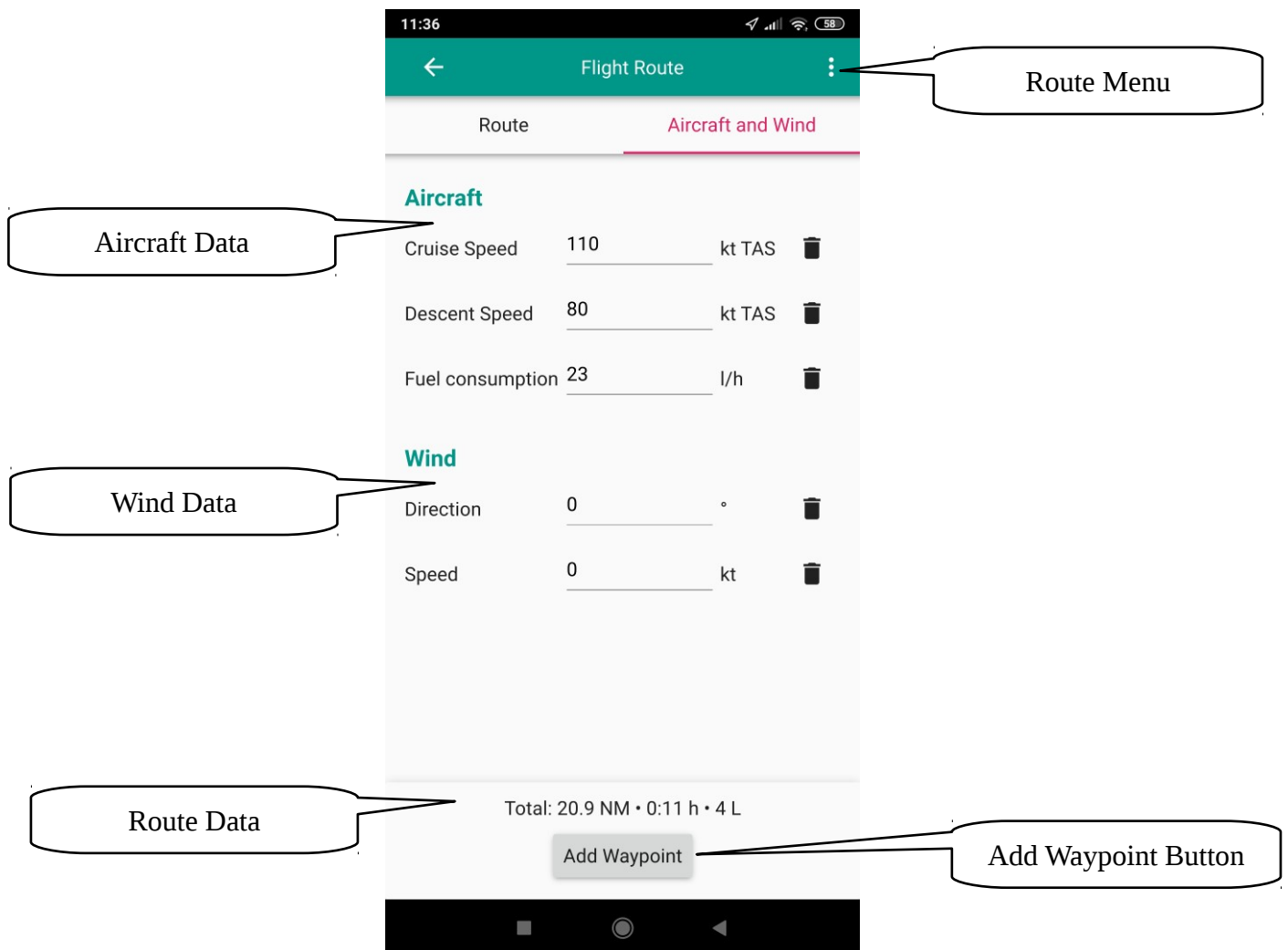Only one speed, fuel consumption and wind may be entered for the whole route.

Figure 9: *Aircraft and Wind Data*

Ending Enroute Flight Navigation

To end Enroute Flight Navigation use the Menu and touch the EXIT area.

Chapter 3
Map Display

The Map display is composed of two layers:
- Aviation Map
- Base Map

Aviation Map

The Aviation Map layers is showing the airspace data on the Map screen. If no Base Map is installed for the area only the information coming from the Aviation Map data is displayed.

Update Menu

Country not installed

Install Button

Country installed

Uninstall Button

10: *Aviation Map selection*

The Aviation Map contains:
- Airfields
- Airspace boundaries
- Navaids

The Aviation Map data is selected on the "Map Library" – "Aviation Data" page accessed via the "Settings" Menu.

To update the list of available maps the "…" option in the upper right corner of the screen may be used.

You may install or uninstall the aviation Map data for a county by the selection on the right hand side of the country list. To find a country you have to scroll up and down in the list.

The shown Map displays Figure 3: Fllight Mode show a combination of Aviation Map and Base Map.

Tip
To have optimum presentation of the Enroute Flight Navigation map display install the Aviation Map and the Base Map for all areas you intend to use Enroute Flight Navigation.

Caution
No airspace information will be provided in country when the Aviation Map is not installed for it.

Note
"Enroute Flight Navigation" will automatically check for updated Maps on the Enroute server and show a pop-up window after start if updated maps have been detected. You will be asked if you want to update the map or delay the update.

Base Map

The Base Map layers is showing the geographic data on the Map screen. If no Base Map is shown for an area it will be shown in the white background color. If no Aviation Map is installed for the area only the information coming from the Base Map data is displayed. The Base Map is organized in tiles. This will result in not stopping the Base Map display abruptly at the border of an installed country, but showing some overlap.

The Base Map will show:

• Landmass

• Water Surface (oceans, lakes and rivers)

• Forests

• Main Roads

• Railroad lines

• City names

Tip
To have optimum presentation of the Enroute Flight Navigation map display install the Aviation Map and the Base Map for all areas you intend to use Enroute Flight Navigation.

Airspace

The display of airspace will generally follow the common ICAO symbology.

Restricted Airspace

Restricted airspace will be surrounded by an intense red dashed line and a thick transparent red line inside the restricted area boundaries.

When selecting a point inside the restricted area by double touching the screen the information to the related area is given with the waypoint pop-up window:

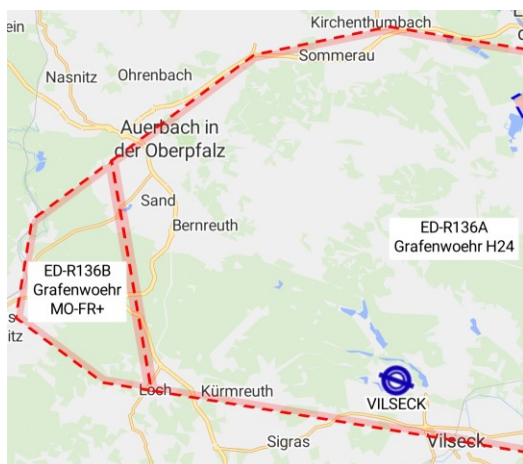- Area Name
- Area altitude limits
- Area activation time

Figure 11: *Restricted Airspace*

Controlled Airspace

All boundaries of controlled airspace are shown by a solid blue line and a thick transparent blue line inside the airspace. Figure 12: Controlled Airspace

When selecting a point inside the controlled airspace by double touching the screen the information to the related area is given with the waypoint pop-up window:

- Area Name
- Area altitude limits

Caution

All controlled airspace (Class A – Class D) are shown in the same way even if different restrictions or ATC clearance requirements may be present.

Control Zone

The Control Zone of an airport is shown with a dashed blue line filled in transparent red color.
Figure 12: Controlled Airspace

When selecting a point inside the Control Zone (CTR) by double touching the screen the information to the related area is given with the waypoint pop-up window:

- Area Name
- Area altitude limits

Figure 12: *Controlled Airspace*

Transponder Mandatory Zones

Transponder Mandatory Zones TMZ are shown with a black dashed outline.

When selecting a point inside the Transponder Mandatory Zone (TMZ) by double touching the screen the information to the related ares is given with the waypoint pop-up window:
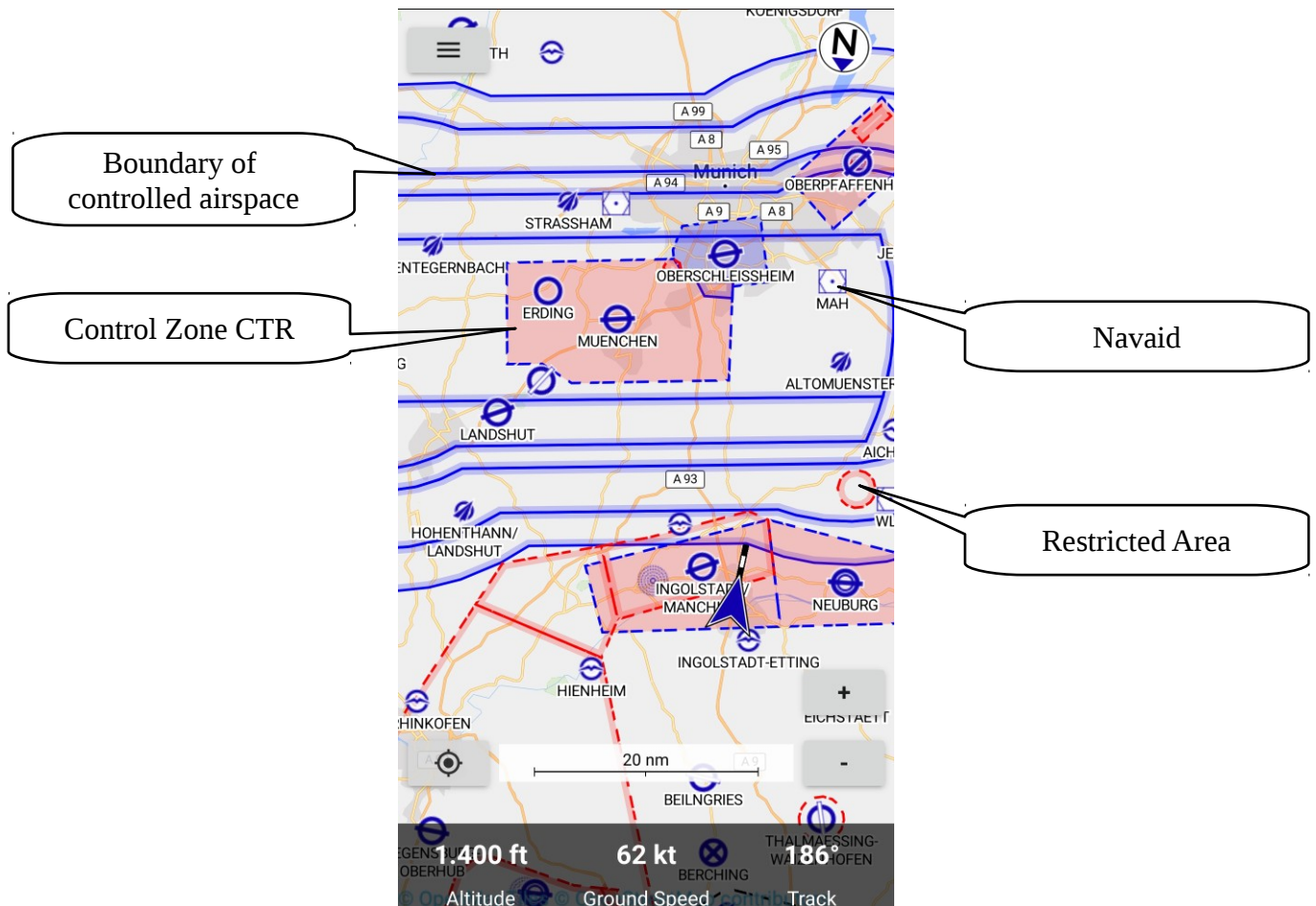
- Area Name
- Area altitude limits
- Monitoring Frequency
- Mode 3 Sqawk

Radio Mandatory Zone

Radio Mandatory Zones (RMZ) are shown with a solid blue dashed outline and filled in transparent blue.

When selecting a point inside the Radio Mandatory Zone (RMZ) by double touching the screen the information to the related area is given with the waypoint pop-up window:

- Area Name
- Area altitude limits
- Radio Frequency

Parachute Jumping Areas

Parachute Jumping Exercise areas (PJE) are shown with a solid red dashed outline.

When selecting a point inside the PJE by double touching the screen the information to the related area is given with the waypoint pop-up window:

- Area Name
- Area altitude limits
- Radio Frequency

Airfields

The symbology used to display airfields follows the ICAO rules.

Airfield Information

When selecting an airfield by double touching the screen the related information is given in a pop-up window:

- Airfield Name and Identifier
- Radio Frequency including COM and Information frequencies
- Navaid frequencies
- Runway orientation, dimensions and surface
- Field elevation
- Data for associated airspace

⊖ **ROTHENBURG O.D.T.**　　　🔧

5.1 NM · TC 232°

ID　EDFR
COM　INFO 128.360 MHz
RWY　03/21, 950×20m, ASPH, 025°
ELEV　1309 ft AMSL

┌─ ─ ─┐
╎ PJE ╎　PARA Rothenburg odT　　　FL 100
└─ ─ ─┘　EDFR 128.360　　　　　　GND

Cancel　　Direct to　　Add to route

Figure 13: *Airfield data*

Approach Routes

Approach routes to airfields are shown as solid blue lines. The designation of the route is written along the paths. The associated reporting points are shown as blue triangles with a dashed circle and the reporting point designation.

Note

Approach Routes will only be displayed when zooming into the area.

Traffic Pattern

Traffic pattern for motorized aircraft are shown as blue lines.

Traffic circuits for gliders or Ultralight aircraft are shown as red lines.

Entry and exit routes to traffic pattern are indicated by open ends of the pattern.

Note

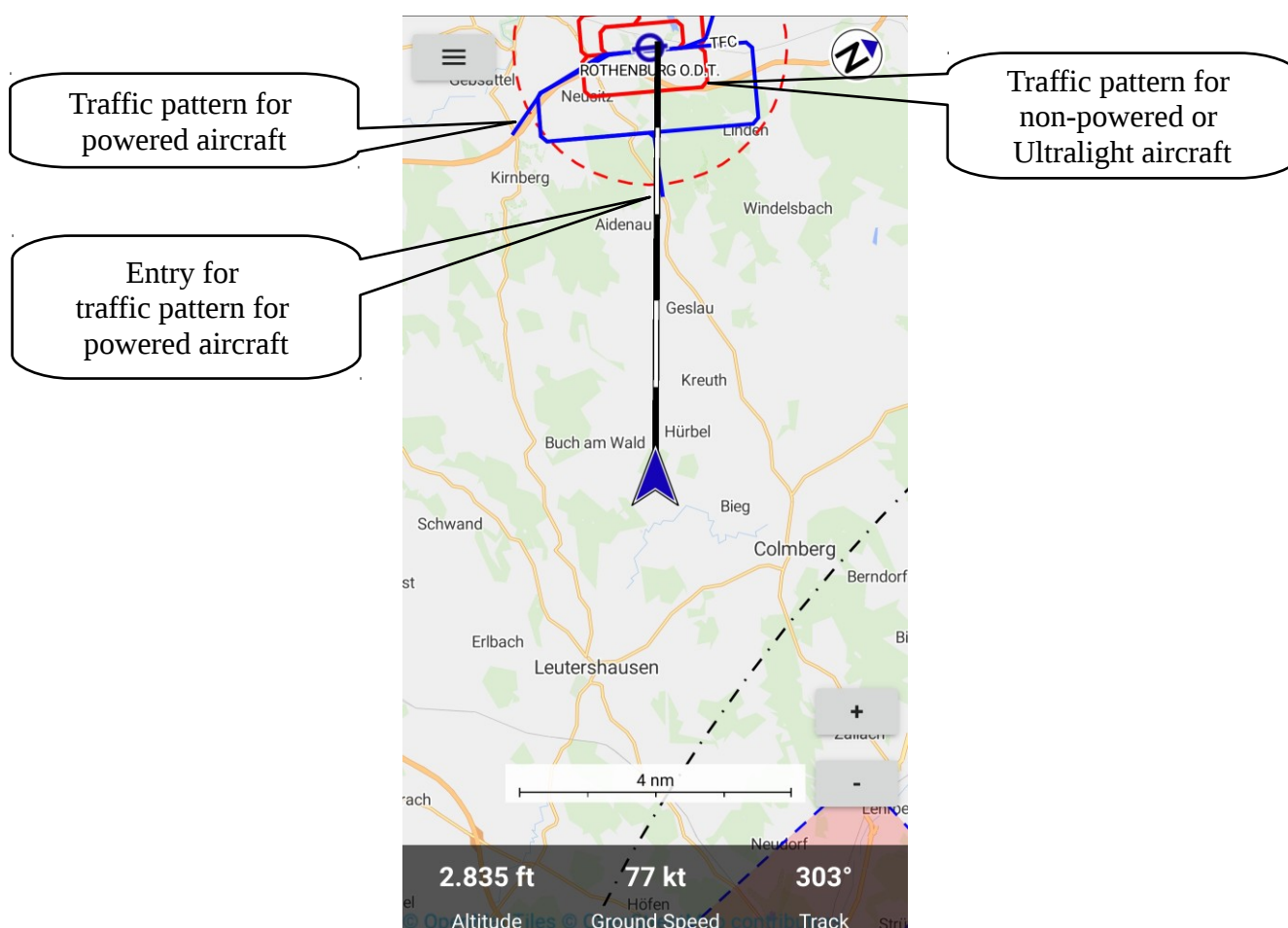Traffic pattern will only be displayed when zooming into the area.

Figure 14: *Approach to Airfield*

Chapter 4
Menu

Figure 15: *Menu Symbol*

When touching the Menu area in the left upper corner of the screen the menu will open and give the following options:

- ➔ Route
- ➔ Nearby Waypoints
- ➔ Set Altimeter
- ➔ Settings
- ➔ Information
    - ➔ About Enroute Flight Navigation
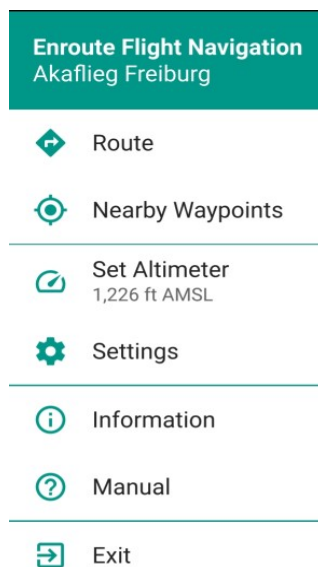   - ➔ Bug report
    - ➔ Participate
- ➔ Manual
- ➔ Exit

Figure 16: *Menu*

Route

The Route planning functions are described in the section Route Planning in Chapter 2 Operation of Enroute Flight Navigation.

Routes may be planned and stored on the device, opened afterwards and also exported and re-imported.
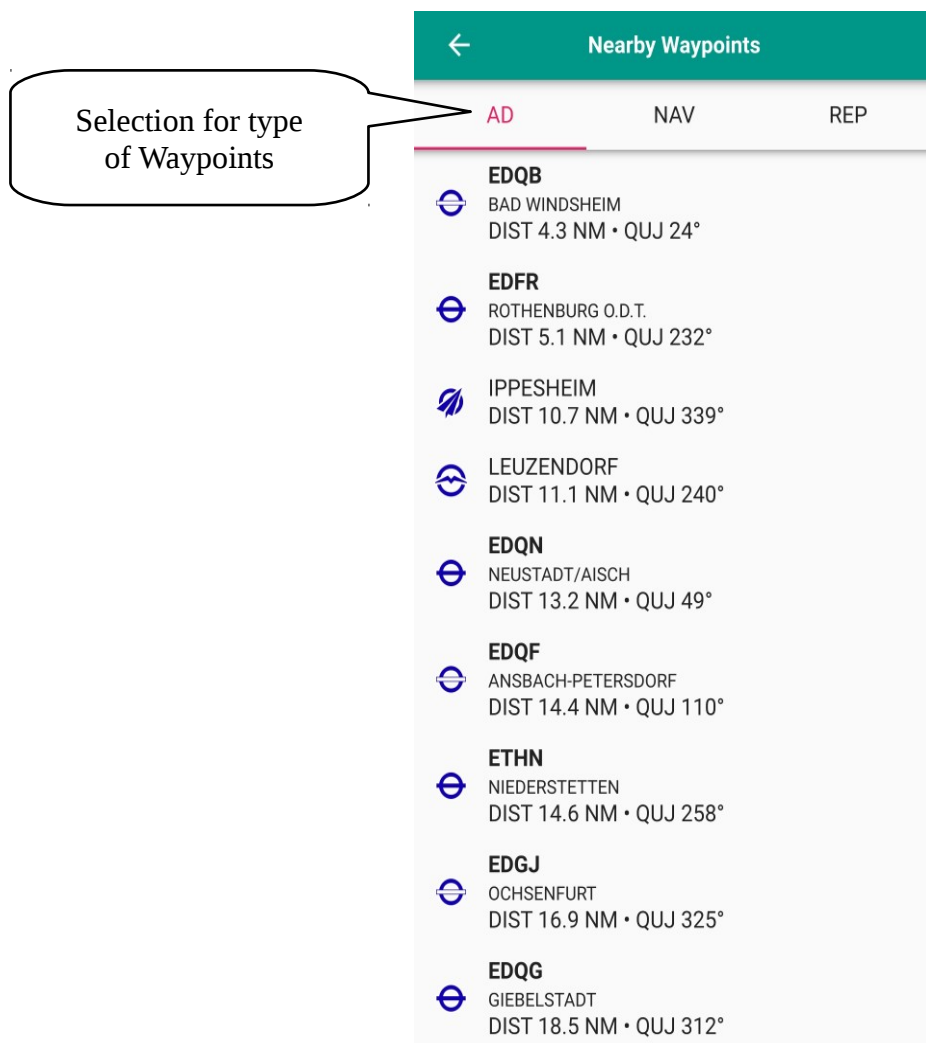
Nearby Waypoints

Selection for type of Waypoints

Figure 17: *Nearby Airfields*

The Nearby Waypoints window is available to show information about

➔ **AD:** Nearby Airfields

➔ **NAV:** Nearby Navaids

➔ **REP:** Nearby Reporting Points

The nearby airfields option will display a list of the nearest 20 airfields with the following information:

➔ *Airfield category by the standard ICAO symbol*
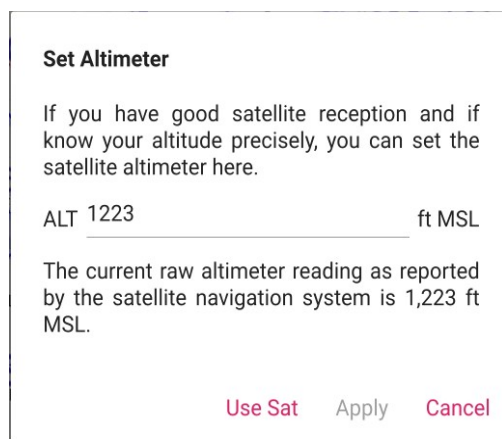
➔ *Airfield Identifier and name*

➔ *Distance and true bearing (QUJ) to the airfield*

Touching the line of an airfield will open the waypoint menu for the airfield Figure 5: Airport and allow to add it to the route or start direct navigation to the airfield. The airfield waypoint page will also give the available airfield information.(see Figure 5: Airport)

Set Altimeter

The Set Altimeter function allows to enter a corrected present altitude. The indicated altitude is derived from GPS. If you enter a corrected altitude and touch "Apply" based on a known location like the field elevation of an airport the difference will be used as an offset for indicated altitude.

Touching the "Use Sat" area will make Enroute Flight Navigation use the GPS altitude as reference again.

Set Altimeter

If you have good satellite reception and if know your altitude precisely, you can set the satellite altimeter here.

ALT 1223   ft MSL

The current raw altimeter reading as reported by the satellite navigation system is 1,223 ft MSL.

Use Sat   Apply   Cancel

Figure 18: *Set Altimeter*

Note

When touching the area indicating the altitude in flight mode the Set Altimeter window will also pop-up.

Settings

The settings Menu will allow to customize Enroute Flight Navigation and give access to program status.

The settings Menu gives the following options:

➔ "Hide Airspace above FL 100" will make Enroute Flight Navigation not show airspace above FL100

➔ **Note**

If you do not select "Hide Airspace above FL 100" the FIS frequencies for the Airspace C above FL100 will be displayed. In most cases this frequency is the same as the INFORMATION frequency applicable below FL100.

➔ "Flight Routes" will show a window with the previously stored routes

➔ "Maps" will show a window with the available and previously installed Aviation and Base Maps

➔ "Sat Nav Status" will open a sub-window showing the GPS data currently received

About Enroute Flight Navigation

Selecting "About Enroute Flight Navigation" will open a window showing information about the App, the Author and License Information.

Bug Report

The "Bug Report" selection will open a Window to transmit bug reports to the Authoring Team via:

➔ GitHub issue Tracker

➔ Email

Participate

The "Participate" selection opens a window showing information for people who want to contribute to the development of Enroute Flight Navigation.

Tip
Enroute Flight Navigation is a non-commercial project created and maintained by volunteers. If you have related skills in C++/Qt programming or other related skills and would like to contribute contact the Author.

Exit

The "Exit" selection will end the program.

Note
The "Enroute Flight Navigation" task may remain in the Android task list and has to be ended separately for complete removal from memory. This is a common property of all Android Apps.