



# RXP GTN 650/750 TOUCH

## User's Manual For X-Plane

### Tap Into The Future Of Avionics!

With GTN 650/750's revolutionary touchscreen interface, you're rarely more than 2 taps away from all of the system's primary functions! The intuitive touchscreen controls and large display give you unprecedented access to high-resolution terrain mapping, graphical flight planning, geo-referenced charting, advanced navigation and more.

### About This Manual

This manual guides you through the product features and is intended for flight simulation purposes only. It shall not be used for any real world aviation application or reference. By reading this manual, you should become well acquainted with the product, and should be able to obtain the information necessary to use the product in your simulator.

We thank you for having chosen a Reality XP Product and wish you a pleasant and a safe virtual flight with us.

**Product disclaimer: this software is designed for entertainment only.** Although we have designed the product to resemble and function like the original, it is not designed as a training device. Not all systems have been simulated, and some of those that have been simulated may not be entirely functional.

**NOT FOR USE IN REAL FLIGHT OR AIRCRAFT OPERATION.**

<b>INTRODUCTION</b>	<b>3</b>
System Requirements	3
<b>GETTING STARTED</b>	<b>4</b>
Garmin Reference Guides	4
Plugins Menu	4
Configuration Panel	5
Using The Mouse	5
Resizing The Gauge Window	5
<b>PLUGIN DETAILS</b>	<b>6</b>
Radios	6
Integral Lighting	6
Taws-A	6
Traffic Collision Alerting Device	6
X-Plane Gps Commands	7
Failures Annunciation	7
Pilotedge Integration	8
Keyboard Shortcuts	8
Other Cool Features	8
Flight Plans And User Waypoints	9
Checklists	10
<b>CONFIGURATION</b>	<b>11</b>
Aircraft Configuration	11
Advanced Settings	12
Custom Commands	12
Custom Datarefs	13
Configuring Alternate Paths	13
Configuring Aviation Database File	14
Installing Multiple Garmin Trainers	14
Third Party Vendor Settings	15
<b>TROUBLESHOOTING</b>	<b>15</b>

## Introduction

The Reality XP GTN 650 and GTN 750 Touch gauges is a faithful reproduction that pilots and flight simulator users can use it as a training tool to familiarize themselves with the workings of the actual equipment. Each button and knob is fully functional and performs identically to its real-world counterpart.

Graphical flight planning capabilities allow you to preview your entire route on the map screen and easily enter new waypoints or modify existing ones. A handy "rubber band" feature lets you grab any leg of your flight plan route and move it to accommodate a deviation to your flight plan.

With the GTN, you can set your standby Com frequency simply by touching the onscreen number pad. Another touch of the screen flip-flops your active and standby frequencies. Recent and favourite user frequencies also are a breeze to access. The GTN also automatically decodes a station's Morse code to provide a positive identification – no aural decoding required.

The GTN can control the simulator audio panel (GTN 750 only) as well as the transponder, with working IDENT and REPLY annunciations. This setup could save you up to 3-inch of panel space versus a typical GNS 430/530 install. In addition, precise course deviation and roll steering outputs can be coupled to the simulator autopilot so that IFR flight procedures may be flown automatically. This includes all ARINC 424 leg types, including NextGen radius-to-fix (RF) legs.

## System Requirements

The Reality XP GTN 650/750 Touch requires Laminar Research X-Plane 11, 10 or 9 for Windows<sup>1</sup>.

During installation you will be prompted to download and install the Garmin GTN/GDU Trainer<sup>2</sup>. The first time you install this package, or should you need to repair the Garmin Trainer installation, the installer will save a copy of the trainer installer to: "C:\ProgramData\Reality XP\Common\GtnTrainer"



---

<sup>1</sup> X-Plane minimum versions required: 11.x (64bits), 10.5(64/32bits), 9.42(32bits) ; Windows versions required: Vista to Win10

<sup>2</sup> Compatible trainer versions: v6.21, 6.1.1. 6.1

## Getting Started

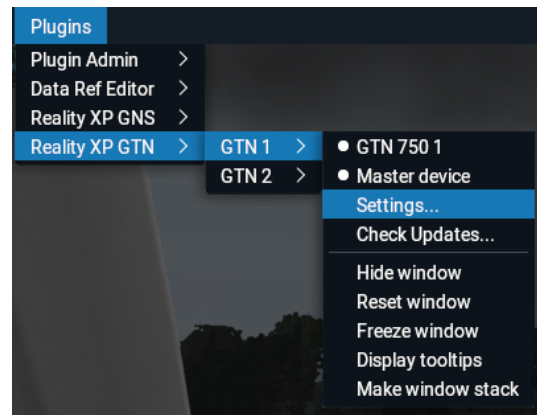
### Garmin Reference Guides

In addition to this user's manual which guide you through the functions within the simulator, we recommend referring to the original Garmin GTN series pilots and cockpit reference guide that is installed in its own Garmin program group. Please take the time to read all manuals completely so that you can become properly acquainted with the product and its operation.

### Plugins Menu

The GTN 750/650 plug-in loads automatically and is operated using the X-Plane Plugins menu.

Select the menu **Plugins | Reality XP GTN** to add or remove a GTN unit to your aircraft. Once a device is active, additional options appear in the menu:



Master Device	the Master Device has autopilot and navigation authority.
Settings...	open the configuration panel.
Check Updates...	check whether there is a new version released.
Show Window	show or hide the gauge window.
Reset Window	reset default gauge size.
Freeze Window	locks window dimensions.
Display tooltips	show or hide mouse tooltips.
Make window stack	make this window the top of the stack, the other adjusts below.

### Configuration Panel

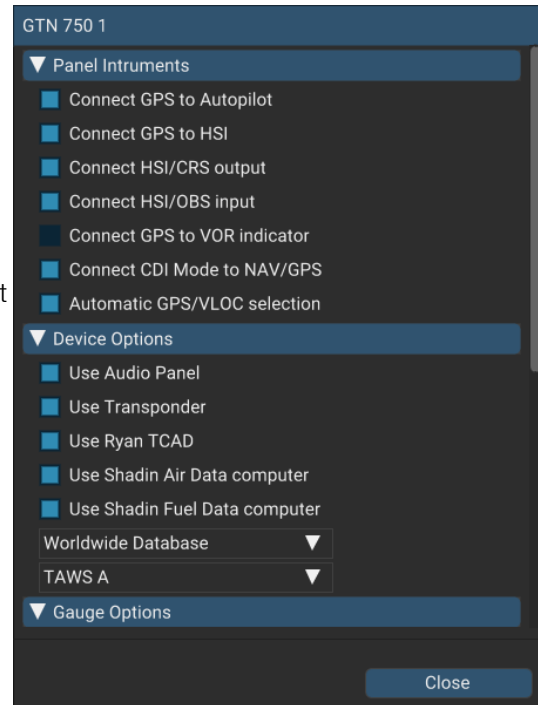
The GTN can be tailored to suit your needs by configuring the way each device looks and behaves. Most of each device configuration options are available from the configuration panel.

Select the menu **Plugins | Reality XP GTN | GTN # | Settings...** to open the configuration panel.

Options are set up for an individual aircraft and then saved to the "RealityXP.GTN.ini" file in the aircraft folder. When loading the aircraft the plug-in restores the last known settings, including window size and position.

Whenever the configuration changes, the last row changes to display 'Cancel' and 'Accept' buttons.

When changed settings require rebooting the device, a warning 'reboot' tag displays next to each one and the confirmation button changes to 'Accept and Reboot'.



### Using The Mouse

This gauge implements a relatively unique implementation of click spots. They work as follows:

- As the mouse cursor passes over a click spot it changes from an arrow cursor to a "hand" cursor.
- Whenever a single click spot is used, a left click will accomplish the task.
- Left clicks turn knobs to the counter-clockwise direction when the mouse is in an area to the left of the knob and to the clockwise direction when the mouse is in an area to the right of the knob.
- Mouse wheel turns knobs in either direction regardless if the mouse is to the left or to the right.
- Touchscreen actions are carried naturally with single clicks or click-and-drag. Mouse wheel simulates pinch-in and pinch-out actions.

### Resizing The Gauge Window

The simulation window maintains its aspect ratio when resizing. While the mouse cursor is grabbing any of its edges or corners, **press and hold the SHIFT key** to relax the aspect ratio constraint while resizing.

## Plugin Details

The simulation comes in the form of a plug-in installed in the "XPlane\Resources\Plugin\rxpGTN" folder<sup>3</sup>. There is only one plug-in for both the GTN 750 and the GTN 650 simulation<sup>4</sup>.

The GTN is capable of precise course deviation and roll steering outputs that can be coupled to the simulator autopilot so that IFR flight procedures may be flown automatically. In addition to GPS integration to the panel system, the GTN offers some additional features described below.

### Radios

The GTN 750 and the GTN 650 can control the simulator COM and NAV audio panel volumes using the single Volume knob (XP10+ only).

### Integral Lighting

The plug-in integrates with the X-Plane panel system and provides adjustable integral lighting through the default X-Plane integral lighting rheostats.

Using the configuration panel, select whether you prefer constant or adjustable brightness. The later offers a choice among the first 4 available X-Plane standard rheostats.

### TAWS-A

The GTN offers TAWS-A, TAWS-B, HTAWS and TERR Proximity modes. Proper integration and use in TAWS-A mode require advanced settings. When configured to operate in TAWS-A mode, the GTN gauge automatically detects best Vref, Vfe and Vle for the aircraft. The GTN also connects to the flaps and the gear in order to adjust its detection sensitivity and operating limits depending on the phase of flight.

### Traffic Collision Alerting Device

The GTN includes a faithful simulation of the Ryan 9900BX TCAD (Traffic Collision Alerting Device). Internally powered by a complete TCAS II Mark 7 simulation passing the 250 TSIM tests, it comes integrated to the RXP GTN 750 Touch and the RXP GTN 650 Touch. Take full control of the TCAD detection shields, view nearby traffic and take actions upon visual and aural TA advisories directly on the GTN touchscreen. The TCAD simulation takes its data source from the standard X-Plane multiplayer datarefs.

---

<sup>3</sup> X-Plane 9: "Resources\Plugin\rxpGTN.xpl"

<sup>4</sup> Although a single plug-in file installs, it requires purchasing and installing both products to unlock both GTN models.

### X-Plane GPS commands

The GTN can be configured to intercept all of the default X-Plane GPS commands. When the option is enabled in the configuration panel, the X-Plane GPS bezel buttons and knobs control the GTN like this:

- The COM knobs control the GTN FMS knobs (lower right).
- The GPS inner knob controls the GTN Volume knob (upper left).
- The DTO key controls the GTN DTO key.
- The MENU key controls the GTN HOME key.
- All other GPS keys are disabled.

### Failures Annunciation

If data fields become invalid, the GTN typically annunciates the failures with a large red X, as shown.

When enabled in the configuration panel, the GNS plugin uses the following datarefs<sup>5</sup> as failures sources:

sim/operation/failures/rel_gps sim/operation/failures/rel_g430_gps1	Satellite reception failure, displays "No GPS Position"
sim/operation/failures/rel_gp	Differential GPS failure, reduces location accuracy. Satellite reception mode switches to 3D instead of 3D-Diff.
sim/operation/failures/rel_com1	COM radios failure only.
sim/operation/failures/rel_nav1	NAV radios failure only.
sim/operation/failures/rel_navcom1	Both COM and NAV radios failure.
sim/operation/failures/rel_xpndr	Transponder failure.
sim/operation/failures/rel_marker	Audio Panel failure.



<sup>5</sup> Pilot side datarefs appear in the table, equivalent copilot datarefs are also supported with the GNS configured to copilot side.

### Pilotedge Integration

Real flying takes place in a dynamic environment populated by other human beings. In a real airplane there's no Pause key, and the pilots and air traffic controllers you interact with on the radio are real people. Enter PilotEdge. Connecting your flight simulation software to PilotEdge<sup>6</sup> instantly creates the same mental environment you find yourself in when you fly a real airplane.

When using the Pilotedge plugin online, the GTN COM box automatically annunciates the **RX flag** when receiving audio and the **TX flag** when transmitting audio

### Keyboard Shortcuts

To change hotkeys, use the X-Plane Plugin Admin Menu. These are saved in a "RealityXP.GTN.ini" file located in the X-Plane preference folders.

### Other Cool Features

The GTN offers some nice additional features such as setting the touchscreen 'click' sound volume or adjusting the screen backlight level directly on the unit. Please refer to the 'Garmin GTN Cockpit Reference Guide'.



---

<sup>6</sup> <https://www.pilotedge.net>



### Flight Plans And User Waypoints

Flight plans can be created on a computer using compatible flight planning software and saved to a virtual datacard folder to be imported into the GTN. The imported flight plans can then be previewed, used directly or stored to the GTN flight plan catalog. This chapter describes how to enable and use this feature<sup>7</sup>.

#### Preparing the virtual datacard

The first step is to create a virtual datacard folder where to store the flight plans and the user waypoints. This folder must be named **FPLN** and be located in the GTN Trainer Data folder, typically<sup>8</sup>:

```
"C:\ProgramData\Garmin\GTN Trainer Data\GTN\FPLN"
```

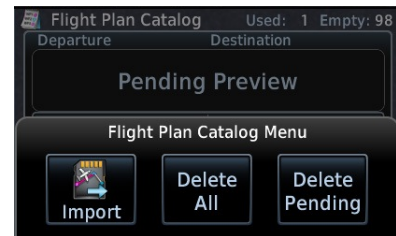
The second step is to create one or more flight plan files with the ".gfp" file extension and one "user.wpt" file. The product comes with a starter pack installed into the following folder:

```
"C:\ProgramData\Reality XP\Common\GtnTrainer\flightplans.zip"
```

#### Importing flight plans

The last step is to import the flight plans and the user waypoints into the GTN device. To proceed with the starter pack, unzip the "flightplans.zip" archive file to extract the "KSLE\_KSLE.gfp" flight plan and the "user.wpt" sample files, then copy the two files to the "FPLN" folder.

On the GTN device, while viewing the Flight Plan page, touch the **Menu** key and then the **Catalog** key to display the Flight Plan Catalog.



An **Import** key will be present in the menu bar when flight plans are present on the virtual datacard folder. Touch the **Import** key to open a pop-up with a list of the file names of the flight plans on the datacard, then select the desired flight plan to import.

#### Importing user waypoints

The GTN can import user generated waypoints from a file on the datacard. The created waypoints will be at the latitude and longitude specified in the file with the specified name and comment.

When a "user.wpt" user waypoint file is present in the virtual datacard FPLN folder, a key will be available on the Waypoint Info page for importing user waypoints. From the Waypoint Info page, touch the **Import Waypoints** key. Touch **OK** to acknowledge the pop-up to import all of the user waypoints in the file.

---

<sup>7</sup> See "GTN Flight Plan and User Waypoint transfer.pdf" guidelines for how to create text based flight plan files (included in the starter pack).

<sup>8</sup> The "FPLN" folder must reside in the folder equivalent to "GTNSIMDATA" (see Configuring Alternate Paths chapter for more information).

### Checklists

The Checklists function provides a built-in method of reviewing your aircraft checklist. As each Checklist is completed, you can advance to the next one in order. In the Checklist Menu, you can access any Checklist, or group of Checklists, and clear the current or all Checklists.

Checklists are created using the Garmin Checklist Editor software<sup>9</sup> and stored in the X-Plane aircraft folder as "checklist.gtn". The product comes with a sample pack installed into the following folder:

```
"C:\ProgramData\Reality XP\Common\GtnTrainer\checklists.zip"
```

To proceed with the sample pack, unzip the "checklists.zip" archive file to extract the sample ".ace" checklists files, then copy one of these to the aircraft folder and rename the file as "checklist.gtn".

On the GTN device, while viewing the Utilities page group, touch the **Checklists** key to start the Checklists function. Touch the **Menu** key to select an option from the Menu.



---

<sup>9</sup> available online: [https://www8.garmin.com/support/download\\_details.jsp?id=5075](https://www8.garmin.com/support/download_details.jsp?id=5075)

## Configuration

### Aircraft Configuration

This chapter details the general organization of the settings file. The GTN settings are automatically saved in the file **RealityXP.GTN.ini** located in the aircraft folder. Every time a GTN opens from the Reality XP GTN menu, it creates this self-documented settings file on save.

The INI file consists of sections and keys. The name of a section in the \*.ini file is always entered inside the square brackets. Each section contains several keys (the key must be always assigned to the section that begins in the file before this key). The content of one section ends by a definition of the next section. The name of a key is always on a separate line and the content is assigned by the = char. A line comment starts with the ; char.

```
[GTN]
; comma separated list of gauges
gauges = GTN_750_1, GTN_750_2

[GTN_750_1]
; comma separated list of render targets.
drawto = WINDOW, PANEL2D
; is the master device if true.
MasterDevice = true

[GTN_750_1.WINDOW]
; display window if true.
visible = true

[GTN_750_1.PANEL2D]
; display window if true.
visible = false
```

There are multiple sections in the Reality.GTN.ini file:

- The GTN section contains the gauges key with the content "GTN\_750\_1, GTN\_750\_2". These are the names of the sections for each gauge.
- The GTN\_750\_1 gauge section contains the drawto key with the content "WINDOW, PANEL2D". These are the names of the sections for each render target.
- The GTN\_750\_1.WINDOW and GTN\_750\_1.PANEL2D render target sections contain the rendering settings<sup>10</sup>.

---

<sup>10</sup> Please note you can only configure one window per gauge, but you can configure multiple panels per gauge.

### Advanced Settings

Advanced settings aren't visible in the configuration panel and are only manually editable in the **RealityXP.GTN.ini** settings file in a **[GTN\_###\_#]** section. Any text editor suffice to open and edit the content.

VFRcode = #1200	sets transponder VFR code (octal default: #1200).
CpuAffinity = -1	selects the CPU running the trainer process: 1 to 32; 0: last core, -1: automatic.

### Custom Commands

This chapter describes the list of custom X-Plane commands available to control the GTN from third party plugins. The following commands control the GTN buttons and knobs. Each command comes with a "\_1" suffix for unit #1, and "\_2" suffix for unit #2.

RXP/GTN/TOGGLE_WINDOW	toggle window visibility
RXP/GTN/DTO	press button: DTO
RXP/GTN/HOME	press button: DTO
RXP/GTN/VOL_PUSH	press knob: VOL
RXP/GTN/VOL_CCW	rotate knob: VOL (counter clock-wise)
RXP/GTN/VOL_CW	rotate knob: VOL (clock-wise)
RXP/GTN/FMS_PUSH	press knob: FMS
RXP/GTN/FMS_OUTER_CCW	rotate knob: FMS (counter clock-wise)
RXP/GTN/FMS_OUTER_CW	rotate knob: FMS (counter clock-wise)
RXP/GTN/FMS_INNER_CCW	rotate knob: FMS (counter clock-wise)
RXP/GTN/FMS_INNER_CW	rotate knob: FMS (counter clock-wise)
RXP/GTN/CDI_SOURCE	toggle CDI source (discrete input)
RXP/GTN/OBS_MODE	toggle OBS mode (discrete input)
RXP/GTN/TAWS_INHIBIT	inhibit TAWS (discrete input)

In addition the plugin exports the following commands designed to work across multiple Reality XP plugins:

"RXP/GPS/MASTER_DEVICE_0	select master device: default GPS
"RXP/GPS/MASTER_DEVICE_1	select master device: Reality XP GPS 1
"RXP/GPS/MASTER_DEVICE_2	select master device: Reality XP GPS 2
RXP/GPS/MASTER_DEVICE_NEXT	select next available master device

### Custom Datarefs

This chapter describes the list of datarefs the GTN publishes to third party plugins. Please note only the "master" device updates these.

```
RXP/radios/indicators/hsi_bearing_deg_mag_pilot
RXP/radios/indicators/hsi_flag_from_to_pilot
RXP/radios/indicators/hsi_hdef_dots_pilot
RXP/radios/indicators/hsi_vdef_dots_pilot
RXP/radios/indicators/hsi_has_dme_pilot
RXP/radios/indicators/hsi_dme_distance_nm_pilot
RXP/radios/indicators/hsi_dme_speed_kts_pilot
RXP/radios/indicators/hsi_dme_time_min_pilot
RXP/radios/indicators/hsi_flag_glideslope_pilot
RXP/radios/indicators/hsi_display_horizontal_pilot
RXP/radios/indicators/hsi_display_vertical_pilot
RXP/radios/indicators/gps_course_degtm
RXP/radios/indicators/gps_cross_track_nm
RXP/radios/indicators/gps_time_min_eta
RXP/radios/indicators/gps_nav_id
RXP/radios/indicators/gps_discrete_out
```

### Configuring Alternate Paths

The Garmin trainer installation is split in various components, each one in a specific path. This chapter describes supported Windows environment variables<sup>11</sup> to configure alternate trainer paths in a typical scenario.

Set the general trainer application path, that is where the trainer is installed:

```
GTNSIMPATH="C:\Program Files (x86)\Garmin\GTN Trainer\GTN\sys\sim"
```

Set the application database path, that is where to look for all the db files (terrain, obstacle, navigation etc.):

```
GTNSIMDATA="C:\ProgramData\Garmin\GTN Trainer Data"
```

---

<sup>11</sup> how to add environment variables: <http://www.kunal-chowdhury.com/2016/09/windows-10-anniversary-update-how-to-edit-environment-variables.html>

### Configuring Aviation Database File

This chapter describes a procedure when you want or need to use another aviation database file.

Copy the aviation database file to the location of your choice on your hard drive, for example in your "My Documents" folder, with a file name "gtn\_db.bin", then add the following Windows environment variable:

```
GTNDBFILE="C:\Users\MyName\Documents\gtn_db.bin"
```

### Installing Multiple Garmin Trainers

This chapter describes a procedure when you want or need to install two different versions of the Garmin GTN Trainer on your computer. The Garmin GTN Trainer installer prevents installing two different versions, such as the latest compatible with the Reality XP GTN Touch and an older one. However, the GTN Touch plugin can be configured to use alternate trainer path and data path.

Please note the following for dual Trainer installation:

1. Install the trainer for the Reality XP GTN Touch
2. Copy the "sim" folder located in "C:\Program Files (x86)\Garmin\GTN Trainer\GTN\sys\" to the location of your choice<sup>12</sup>, or rename it for example to: "C:\Program Files (x86)\Garmin\GTN Trainer\GTN\sys\sim (6210)\"
3. Copy the "GTN Trainer Data" folder located in "C:\ProgramData\Garmin\" to another location, or just rename it to something like: "C:\ProgramData\Garmin\GTN Trainer Data (6210)\"
4. Add the following 2 environment variables in Windows:

name = "GTNSIMPATH" value = *the path to the 'sim' folder you have chosen above*  
name = "GTNSIMDATA" value = *the path to the 'data' folder you have chosen above*  
for example:

```
GTNSIMPATH="C:\Program Files (x86)\Garmin\GTN Trainer\GTN\sys\sim (6210)\"  
GTNSIMDATA="C:\ProgramData\Garmin\GTN Trainer Data (6210)\"
```

5. You can now uninstall the trainer and reinstall the old one: the GTN plugin will use the trainer and its data from the location indicated in your environment variables.

---

<sup>12</sup> Please note you only need to copy or rename this folder for the GTN plugin, but you'll need the rest for our G500/600

### Third Party Vendor Settings

Third party aircraft vendor might want to prevent users from altering settings which would break the integration. For example, a specific aircraft integration might require the device to be set to 'Copilot' side, and connected to the HSI. The plugin support additional setting to make any entry read-only. When locked, settings appear disable in the configuration panel.

The following key must be manually added in the **RealityXP.GTN.ini** settings file in a **[GTN\_###\_#]** section:

locked = CopilotSide, LinkHsi	comma separated list of read only settings. (NB: case sensitive names)
-------------------------------	--

## Troubleshooting

This chapter describes solutions available to help troubleshooting problems with the plugin and the Garmin Trainer.

The solution monitors certain key operations and logs runtime data to specific files. When troubleshooting a problem, the first step is to analyze runtime data saved to the log files. The X-Plane plugin logs to the file "**My Documents\rxpGTN.xpl.log**". The GTN simulation logs to the file "**My Document\rxpGtnSim.dll.log**".

The GTN simulation support additional settings to help troubleshooting video card drivers, and to report internal Garmin trainer errors. When enabled, the trainer will log additional information to "rxpGtnSim.dll.log"

The following keys must be manually added in the **RealityXP.GTN.ini** settings file in a **[GTN\_###\_#]** section:

DebugValue = 0	1 to enable video card driver debug logs.
LogTrainer = 0	1 to enable Garmin Trainer logs.

THIS SPACE INTENTIONALLY LEFT BLANK

This manual is intended for Flight Simulation use only, and may not be used in any real world aviation applications. The authors are not responsible for any errors or omissions. The information and data given in this user manual can be changed without prior notice. No part of this manual may be reproduced in any form or by any means without the written permission of the publisher, regardless of which method or which instruments, electronic or mechanical, are used. All technical information, drafts, etc. are liable to law of copyright protection.

Inclusion of Garmin copyrighted material in this presentation does not imply any endorsement by Garmin Ltd or its affiliates of the flight training material provided by Reality XP. Please note that Garmin Ltd. or its affiliates owns the copyright to this material and it is reproduced by permission.

©2002-2017 Reality XP all rights reserved.