# Guideline for GTN Flight Plan and User Waypoint Files

**Garmin International, Inc.**
**1200 E. 151st Street**
**Olathe, Kansas 66062 USA**

**190-01007-F0 Rev. 1**
**December 9, 2014**

| Rev. | Date | Description of Change |
|------|------|----------------------|
| 1 | 12/9/2014 | Initial Release |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

Garmin International, Inc.
1200 E. 151st Street
Olathe, Kansas
66062 U.S.A

# Table of Contents

# 1 Overview

## 1.1 Purpose

The purpose of this document is to provide a guideline for end-users of the GTN 6XX/7XX to create text based flight plan files on a computer so that they can be imported to a GTN through an SD card.

## 1.2 Definitions

The following terms and conventions are applicable to this this document.

| | |
|---|---|
| **DME**: | Distance Measurement Equipment |
| **FAA**: | Federal Aviation Administration |
| **FPE**: | Flight Plan Element |
| **FPEI**: | Flight Plan Element Identifier |
| **FPL:** | Flight Plan |
| **GFP:** | Garmin Flight Plan |
| **GPS**: | Global Position System |
| **GTN**: | Garmin Touchscreen Navigator |
| **IEI**: | Imbedded Element Identifier |
| **ILS**: | Instrument Landing System |
| **IMI**: | Imbedded Message Identifier |
| **NDB**: | Non-directional Beacon |
| **RNAV**: | Area Navigation (Random Navigation) |
| **TACAN**: | Tactical Air Navigation System |
| **VOR**: | VHF Omnidirectional Range |
| **WAAS**: | Wide Area Argumentation System |
| **WPT:** | Waypoint |

## 1.3 Applicable Documents

### 1.3.1 Industry Standards

- ARINC Specification 424-20, Navigation System Database
- ARINC Characteristic 702 A-3, Advanced Flight Management Computer System

### 1.3.2 Garmin Documents

- 190-01007-03, GTN 725/750 Pilot's Guide
- 190-01004-03, GTN 625/635/650 Pilot's Guide

## 1.4 Requirements

The following is required before creating a flight plan or user waypoint file.
- Any text editor capable of editing plain ASCII characters
- A data card formatted in FAT32
- A folder titled "FPL" to the data card. This folder will contain all flight plan files.

## 1.5 Compatible Garmin Units

The following Garmin units are compatible to import the flight plan files created per this guidance.
- GTN 625/635/650 with version 5.10 software or later
- GTN 725/750 with version 5.10 software or later

# 2 Flight Plan File Guidelines

## 2.1 File Overview

The flight plan file name must have a ".gfp" extension and contain English letters, numbers, or "_" and "-"characters only. No other special characters are allowed. The flight plan file must be stored in the "FPL" folder, as mentioned above.

## 2.2 File Contents

The text based flight plan elements are derived from IMI/IEI messages format specified in ARINC 702A-3. The following sections provide detailed guidance to create GTN compatible flight plan. Table 1 lists all the accepted flight plan elements in order to create compatible flight plan files.

**Table 1: GTN Supported Flight Plan Element Identifier (FPEI) and Flight Plan Element (FPE)**

| FPEI | FPE | Use (For Reference) |
|---|---|---|
| :DA: | Departure Airport | Specifying the location of the departure. |
| :D: | Departure Procedure | Specifying the departure procedure and transition. |
| :R: | Departure Runway | Specifying the runway for the selected procedure. |
| :F: | Flight Plan Segment | Waypoints to insert in the flight plan. |
| . | Airway VIA | Specifying the entry and exit way point for an airway. |
| :AA: | Arrival Airport | Specifying the location of the arrival. |
| :A: | Arrival Procedure | Specifying the arrival procedure and transition. |
| :AP: | Approach Procedure | Specifying the approach procedure and transition |

The only accepted IMI (Imbedded Message Identifier) is FPN, and the only accepted IEI (Imbedded Element Identifier) is RI. The contents of the flight plan must be preceded by the accepted IMI/IEI "FPN/RI".

The flight plan must be contained in the first line of the file (i.e. no carriage returns). Anything after the first line will be discarded and may result in importing failures. Flight plans can only contain upper case letters (A-Z), numbers (0-9), colons, parenthesis, commas, and periods and must not contain spaces or any other special characters.

All FPEs can be organized and combined into a complete flight plan. A specific sequence of departure, arrival, and approach procedures is not necessary; however, it is highly recommended to create a flight plan in sequence starting from a departure and ending with an approach procedure.

*Note: The symbols "<" and ">" in the following sections are only used to tag the location of the parameters for the flight plan elements and should NOT be included in the flight plan file.*

## 2.3 Procedures

Each flight plan file can contain no more than one of each procedure type, i.e. departure, arrival, and approach.

### 2.3.1 Departures

In order to include a departure procedure in a flight plan, the following must be specified:
- :DA:<Departure airport identifier>
- :D:<Departure procedure name>.<Transition waypoint identifier>
- :R:<Runway number, must be two digits><One of the following runway locations>
    L=Left
    R=Right
    C=Center
    O=None specified or applies to multiple runways

Examples:
- :DA:KPDX:D:LAVAA5.YKM:R:10R (LAVAA5 departure from runway 10R at KPDX via YKM)
- :DA:EGKK:D:BIG1X.BIG:R:26L (BIG1X departure from runway 26L at EGKK via BIG)

### 2.3.2 Arrivals

In order to include an arrival procedure in a flight plan, the following must be specified:

- :AA:<Arrival airport identifier>
- :A:<Arrival procedure name>.<Transition waypoint identifier>(<Runway number>< One of the following runway locations>)
    - L=Left
    - R=Right
    - C=Center
    - O=None specified or applies to multiple runways

If the arrival applies to all runways, exclude the runway number and location.

Examples:

- :AA:KLAX:A:BASET3.HEC(06R) (BASET3 arrival to runway 06R at KLAX via HEC)
- :AA:KLAX:A:DOWNE4.TNP (DOWNE4 arrival to KLAX via TNP)
- :AA:EGKK:A:ASTR2H.BEDEK(08L) (ASTR2H arrival to runway 08L at EGKK via BEDEK)

### 2.3.3 Approaches

In order to include an approach procedure in a flight plan, the following must be specified:

- :AA:<Approach airport identifier, required if no arrival is specified, must be same as arrival airport>
- :AP:<Approach type><Approach runway number, if required for given approach><Approach runway location, if required for given approach>.<Optional approach transition>

Example approach types (as coded by the FAA, reference ARINC 424):

- B-Localizer/Backcourse approach
- D-VOR/DME approach
- I-ILS approach
- K-WAAS/GPS Approach
- L-Localizer only approach
- N-NDB approach
- P-GPS approach
- Q-NDB/DME approach
- R-RNAV approach
- S-VOR approach using VORDME/VORTAC
- T-TACAN approach
- V-VOR approach
- CNDB-NDB circle-to-land
- GPSC-GPS circle-to-land
- CVDM-VOR/DME circle-to-land

- CVOR-VOR circle-to-land
- CNDM-NDB/DME circle-to-land
- LDME-LOC/DME circle-to-land

If no transition is specified, the GTN will load the approach with vectors-to-final.

Examples:
- :AA:KLAX:AP:I07R.MERMA (ILS approach to runway 07R at KLAX via MERMA)
- :AA:KPDX:AP:S28R (VOR approach to runway 28R at KPDX via vectors)
- :AA:BIHN:AP:R18.TADOD (RNAV approach to runway 18 at BIHN via TADOD)
- :AA:ESND:AP:N09.D264P (NDB approach to runway 09 at ESND via D264P)

## 2.4   En Route Waypoints

### 2.4.1   Database Defined Waypoints

To include a database defined waypoint in a flight plan, such as airport, VOR station, NDB station, intersection, etc., the following must be specified:
- :F:<Waypoint identifier, up to five characters>
- ,<Latitude cardinal direction (N or S)><Degrees latitude, must be two digits><Tenth minutes latitude, must be three digits>
- <Longitude cardinal direction (E or W)><Degrees longitude, must be three digits ><Tenth minutes longitude, must be three digits>

Latitude and longitude are optional for database defined waypoints unless there are duplicate waypoints with that same identifier in the database. The GTN will use the identifier to look up the waypoint in the database and find the published position.

Examples:
- :F:KSLE,N44546W123001
  (Airport waypoint: Mc Nary Airport, North 44º54.6´, West 123º 0.1´)
- :F:UBG
  (VOR waypoint: Newberg, existing VOR station waypoint in the database, no latitude and longitude are necessary)
- :F:ON,N44406W124039
  (NDB waypoint: Newport, OR, North 44º40.6´, West 124º03.9´)
- :F:DIPER,N50208E002037
  (Intersection waypoint: DIPER Intersection in France, North 50º20.8´, East 002º03.7´)

## 2.4.2 User Defined Waypoints

To include a user defined waypoint in a flight plan, the following must be specified:

- :F:<Latitude cardinal direction (N or S)><Degrees latitude, must be two digits><Tenth minutes latitude, must be three digits>
- <Longitude cardinal direction (E or W)><Degrees longitude, must be three digits ><Tenth minutes longitude, must be three digits>

User defined waypoints are specified without a name. The GTN will match the user waypoints in the imported flight plan with those in the user waypoint database, or assign a generic name to the waypoint if no existing waypoint is found at that location.

Examples:

- :F:N44124W122451 (User Waypoint: N44° 12.4′, W122° 45.1′)
- :F:N14544W017479 (User Waypoint: N14° 54.4′, W17° 47.9′)
- :F:S31240E136502 (User Waypoint: S31° 24.0′, E136° 50.2′)

## 2.4.3 Airways

To include an airway in a flight plan, the following must be specified:

- :F:<Entry via waypoint identifier>
- ,<Latitude cardinal direction (N or S)><Degrees latitude, must be two digits><Tenth minutes latitude, must be three digits>
- <Longitude cardinal direction (E or W)><Degrees longitude, must be three digits ><Tenth minutes longitude, must be three digits>
- .<Airway identifier>.
- <Exit via waypoint identifier>
- ,<Latitude cardinal direction (N or S)><Degrees latitude, must be two digits><Tenth minutes latitude, must be three digits>
- <Longitude cardinal direction (E or W)><Degrees longitude, must be three digits ><Tenth minutes longitude, must be three digits>

Latitude and longitude are optional for the airway defined waypoints because the GTN will use the identifier to look up the waypoint in the database and find the published position. Multiple airways can be chained together, if desired.

Examples:

- :F:UBG.J126.RBL (Single Airway: Jet Airway J126 with entry waypoint UBG and exit waypoint RBL)
- :F:LAX,N33560W118259.C1318.ELKEY,N32410W122031 (Single Airway: Airway C1318 with entry waypoint LAX and exit waypoint ELKEY, with optional latitude and longitude)
- :F:LAX.T306.ELP.J183.CLL.V194.MEI (Multiple chained airways: Entry to Jet Airway T306 at LAX to ELP followed by Jet Airway J183 to CLL followed by Victor Airway V194 to MEI)

## 2.5   Flight Plan Examples

Flight plan to depart from KPDX airport and arrive in KHIO through Airway 448 and 204 using Runway 13 for final RNAV approach:

- FPN/RI:DA:KPDX:D:LAVAA5.YKM:R:10R:F:YKM.V448.GEG.V204.HQM:F:SEA,N47261W122186:AA:KHIO:A:HELNS5.SEA(13O):AP:R13

Flight plan from KSLE to two user waypoints and then returning for the ILS approach to runway 31 via JAIME:

- FPN/RI:F:KSLE:F:N45223W121419:F:N42568W122067:AA:KSLE:AP:I31.JAIME

# 3 User Waypoint File Guidelines

## 3.1 File Overview

The user waypoint file name must be "user.wpt" and only contain English letters, numbers, and commas, periods, and dash characters. No other special characters are allowed. The file must be saved to the SD card root.

## 3.2 File Contents

The user waypoint file is a comma-separated values (CSV) file. Each row in the file represents a unique user waypoint. There must be four columns of data in the file:

1. Waypoint name
2. Waypoint comment
3. Latitude
4. Longitude

A comma (,) must be used between each value and a carriage return must be inserted after the longitude.

The waypoint name can be up to 10 numbers or capital letters; however, the GTN will shorten the name to the first 6 characters. No special characters or symbols can be used.

The waypoint comment can be up to 25 numbers, capital letters, spaces, or forward slash (/) characters. The comment is not used to define the position of the waypoint but is displayed when selecting waypoints to provide additional context to the pilot.

The latitude is specified in decimal degrees. For southern latitudes, include a dash (-) in front of the latitude value. Up to two digits can be provided to the left of the decimal point and nine to the right of the decimal point. (Example: -12.123456789)

The longitude is specified in decimal degrees. For western longitudes, include a dash (-) in front of the longitude value. Up to three digits can be provided to the left of the decimal point and eight to the right of the decimal point. (Example: -123.12345678)

*Note: If a waypoint to be imported is located within 0.001° (latitude and longitude) of an existing user waypoint in the GTN, the existing waypoint and name will be reused.*

## 3.3 User Waypoint File Examples

The following are excerpts from a "user.wpt" file:

- MTHOOD,MT HOOD PEAK,45.3723,-121.69783
- CRTRLK,CRATER LAKE,42.94683,-122.11083
- EIFFEL,EIFFEL TOWER,48.858151,2.294384
- OCEAN,,32.687356725,-51.45543634