

AeroNav Format Specification



Company:

Navigraph

Author:

Richard Stefan

Version:

2.00

Date:

February 12, 2025

Blank page

Table of Content

1.	INTRODUCTION	6
1.1.	SPECIFICATION ASCII TEXT-FILE FORMAT	7
2.	RECORD/FIELD SPECIFICATION	8
2.1.	HEADER / METADATA.....	8
2.2.	VHF NAVAIDS, ENROUTE NDB NAVAIDS, TERMINAL NDB NAVAIDS	9
2.3.	ENROUTE WAYPOINTS, TERMINAL WAYPOINTS	10
2.4.	HOLDINGS.....	11
2.5.	ENROUTE AIRWAYS	12
2.6.	AIRPORTS.....	14
2.7.	RUNWAYS	15
2.8.	LOCALIZERS/GLIDESLOPES	16
2.9.	LOCALIZER MARKER	18
2.10.	TERMINAL PROCEDURES (SID/STAR/IAP)	19
2.12.	GATE.....	21
3.	APPENDIXES.....	23
3.1.	NAVAID USAGE.....	23
3.2.	NAVAID TYPE	23
3.3.	WAYPOINT USAGE	23
3.4.	WAYPOINT SECTIONCODE.....	23
3.5.	TURN DIRECTION	23
3.6.	FLIGHTLEVEL.....	24
3.7.	DIRECTIONAL RESTRICTION	24
3.8.	CRUISE TABLE IDENTIFIER	24
3.9.	TRUE/MAG FLAG	24
3.10.	ILS/MLS/GLS CATEGORY	24
3.11.	MARKER TYPE.....	24
3.12.	ROUTE TYPE FOR SIDs (PD)	25
3.13.	ROUTE TYPE FOR STARS (PE).....	25
3.14.	ROUTE TYPE OF IAPs (PF).....	26
3.15.	SPEED LIMIT DESCRIPTION	26
3.16.	PATH AND TERMINATION.....	27
3.17.	ALTITUDE DESCRIPTION	27
3.18.	MAPT	28
3.19.	OVERFLY.....	28

Revisions

Version	Date	Changes
1.00	11/02/2025	first public version

Blank page

1. Introduction

This document will define the complete dataset specifications of the AeroNav format.

The AeroNav format contains the primary records of the following record types (in parenthesis, the corresponding ARINC 424 section and subsection codes):

- Airports (PA)
- Enroute Airways (ER)
- Enroute NDB Nav aids (DB)
- Enroute Waypoints (EA)
- Holdings (EP)
- IAP - Instrument Arrival Procedures (PF)
- Localizer Marker (PM)
- Localizer/Glideslopes (PI)
- Runways (PG)
- SID – Standard Instrument Departure (PD)
- STAR – Standard Terminal Arrival Route (PE)
- Terminal NDB Nav aids (PN)
- Terminal Waypoints (PC)
- VHF Nav aids (D)
- Gate (PB)

1.1. Specification ASCII text-file format

All fields in the records are separated with a | character (vertical bar or ASCII 124). All blanks will be trimmed at the end of each field (excluding special marked fields – footnote)

2. Record/Field Specification

2.1. Header / Metadata

Filename:
Header.txt

ASCII Format:
creator|cycle|data_provider|dataset_version|dataset|
effective_fromto|parsed_at|revision

<i>Field</i>	<i>Format</i>	<i>max. length</i>	<i>ARINC Ref</i>
creator	alphanumeric	16	
cycle	alphanumeric	4	
data_provider	alphanumeric	16	
dataset_version	alphanumeric	16	
dataset	alphanumeric	20	
effective_fromto	alphanumeric	10	
parsed_at	alphanumeric	22	
revision	alphanumeric	3	

Description:

- **creator:** company name (ex. Navigraph)
- **cycle:** valid AIRAC cycle (ex. 2410)
- **data_provider:** data provider (ex. Jeppesen)
- **dataset_version:** dataset specification version (Format: 2.0.xx.xxxx)
- **dataset:** name of the dataset (Format: NG_xxx...)
- **effective_fromto:** the date when the current AIRAC cycle starts/ends (Format DDMMDDMMYY– DD is the day, MM is the month, YY is the year) (ex. 0310301024)
- **parsed_at:** parsing/creation date of this AIRAC cycle (Format YYYY-MM-DD – HH:MM:SS in UTC)
- **revision:** revision of this AIRAC cycle (Format: xxx)

2.2. VHF Navaids, Enroute NDB Navaids, Terminal NDB Navaids

Filename:

Nav aids.txt

ASCII Format:

```
id|navaid_identifier|navaid_icao_code|airport_identifier|navaid_freq  
uency|navaid_name|navaid_latitude|navaid_longitude|navaid_usage|  
navaid_type
```

<i>Field</i>	<i>Format</i>	<i>max.length</i>	<i>ARINC Ref</i>
id	Numeric	-	-
navaid_identifier	alphanumeric	4	5.33
icao_code	alphanumeric	2	5.14
airport_identifier	alphanumeric	4	5.6
navaid_frequency	numeric	-	5.34
navaid_name	alphanumeric	30	5.71
navaid_latitude	numeric	-	5.36
navaid_longitude	numeric	-	5.37
navaid_usage	alphanumeric	1	-
navaid_type	numeric	-	-

Description:

- **id:** unique number
- **navaid_identifier:** navaid identifier
- **icao_code:** 2-letter location indicator of the navaid
- **airport_identifier:** four-character ICAO location identifier
- **navaid_frequency:** navaid frequency in kHz
- **navaid_name:** navaid name
- **navaid_latitude:** navaid latitude in degrees decimal floating point (N positive, S negative)
- **navaid_longitude:** navaid longitude in degrees decimal floating point (E positive, W negative)
- **navaid_usage:** navaid usage (see appendix 3.1)
- **navaid_type:** navaid type (see appendix 3.2)

2.3. Enroute Waypoints, Terminal Waypoints

Filename:

Waypoints.txt

ASCII Format:

```
id|waypoint_identifier|icao_code|airport_identifier|  
waypoint_latitude|waypoint_longitude|waypoint_usage
```

<i>Field</i>	<i>Format</i>	<i>max.length</i>	<i>ARINC Ref</i>
id	numeric	-	-
waypoint_identifier	alphanumeric	5	5.13
icao_code	alphanumeric	2	5.14
waypoint_latitude	numeric	-	5.36
waypoint_longitude	numeric	-	5.37
waypoint_usage	alphanumeric	1	-

Description:

- **id:** unique number
- **waypoint_identifier:** waypoint identifier
- **icao_code:** 2-letter location indicator of the waypoint
- **waypoint_latitude:** waypoint latitude in degrees decimal floating point (N positive, S negative)
- **waypoint_longitude:** waypoint longitude in degrees decimal floating point (E positive, W negative)
- **waypoint_usage:** waypoint usage (see appendix 3.3)

2.4. Holdings

Filename:
Holdings.txt

ASCII Format:

```
waypoint_sectioncode|waypoint_id|turn_direction|  
inbound_holding_course|leg_length|leg_time|holding_speed|  
minimum_altitude|maximum_altitude
```

<i>Field</i>	<i>Format</i>	<i>max.length</i>	<i>ARINC Ref</i>
waypoint_sectioncode	alphanumeric	3	
id	numeric	-	-
turn_direction	alphanumeric	1	
inbound_holding_course	numeric	-	5.62
leg_length	numeric	-	5.64
leg_time	numeric	-	5.65
holding_speed	numeric	-	5.175
minimum_altitude	numeric	-	5.30
maximum_altitude	numeric	-	5.127

Description:

- **waypoint_sectioncode:** waypoint type (see appendix 3.4)
- **id:** reference id to waypoints/navaids
- **turn_direction:** holding turn direction (see appendix 3.5)
- **inbound_holding_course:** inbound magnetic course in degrees floating point
- **leg_length:** inbound leg length in nautical miles, decimal floating point
- **leg_time:** inbound leg time in minutes, decimal floating point
- **holding_speed:** holding speed limit in knots
- **minimum_altitude:** contain altitudes in feet or flight level
- **maximum_altitude:** contain altitudes in feet or flight level

2.5. Enroute Airways

Filename:

Airways.txt

ASCII Format:

Header:

"A"|route_identifier

Segment:

"S"|from_sectioncode|from_sectioncode|

to_type|to_id|inbound_course|outbound_course|

inbound_distance|direction_restriction|flightlevel|

minimum_altitude1|maximum_altitude|crusing_table_identifier

<i>Field</i>	<i>Format</i>	<i>max.length</i>	<i>ARINC Ref</i>
route_identifier	alphanumeric	6	5.8
from_sectioncode	alphanumeric	3	-
from_id	numeric	-	-
to_sectioncode	alphanumeric	3	-
to_id	numeric	-	-
inbound_course	numeric	-	5.28
outbound_course	numeric	-	5.26
inbound_distance	numeric	-	5.27
direction_restriction	alphanumeric	1	5.115
flightlevel	alphanumeric	1	5.19
minimum_altitude1	numeric	-	5.30
maximum_altitude	numeric	-	5.127
crusing_table_identifier	alphanumeric	2	5.134

Description:

- `route_identifier`: enroute route identifier
- `from_sectioncode`: waypoint type (see appendix 3.4)
- `from_id`: reference id to waypoints/navaids
- `to_sectioncode`: waypoint type (see appendix 3.4)
- `to_id`: reference id to waypoints/navaids
- `inbound_course`: inbound magnetic course to the waypoint identified
- `outbound_course`: outbound magnetic course from the waypoint identified
- `inbound_distance`: contain segment distances/along track distances/excursion distances/DME distances in nautical miles
- `direction_restriction`: indicate the flyable direction (see appendix 3.5)
- `flightlevel`: defines the airway structure (see appendix 3.6)
- `minimum_altitude1`: contain altitudes in feet
- `maximum_altitude`: contain altitudes in feet
- `cruising_table_identifier`: indicate the cruising table (see appendix 3.8)

2.6. Airports

Filename:
Airports.txt

ASCII Format:

```
id|airport_identifier|icao_code|ata_iata_code|airport_name|  
elevation|true_mag_flag|magnetic_variation|airport_ref_latitude|  
airport_ref_longitude
```

<i>Field</i>	<i>Format</i>	<i>max.length</i>	<i>ARINC Ref</i>
id	numeric	-	-
airport_identifier	alphanumeric	4	5.6
icao_code	alphanumeric	2	5.14
ata_iata_code	alphanumeric	3	5.107
airport_name	alphanumeric	30	5.71
elevation	numeric	-	5.55
true_mag_flag	alphanumeric	1	-
magnetic_variation	numeric	-	5.39
airport_ref_latitude	numeric	-	5.36
airport_ref_longitude	numeric	-	5.37

Description:

- **id:** unique number
- **airport_identifier:** four character ICAO location identifier
- **icao_code:** location indicator of the airport
- **ata_iata_code:** IATA/ATA airport designator code
- **airport_name:** airport name
- **elevation:** elevation in feet above MSL
- **true_mag_flag:** true or magnetic flag (see appendix 3.9)
- **magnetic_variation:** magnetic north at the location
- **airport_ref_latitude:** airport reference latitude in degrees decimal floating point (N positive, S negative)
- **airport_ref_longitude:** airport reference longitude in degrees decimal floating point (E positive, W negative)

2.7. Runways

Filename:

Runways.txt

ASCII Format:

```
id|airport_identifier|runway_identifier|runway_magnetic_bearing|  
runway_length|runway_width|landing_threshold_elevation|  
runway_latitude|runway_longitude
```

<i>Field</i>	<i>Format</i>	<i>max.length</i>	<i>ARINC Ref</i>
id	numeric	-	-
airport_identifier	alphanumeric	4	5.3
runway_identifier	alphanumeric	3	5.68
runway_magnetic_bearing	numeric	-	5.44
runway_length	numeric	-	5.67
runway_width	numeric	-	
landing_threshold_elevation	numeric	-	5.36
runway_latitude	numeric	-	5.69
runway_longitude	numeric	-	5.109

Description:

- **id:** unique number
- **airport_identifier:** four character ICAO location identifier
- **runway_identifier:** runway identifier
- **runway_magnetic_bearing:** magnetic bearing of the runway identifier
- **runway_length:** runway length in feet
- **runway_width:** runway width in feet
- **landing_theshold_elevation:** elevation of the landing threshold in feet
- **runway_latitude:** runway latitude in degrees decimal floating point (N positive, S negative)
- **runway_longitude:** runway longitude in degrees decimal floating point (E positive, W negative)

2.8. Localizers/Glideslopes

Filename:

Localizers.txt

ASCII Format:

```
id|airport_identifier|llz_identifier|runway_identifier|  
ils_mls_gls_category|llz_bearing|llz_frequency|llz_latitude|  
llz_longitude|gs_angle|gs_elevation|gs_latitude|gs_longitude
```

<i>Field</i>	<i>Format</i>	<i>max.length</i>	<i>ARINC Ref</i>
id	numeric	-	-
airport_identifier	alphanumeric	4	5.3
llz_identifier	alphanumeric	4	5.44
runway_identifier	alphanumeric	3	5.46
ils_mls_gls_category	alphanumeric	1	5.80
llz_bearing	numeric	-	5.47
llz_frequency	numeric	-	5.45
llz_latitude	numeric	-	5.36
llz_longitude	numeric	-	5.37
gs_angle	numeric	-	5.52
gs_elevation	numeric	-	5.74
gs_latitude	numeric	-	5.36
gs_longitude	numeric	-	5.37

Description:

- `id`: unique number
- `airport_identifier`: four character ICAO location identifier
- `llz_identifier`: identification code of the LLZ, MLS facility or GLS reference path
- `runway_identifier`: runway identifier
- `ils_mls_gls_category`: ILS/MLS/GLS performance categories (see appendix 3.10)
- `llz_bearing`: magnetic bearing of the localizer course
- `llz_frequency`: VHF frequency of the facility in MHz
- `llz_latitude`: LLZ latitude in degrees decimal floating point (N positive, S negative)
- `llz_longitude`: LLZ longitude in degrees decimal floating point (E positive, W negative)
- `gs_angle`: glide slope angle of an ILS facility/GLS approach in degrees
- `gs_elevation`: elevation of LLZ in feet
- `gs_latitude`: GS latitude in degrees decimal floating point (N positive, S negative)
- `gs_longitude`: GS longitude in degrees decimal floating point (E positive, W negative)

2.9. Localizer Marker

Filename:

Markers.txt

ASCII Format:

airport_identifier|llz_identifier|runway_identifier|marker_type|
marker_latitude|marker_longitude

<i>Field</i>	<i>Format</i>	<i>max.length</i>	<i>ARINC Ref</i>
airport_identifier	alphanumeric	4	5.3
llz_identifier	alphanumeric	4	5.44
runway_identifier	alphanumeric	5	5.47
marker_type	alphanumeric	3	5.36
marker_latitude	numeric	-	5.36
marker_longitude	numeric	-	5.37

Description:

- **airport_identifier:** four character ICAO location identifier
- **llz_identifier:** identification code of the LLZ, MLS facility or GLS reference path
- **runway_identifier:** runway identifier
- **marker_type:** defines the type of marker (see appendix 3.11)
- **marker_latitude:** marker latitude in degrees decimal floating point (N positive, S negative)
- **marker_longitude:** marker longitude in degrees decimal floating point (E positive, W negative)

2.10. Terminal Procedures (SID/STAR/IAP)

Filename:

proc\

ASCII Format:

Header:

"SID,STAR,APP"|procedure_identifier|transition_identifier|
<total number legs>

Legs:

path_termination|waypoint_sectioncode|waypoint_id|
recommended_waypoint_sectioncode|recommended_waypoint_id|
turn_direction|course|rho|theta|distance_time|
speed_limit_description|speed_limit|altitude_description|altitude1|
altitude2|vertical_angle|overfly|center_waypoint_sectioncode|
center_waypoint_id|arc_radius|mapt

<i>Field</i>	<i>Format</i>	<i>max.length</i>	<i>ARINC Ref</i>
airport_identifier	alphanumeric	4	5.6
procedure_identifier	alphanumeric	6	5.9/10
path_termination	alphanumeric	2	5.21
waypoint_sectioncode	alphanumeric	3	-
waypoint_id	numeric	-	-
recommended_waypoint_sectioncode	alphanumeric	3	-
recommended_waypoint_id	numeric	-	-
turn_direction	alphanumeric	1	5.20
course	numeric	-	5.26
rho	numeric	-	5.25
theta	numeric	-	5.24
distance_time	numeric	-	5.27
speed_limit_description	alphanumeric	1	5.261
speed_limit	numeric	-	5.72
altitude_description	alphanumeric	1	5.29
altitude1	numeric	-	5.30
altitude2	numeric	-	5.30
vertical_angle	numeric	-	5.70
overfly	alphanumeric	1	-
center_waypoint_sectioncode	alphanumeric	3	-
center_waypoint_id	numeric	-	-
arc_radius	numeric	-	5.204
mapt	numeric	-	-

Description:

- **airport_identifier:** four character ICAO location identifier
- **procedure_identifier:** name of the terminal procedure
- **path_termination:** defines the path geometry for a single record of an terminal procedure (see appendix 3.16)
- **waypoint_sectioncode:** waypoint type (see appendix 3.4)
- **waypoint_id:** reference id to waypoints/navaids
- **recommended_waypoint_sectioncode:** waypoint type (see appendix 3.4)
- **recommended_waypoint_id:** reference id to waypoints/navaids
- **turn_direction:** turn direction (see appendix 3.5)
- **course:** outbound course from the waypoint identified in the record's "waypoint_identifier" field
- **rho:** defined as the geodesic distance in nautical miles to the waypoint identified in the record's "waypoint_identifier" field from the "recommended_navaid_identifier" field
- **theta:** defined as the magnetic bearing to the waypoint identified in the record's "waypoint_identifier" field from the "recommended_navaid_identifier" field
- **distance_time:** indicates the distance
- **speed_limit_description:** designate whether the speed limit coded at a waypoint in a terminal procedure description is a mandatory, minimum or maximum speed (see appendix 3.15)
- **speed_limit:** speed limit in knots
- **altitude_description:** designate whether a waypoint should be crossed (see appendix 3.17)
- **altitude1:** contain altitudes in feet or flight level
- **altitude2:** contain altitudes in feet or flight level
- **vertical_angle:** defines the vertical navigation path prescribed for the procedure
- **overfly:** flyby/over flag (see appendix 3.19)
- **center_waypoint_sectioncode:** waypoint type (see appendix 3.4)
- **center_waypoint_id:** reference id to waypoints/navaids
- **arc_radius:** used to define the radius of a precision turn
- **mapt:** missed approach point (see appendix 3.18)

2.12. Gate

Filename:

Gates.txt

ASCII Format:

airport_identifier|gate_identifier|gate_latitude|
gate_longitude

<i>Field</i>	<i>Format</i>	<i>max.length</i>	<i>ARINC Ref</i>
airport_identifier	alphanumeric	4	5.6
gate_identifier	alphanumeric	5	5.56
gate_latitude	numeric	-	5.36
gate_longitude	numeric	-	5.37

Description:

- **airport_identifier:** four character ICAO location identifier
- **gate_identifier:** airport gate identifier
- **gate_latitude:** latitude in degrees decimal floating point (N positive, S negative)
- **gate_longitude:** longitude in degrees decimal floating point (E positive, W negative)

Blank page

3. Appendixes

3.1. Navaid Usage

Field	Description
T	Terminal Navaid
E	Enroute Navaid

3.2. Navaid Type

Field	Description
0	NDB
1	VOR/DME
2	VORTAC Military
3	VOR/ILS/DME
4	VOR/MLS/DME/N
5	VOR/MLS/DME/P
6	VOR
7	VORTAC
8	DME
9	TACAN Military
10	ILS/DME
11	MLS/DME/N
12	MLS/DME/P
13	VHF
14	TACAN

3.3. Waypoint Usage

Field	Description
T	Terminal Waypoint
E	Enroute Waypoint

3.4. Waypoint SectionCode

Field	Description
WPT	Waypoint
NAV	Navaid

3.5. Turn Direction

Field	Description
L	left turn
R	right turn
blank	shortest turn

3.6. Flightlevel

Field	Description
B	All Altitudes
H	High Level Airways
L	Low Level Airways

3.7. Directional Restriction

Field	Description
F	One way in direction route is coded (Forward)
B	One way in opposite direction route is coded (backwards)
blank	no restrictions on direction

3.8. Cruise Table Identifier

Field	Description
AA	ICAO standard cruise table
AO	Exception to ICAO cruise table
BB-ZZ	Modified cruise table
BO-ZO	Exception to modified cruise table

3.9. True/Mag Flag

Field	Description
T	True
M	Mag

3.10. ILS/MLS/GLS Category

Field	Description
0	Loc only
1	CAT 1
2	CAT 2
3	CAT 3
I	IGS
L	LDA with GS
A	LDA without GS
F	SDF without GS

3.11. Marker Type

Field	Description
IM	Inner Marker
MM	Middle Marker
OM	Outer Marker
BM	Back Marker
L	Locator at Marker

3.12. Route Type for SIDs (PD)

Field	Description
0	Engine Out SID
1	SID Runway Transition
2	SID or SID Common Route
3	SID Enroute Transition
4	RNAV SID Runway Transition
5	RNAV SID or SID Common Route
6	RNAV SID Enroute Transition
F	FMS SID Runway Transition
M	FMS SID or SID Common Route
S	FMS SID Enroute Transition
T	Vector SID Runway Transition
V	Vector SID Enroute Transition

3.13. Route Type for STARs (PE)

Field	Description
1	STAR Enroute Transition
2	STAR or STAR Common Route
3	STAR Runway Transition
4	RNAV STAR Enroute Transition
5	RNAV STAR or STAR Common Route
6	RNAV STAR Runway Transition
7	Profile Descent Enroute Transition
8	Profile Descent Common Route
9	Profile Descent Runway Transition
F	FMS STAR Enroute Transition
M	FMS STAR or STAR Common Route
S	FMS STAR Runway Transition

3.14. Route Type of IAPs (PF)

Field	Description
A	Approach Transition
B	Localizer/Back course Approach
D	VORDME Approach
F	FMS Approach
G	IGS Approach
I	ILS Approach
J	GLS Approach
L	LOC only Approach
M	MLS Approach
N	NDB Approach
P	GPS Approach
Q	NDB DME Approach
R	RNAV Approach
S	VOR Approach using VORDME/VORTAC
T	TACAN Approach
U	SDF Approach
V	VOR Approach
W	MLS Type A Approach
X	LDA Approach
Y	MLS Type B and C Approach
Z	Missed Approach

3.15. Speed Limit Description

Speed Limit	Description
@	Mandatory Speed, cross fix at speed specified in the Speed Limit field
+	Minimum Speed, cross fix at or above speed specified in Speed Limit field
-	Maximum Speed, cross fix at or below speed specified in Speed Limit field

3.16. Path and Termination

Path & Termination	Description
IF	Initial Fix
TF	Track to a Fix
CF	Course to a Fix
DF	Direct to a Fix
FA	Fix to an Altitude
FC	Track from a Fix for a Distance
FD	Track from a Fix to a DME Distance
FM	From a Fix to a Manual termination
CA	Course to an Altitude
CD	Course to a DME Distance
CI	Course to an Intercept
CR	Course to a Radial termination
RF	Constant Radius Arc
AF	Arc to Fix
VA	Heading to an Altitude
VD	Heading to a DME Distance termination
VI	Heading to an Intercept
VM	Heading to a Manual termination
VR	Heading to a Radial termination
PI	045/180 Procedure turn
HA, HF, HM	Holding in lieu of Procedure Turn

3.17. Altitude Description

Field	Description
+	at or above altitude specified in Altitude1 field
-	at or below altitude specified in Altitude1 field
@	at altitude specified in Altitude1 field
B	at or above to at or below altitudes in Altitude1 field and Altitude2 field
C	at or above altitude specified in Altitude2 field
G	Glide Slope altitude (MSL) specified in Altitude2 field and at altitude specified in Altitude1 field
H	Glide Slope altitude (MSL) specified in Altitude2 field and at or above altitude specified in Altitude1 field
I	Glide Slope Intercept Altitude specified in Altitude2 field and at altitude specified in Altitude1 field
J	Glide Slope Intercept Altitude specified in Altitude2 field and at or above altitude specified in Altitude1 field
V	at altitude on the coded vertical angle in the Altitude2 field and at or above altitude specified in Altitude1 field
X	at altitude on the coded vertical angle in Altitude2 field and at altitude specified in Altitude1 field
Y	at altitude on the coded vertical angle in Altitude2 field and at or below altitude specified in the Altitude1 field

3.18. MAPt

Field	Description
1	missed approach waypoint
blank	-

3.19. Overfly

Field	Description
0	fly-by
1	fly-over