OGNAVI APRS message specification

Naviter's APRS message format is built on top of the standard OGN-flavoured APRS aircraft beacon messages.

1 Versions

In accordance with the OGN's versioning schema, all sent messages will be versioned using the `destto` field of the APRS message.

Format version consists of two parts:

1. 6 character long OGN-assigned identifier for Naviter: `OGNAVI`,
2. 1 character long format version

Thus, every version will be formatted as `OGNAVI-<version>`, for example `OGNAVI-1`.

Note: The `destto` field *may* be set to `OGNAVI`. This implies version 1.

1.1 Version history

OGNAVI-1 first version (introduced 2017-09-16)

2 Message format

2.1 OGNAVI-1

Every message will begin with a header and will contain a comment as described below.

Header of each message will be formatted as specified in the original APRS message specification:

```
<device_type><device_id>>OGNAVI,qAS,NAVITER:/<timestamp>h<latitude>
/<longitude>'<heading>/<ground_speed>/A=<altitude> <comment>.
```

Parameters:

device_type 3-character device type identifier (e.g. `NAV`, `FLR`, …)
device_id 24-bit device identifier written in hexadecimal format. Device identifier is only unique in the Naviter's namespace (e.g. two devices using ids NAV000000 and FLR000000 are not necessarily the same).
timestamp using the HMS format as specified in APRS 1.01 (e.g. 010203 means 01:02:03 UTC).
latitude as specified in APRS 1.01
longitude as specified in APRS 1.01
heading as specified in OGN-flavoured APRS
ground_speed as specified in OGN-flavoured APRS
altitude as specified in OGN-flavoured APRS

Note: OGN-flavoured APRS specification states that if heading and ground speed are set to 0 (i.e. the relevant part of the message is `000/000`), this indicates no data is provided for either of the fields.

Comment format

Naviter tried to follow OGN's comment format as closely as possible. Comments will be formatted as follows:

```
!W<precision_enhancment>! id<identifier> +<climb_rate> <turn_rate>rot
```

Parameters:

precision_enhancment as specified in OGN-flavoured APRS
identifier 40-bit device identifier. See bellow for details.
climb_rate as specified in OGN-flavoured APRS
turn_rate as specified in OGN-flavoured APRS

Device identifier

Device identifier is a sequence of 40 bits encoded in a hexadecimal format (most significant bit first) that tries to resemble OGN's format as much as possible. It encodes (listed from most to least significant bits):

- bit 0: stealth mode
- bit 1: do not track mode
- bits 2-5: aircraft type
- bits 6-11: address type (namespace is extended from 2 to 6 bits to avoid collisions with other tracking providers)
- bits 12-15: reserved for use at a later time
- bits 16-39: device id (24-bit device identifier, same as in APRS header)

Note: In OGN-flavoured APRS address types 00, 01, 10 and 11 are already used to represent unknown, ICAO, FLARM and OGN devices (respectively).

For the extended address type Naviter is reserving the following ids:

000000 unknown
000001 ICAO
000010 FLARM
000011 OGN trackers
000100 Naviter

Other address types might be added at a later time.

3 Examples

```
NAV042121>OGNAVI,qAS,NAVITER:/140648h4550.36N/01314.85E'090/152/A=001086
!W47! id0440042121 +000fpm +0.5rot
NAV04220E>OGNAVI,qAS,NAVITER:/140748h4552.27N/01155.61E'090/012/A=006562
!W81! id044004220E +060fpm +1.2rot
NAV07220E>OGNAVI,qAS,NAVITER:/125447h4557.77N/01220.19E'258/056/A=006562
!W76! id1C4007220E +180fpm +0.0rot
```

4 Other

4.1 Relaying messages from other devices

Naviter is able to relay position of a FLARM device connected to an Oudie through it's network. Origin of of such messages will be `FLR<flarm_id>`, not `NAV<device_id>`. However, message will still be formatted using `OGNAVI` schema.

Format of such messages will be:

```
<device_type><device_id>>OGNAVI,<relay_id>*,qAS,NAVITER:/<timestamp>h
<latitude>/<longitude>'<heading>/<ground_speed>/A=<altitude> <comment>.
```

Parameters:

All parameters – with the exception of `relay_id` – are the same as in the standard message format described in section 2.

The `relay_id` will contain the identifier of the device that served as a relay. The identifier will be formatted as `NAV<device_id>`, where `device_id` is a 6 character hexadecimal number uniquely identifying an Oudie device.

The asterisk following the `relay_id` indicates that the transmision has been relayed.

Example:

```
FLRFFFFFF>OGNAVI,NAVABCDEF*,qAS,NAVITER:/092002h1000.00S/01000.00W'000/000/
A=003281 !W00! id2820FFFFFF +300fpm +1.7rot
```

5 Related documents

APRS Protocol Reference, Protocol Version 1.0: http://www.aprs.org/doc/APRS101.PDF

OGN-flavoured APRS: https://github.com/svoop/ogn_client-ruby/wiki/OGN-flavoured-APRS/c6678fecc15222cb980f491d09dfaba7e2982df6