Zhongke Micro AGNSS Solution

www.gnss-aide.com

Why use AGNSS

- Conditions for autonomous GNSS receiver positioning include:
  - Capture and track satellite signals, analyze time
  - Obtaining messages from satellites
- In a strong signal environment, the autonomous GNSS receiver can cold start positioning i

  In a weak signal environment, it is very slow for receivers without external assistance to

  Message, so it takes a long time to locate, or even unable to locate.
- AGNSS can provide the receiver with auxiliary information necessary for positioning, suc

Set and time. Whether in a strong signal or a weak signal environment, this information
Short first positioning time.

AGNSS auxiliary information

- Zhongkewei’s AGNSS server can provide customers who use Zhongke micro navigation p
  For AGNSS service, AGPS data is currently provided, and Beidou and GLONASS will
  Supplementary information.
- At present, the auxiliary information that the AGNSS server of Zhongkewei can provide ir
  – Rough time
  – GPS ephemeris, GPS almanac, ionospheric correction parameters, UTC leap second correctio
  – Location: The estimated location of the receiver, which needs to be provided by the customer
- The rough location needs to be obtained by the customer through other means, such as the
  The accuracy of rough position is not high, less than 15km is a more reliable rough posi
  .

AGNSS solution

- The AGNSS server obtains and manages AGNSS auxiliary information from multiple GNSS data s
  Immediately monitor and respond to the client's AGNSS request (user name and password are re
- The user obtains the auxiliary information from the AGNSS server through the TCP/IP protocol, an
  Directly transmitted to the GNSS receiver.
- Users can also set up their own proxy server.

AGNSS process

- For the user side, the AGNSS process is as follows:
- 1) Connect to the AGNSS server
  - The address of the server is 121.41.40.95 (domain name: www.gnss-aide.com)
  - The port number is 2621
- 2) Send AGNSS request
  - Example of request statement: (user name and password fields are required)
  - User=freetrial;pwd=123456;cmd=full;lat=60.0;lon=55.0;alt=0;
- 3) Obtain AGNSS auxiliary information
- 4) Send AGNSS auxiliary information to the receiver

AGNSS request parameters

- The client sends a request to the AGNSS server. The format of the request statement is as follows
  - The request statement is a combination of multiple sets of ***key=value;,*** such as: key=value;key=value;
- Example: user=freetrial;pwd=123456;cmd=full;lat=60.0;lon=55.0;alt=0;
- The specific key and value are defined in the following table

Keyword (Key)	Value (value)	Optionality	Remark
user	String	must	username. It is strongly recommended that the user name is a valid email address, and important AGNSS server maintenance information will be sent to tl
pwd	String	must	user password
gnss	String	Optional	A comma-separated list of GNSS, currently supports GPS. Valid values are: gps, bds, glo "Gnss=gps;" means to request GPS assistance information;

			"Gnss=gps,bds;" means request GPS and BDS auxiliary information;
cmd	String	Optional	full: all information, including ephemeris, estimated time and location eph: only provides ephemeris information aid: auxiliary time, location and other information If this item is not filled, the default is full
lat	Numerical value	Optional	Estimated latitude of the user's location. The unit of latitude: degrees. The value range is -90~90 degrees. Both position auxiliary format, latitude and lon Style, choose one of two. The effective latitude and longitude position auxiliary format is "lat=30;lon=120.3;alt=100;" all three fields must be complete.
lon	Numerical value	Optional	An estimate of the longitude of the user's location. The unit of longitude: degrees. The value range is -180~180 degrees.
alt	Numerical value	Optional	The estimated value of the height of the user's location. Unit: m.
x	Numerical value	Optional	The estimated value of the user's position (X, Y, Z in the ECEF coordinate system). Unit: m. The valid ECEF position assist format is "X=30000;y=1111120.3;z=3345100;" All three fields must be complete.
y	Numerical value	Optional	The estimated value of the user's position (X, Y, Z in the ECEF coordinate system). Unit: m.
z	Numerical value	Optional	The estimated value of the user's position (X, Y, Z in the ECEF coordinate system). Unit: m.
pacc	Numerical value	Optional	The accuracy of the user's location. The unit is meters.

authority management

- AGNSS currently only provides AGNSS services to authorized customers
- Please contact sales to obtain AGNSS permission, please provide user nar

  Name) and password.
- AGNSS only provides assistance to Zhongkewei's GNSS receivers.
- Free trial account
  - Username: freetrial
  - Password: 123456
  - Limit: 1000 requests per hour.

Server returns information

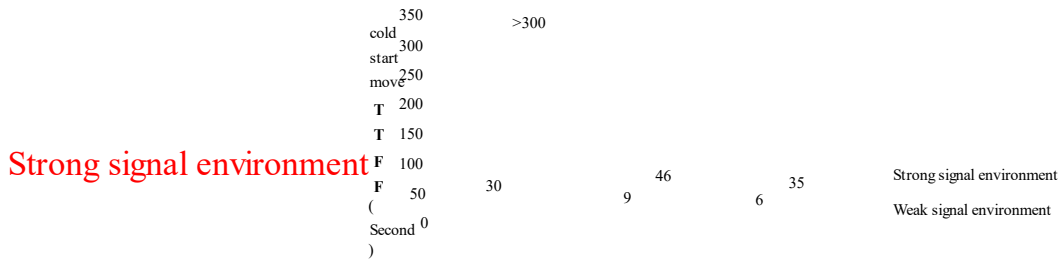
• Example of data returned by the AGNSS server: data header + auxiliary data content
• Binary data is the auxiliary data required by the GNSS receiver. All of these binary data
Comes with data verification. The binary data format refers to the receiver protocol spec
• If the data header is also sent to the GNSS receiver, it will not affect the GNSS receiver.
ring.

AGNSS evaluation software

• Zhongkewei's GNSS visualization software tool integrates the AGNSS evaluation functio
Tools can be obtained free of charge by contacting sales.
• Use this tool to quickly evaluate AGNSS functions.

AGNSS performance comparis

• Based on the AGNSS evaluation software (running on a laptop), the AGNSS function can be realize
• Compared with ordinary stand-alone GNSS receivers, AGNSS receivers have significant TTFF perfo
Boost, especially under weak signal conditions.



Precautions

- The rough position assistance needs to be obtained by the user side through other means,
  - GSM/GPRS/3G communication modules, these modules can use CELL ID to obtain the curre
    Rough location
  - Other wireless modules such as WiFi can also be roughly positioned
- The accuracy of the rough position is required to be within 15km, and the wrong position
  performance
- If the rough position cannot be obtained, ignore the position field in the AGNSS request s
  lat,lon,alt,x,y,z), the receiver will automatically select the effective position of historical
- It is not necessary to use the position output by the GNSS receiver as a rough position

When do you need AGNSS

- No need to download from the server every time you boot, saving data
  - There are battery backup SRAM inside the chip of Zhongke Micro, as well as perma

Can automatically save received ephemeris data, etc.

– The chip is constantly downloading the latest ephemeris data from the satellite durin

• Determine whether to download from the server by querying the status of AGNSS data

– The receiver can output the message status statement (default is not output, it needs t

– See the next page for the sentence introduction

Introduction to Message Status

- The output of this sentence is the current time inside the receiver + the state of the message.
- You can send the command $PCAS03,,,,,,,,,,,1*1F, output the message status statement once per second
- You can send the command $PCAS03,,,,,,,,,,,0*1E to stop outputting the message status statement
- Note: Every sentence must end with \r\n (0x0D,0x0A), there are 11 commas in the sentence
- If the time stamp is valid (non-zero) and the number of valid ephemeris is large (more than 8), there is no need to download the AG

AGNSS implementation exam

• Python language implementation

```
# 1) Variable definition
    addr = '121. 41. 40. 95' #Server address
    por t = 2621                                    #port
    message = 'user = fr eet ri al; pwd=123456; cmd=f ul l; l at =30; l on=120;' #Request message
```

- Please follow the example of C language

  Sales request

```
# 2) Server connection.
        import socket
        socket. set def aul tti meout (4)
        cl i ent = socket. socket ()
        cl i ent. connect ((addr, port))
# 3) Send request message
        cl i ent. send( message)
# 4) Receive server response
        r epl y _dat a = ''
        whi le Tr ue:
                cur r ent _r epl y = cl i ent. r ecv( 1024)
                ifl en( cur r ent _r epl y) == 0:
                        br eak
                el se:
                        r epl y _dat a += cur r ent _r epl y
# 5) Send the server response to the navigation module, take COM1, 9600 as an example.
        i mpor t ser i al
        tty = ser i al. Ser i al ()
        tt y. por t ='COM1'
        tt y. baudr at e = 9600
        tt y. open()
        tt y. wr ite( r epl y _dat a)
        tt y. cl ose()
```


Technical Support

- For questions about AGNSS, please contact sales, or technical support.
- Contact: software@casic.ac.cn