



GSM-GPRS

Datawell - Oceanographic Instruments

Upgrade your GSM link from dial-in to GPRS

Motivation

Waverider buoys may be fitted with a GSM link, transmitting data across the internet. In our documentation several examples are given of how to set up a dial-in connection. However, some mobile networks have discontinued their dial-in service. It has been replaced by GPRS and later technologies. To keep up the data link your buoy GSM configuration must be modified to set up a GPRS connection. Even without this necessity switching to GPRS may be motivated by the lower cost as calculated below. This technical note does not apply to SMS text messaging unless you switch to internet communication.

GPRS versus GSM dial-in

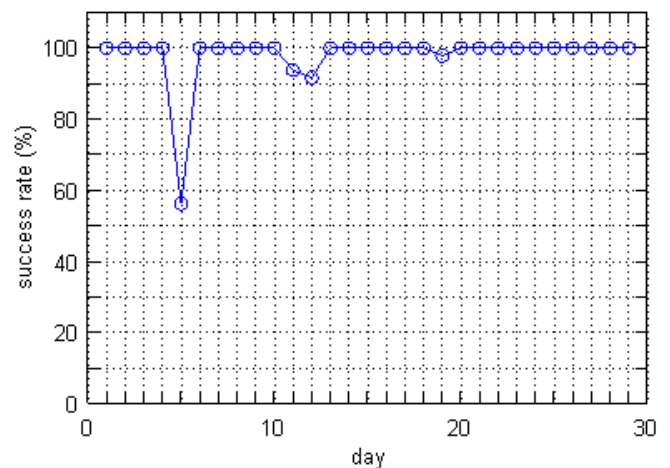
GSM connections are mostly used for speech. The acoustic signals are converted to packets. GPRS is short for General Packet Radio Service, in this case packets of data. The same GSM network is used and often the same GSM modem can be used. As a result network coverage on your buoy location and performance in your typical wave conditions remains identical. However, there is one important difference: GPRS has lower priority than speech (dial-in). The results of a short field test will illustrate this.

Cost example

GPRS is charged per Mbyte, whereas GSM dial-in is charged per minute. In this example transmission of one raw data logger message (RDT, 14 Kbyte) every half hour for one month is assumed. This adds up to 20 Mbyte or 350 minutes at typically 9600 baud. Due to dial-in overhead the time easily doubles. With €0.10/minute and a 500 Mbyte data limit for €10, monthly costs compare as €10 (GPRS) to €70 (dial-in).

Field test

At the end of the summer Datawell performed a small field test for one month. A buoy fitted with GSM was deployed on the North Sea near the port of IJmuiden. Every half hour the buoy transmits data over a GSM GPRS connection. Usually 48 messages per day are received and the success rate is 100%. On day 5 however no connection to the Datawell server could be made. By default the buoy will suspend further messages until the next 12 hour limit (noon or midnight, UTC). More relevant are day 11 and 12. During this hot sunny weekend the beaches near IJmuiden were very crowded. Apparently at times higher priority GSM phone calls and smart phone data requests left no bandwidth for buoy GPRS transmissions. Nevertheless, all missing data could easily be retrieved over the GSM-GPRS link at a later time.



GSM-GPRS success rate during a 29 day field test.



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Photographs of Telit and Siemens GSM modems used in Waverider buoys. As for the Siemens modem the particular model is critical. Check the label on the bottom side (area inside red ellipse).

Compatible GSM modems

To find out if your GSM modem supports GPRS please check the manufacturer and model with help of the photographs. Telit modems and Siemens modems MC55 and MC55i are compatible with GPRS communication, but Siemens modem TC35i is not although it can be replaced with a MC55(i) modem. Please contact Datawell Service.

Setting up a GPRS connection

The GSM link can be configured locally via a `set tcp` command over the console. Dial-script commands, internet-address and -port, etc must be set for the primary and secondary connection. To switch to GPRS mainly the dial-script must be changed. The GPRS dial-script template is as follows:

```
d10sAT&F#~sAT&K0#~sAT+CGDCONT=1,"IP",<APN>
#~sAT+CGDATA="PPP",1#~w60CONNECT~p<Login>
,<Password>~
```

where AT+CGDCONT and AT+CGDATA are specific GPRS commands that replace the ATD command of the dial-in template.

If a connection fails, extend the waiting period by replacing d10s with d20s. This will give the modem more time to log on to the network. Verify that the provider approves logging on to different networks. This can become an issue if a buoy is drifting away from its original location. While still supported you can configure the secondary (backup) script for standard GSM dial-in connection. The second script will be used if the first script fails.

Important: Warning

In principle the GSM link can be configured remotely, but experimenting with a buoy out at sea is not recommended. In addition, due to a buoy firmware bug equal signs (=) and quotation marks (") are stripped from remotely set commands, which would corrupt your GPRS dial script! This will be fixed in a new buoy firmware release.