

Approval Date: 20 May 1998

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Version: 1

Purpose

The Differential Global Positioning System (DGPS) will be used for accurate position fixing during bathymetric surveying and for general-purpose hydrographic/(geo)hydrological applications.

Conditions & Requirements

- The system shall be of such a design that it operates reliably and accurately under the prevailing environmental and operational conditions.
- The system shall be easy to operate and maintain.
- The system shall be supplied with the accessories as needed for effective deployment.
- All materials on the system exterior shall be non-corrosive.
- All enclosures, cables and connectors shall be sturdy and compliant with IP65.
- The system shall be of a rugged design that can cope with the prevailing shock and vibration as experienced in mobile operations.
- The system shall have an expected technical lifetime of not less than 10 years.
- Operator's and technical manuals, related to the type and model of the system, shall be part of the delivery.
- Power consumption shall be moderate, to be derived from a standard car-battery
- The system shall comprise
 1. a portable reference station with a GPS receiver, a digital radio link (radio modem) and matching antennas, and
 2. a portable mobile station with a GPS receiver, a digital radio link (radio modem) and matching antennas.
- The system shall generate alert messages in case the GPS data quality deteriorates beyond required accuracy and reliability and also in case of failures at the reference station. Causes can be bad satellite configuration, ionospheric activity, data link failure and similar.
- A digital radio link shall be included to deliver the pseudo range correction data to the mobile station.
- Preferably, the digital radio link includes voice communication support (voice radio link), possibly over an analogue channel on the same radio.
- The DGPS is to be deployed on reservoirs with a maximum dimension of about 80 km. The digital radio link shall be capable to cover the full range, i.e. from the reservoir dam to the end of the reservoir.

Specifications

1. Reference Station

GPS receiver channels	≥8 parallel
tracking characteristics	L1 C/A code and carrier
antenna	external compact dome
antenna cable	≥12 m, low loss type for the GPS frequencies
display	built in display for set-up, control and supervision
keypad	for set-up and control

2. Mobile Station

GPS receiver channels	≥8 parallel
tracking characteristics	L1 C/A code and carrier
antenna	external compact dome
antenna cable	≥12 m, low loss type for the GPS frequencies
display	built in display for set-up, control and supervision
keypad	for set-up and control

3. Digital radio link

radio frequency	VHF (or UHF band)
transmitting power	enough to reliably cover the reservoir completely, e.g. ≥5 W for medium sized reservoirs
reference station antenna	directional Yagi
mobile station antenna	omni-directional, co-linear
antenna cable	≥12 m, low loss type for the radio modem frequencies
corrections	RTCM SC104 V2
update rate	≥1/s

4. General

DGPS accuracy	<1 m (95% confidence level)
position update rate	≥1/s
data output	ASCII, serial RS232, 9600 baud
data storage (optional)	2 PCMCIA cards of 4 Mb
power supply	11 to 18 VDC
enclosure, connections	compliant with IP65
operating temperature	0 to 60°C
operating humidity	0 to 100%

Accessories

- power cords
- RS232 cables
- AC adapters
- external keypad and display, e.g. by dedicated hand held terminal
- data logging storage capacity, e.g. on PCMCIA card(s)

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- A digital radio link shall be included to deliver the pseudo range correction data to the mobile station.
- Preferably, the digital radio link includes voice communication support (voice radio link), possibly over an analogue channel on the same radio.
- The DGPS is to be deployed on reservoirs with a maximum dimension of about 80 km. The digital radio link shall be capable to cover the full range, i.e. from the reservoir dam to the end of the reservoir.

Specifications

5. Reference Station

GPS receiver channels	≥8 parallel
tracking characteristics	L1 C/A code and carrier
antenna	external compact dome
antenna cable	≥12 m, low loss type for the GPS frequencies
display	built in display for set-up, control and supervision
keypad	for set-up and control

6. Mobile Station

GPS receiver channels	≥8 parallel
tracking characteristics	L1 C/A code and carrier
antenna	external compact dome
antenna cable	≥12 m, low loss type for the GPS frequencies
display	built in display for set-up, control and supervision
keypad	for set-up and control

7. Digital radio link

radio frequency	VHF (or UHF band)
transmitting power	enough to reliably cover the reservoir completely, e.g. ≥5 W for medium sized reservoirs
reference station antenna	directional Yagi
mobile station antenna	omni-directional, co-linear
antenna cable	≥12 m, low loss type for the radio modem frequencies
corrections	RTCM SC104 V2
update rate	≥1/s

8. General

DGPS accuracy	<1 m (95% confidence level)
position update rate	≥1/s
data output	ASCII, serial RS232, 9600 baud
data storage (optional)	2 PCMCIA cards of 4 Mb
power supply	11 to 18 VDC
enclosure, connections	compliant with IP65
operating temperature	0 to 60°C
operating humidity	0 to 100%

Accessories

- power cords
- RS232 cables
- AC adapters
- external keypad and display, e.g. by dedicated hand held terminal
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