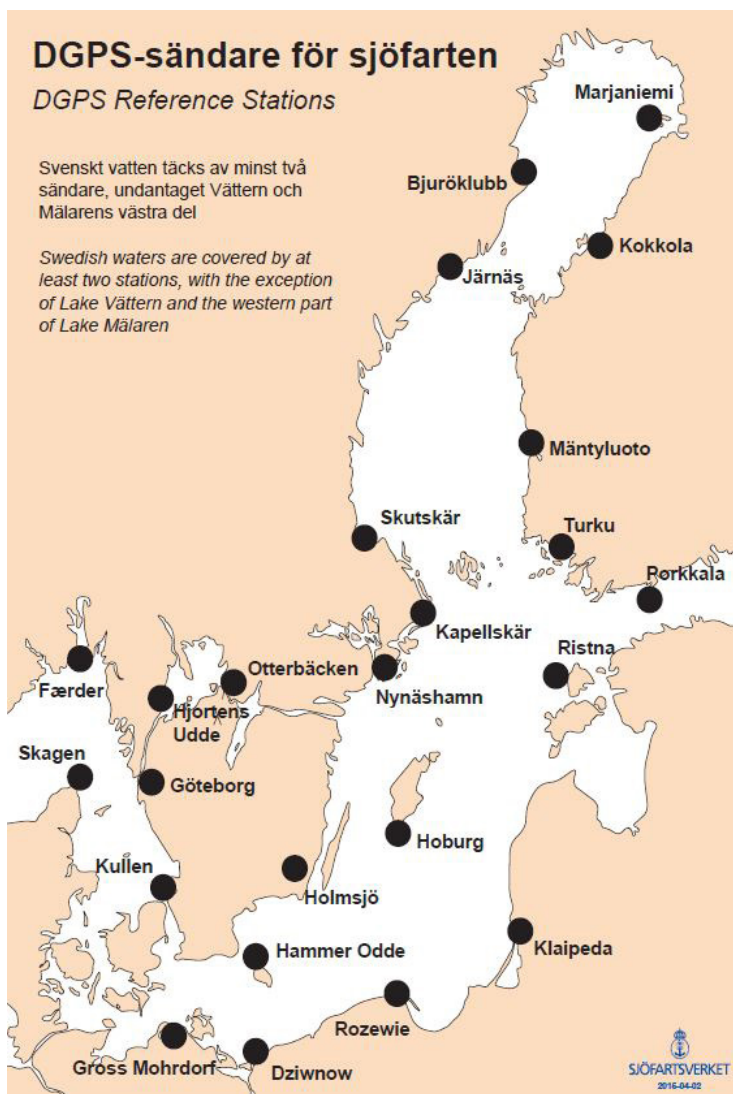


Swedish Maritime Administration

Differential GPS Service

IALA/DGPS



DGPS is the basis of GPS

GPS, Global Positioning System, is a constellation of normally 24 satellites orbiting the Earth in six distinct planes, approximately 20,000 km above the ground. The satellites transmit radio signals containing precise time and position information. A user equipped with a suitable receiver may incorporate any three or more of these broadcast signals to compute the co-ordinates of the receiver's antenna relative to the reference co-ordinate system designated WGS-84. In 95 % of the time the accuracy available to the user will be better than 9 metres.

DGPS improves the accuracy

The fact that the position isn't more accurate is due to that the signal from the satellites are influenced by the ionosphere and the troposphere and also due to insufficient exactness in the satellites ephemerides. To obtain an ever better accuracy you can install a DGPS-receiver and then receive accuracy in practical 1-2 metres, but because of juridical purposes the Swedish Maritime Administration indicate an accuracy of 8 metres.

The SMA has together with our neighbouring countries and according to IALA's recommendations established a network for DGPS including 11 stations in Sweden. The DGPS-station calculates the miscount in distance to satellites in sight and via long-wave it will transmit a correction together with information concerning the station reliability, the correction's quality and if any satellite is not suitable to use.

Table of DGNSS Stations			Country: SWEDEN			Date of issue: January 2002 Date of last amendment: September 2007					
Station name	Identification Numbers		Geographical Position Latitude Longitude	Nominal range		Station in operation	Integrity Monitoring	Transmitted message types	Freq. (kHz)	Bit Rate (bps)	Remarks
	Reference Stations	Transmitting station		km	at ($\mu\text{V}/\text{m}$)						
Bjuröklubb	722	461	64° 29' N 21° 35' E	200	50	Yes	Yes	3 6 9 16	311.5	100	
Hjortens udde	733	467	58° 38' N 12° 40' E	125	50	Yes	Yes	3 6 9 16	302.0	100	
Hoburg	730	465	56° 55' N 18° 09' E	240	50	Yes	Yes	3 6 9 16	297.5	100	
Holmsjö	720	460	56° 27' N 15° 39' E	240	50	Yes	Yes	3 6 9 16	292.0	100	
Järnäs	724	462	63° 29' N 19° 39' E	240	50	Yes	Yes	3 6 9 16	289.0	100	
Kapellskär	728	464	59° 43' N 19° 04' E	240	50	Yes	Yes	3 6 9 16	307.5	100	
Kullen	732	466	56° 18' N 12° 27' E	200	50	Yes	Yes	3 6 9 16	293.0	100	
Göteborg	736	469	57° 37' N 11° 59' E	240	50	Yes	Yes	3 6 9 16	296.5	100	
Nynäshamn	734	468	58° 56' N 17° 57' E	240	50	Yes	Yes	3 6 9 16	298.0	100	
Skutskär	726	463	60° 37' N 17° 26' E	240	50	Yes	Yes	3 6 9 16	299.5	100	
Otterbacken	738	470	58° 52' N 14° 06' E	240	50	Yes	Yes	3 6 9 16	288.5	100	

Corrections can be sent for maximum 12 satellites of which each has an angle of elevation of more than 7 degrees. The transmitted signal are supervised by a control receiver and if the calculated position of the station differ more than 8 metres from the actual position it will transmit a message of failure to your DGPS-receiver.

The broadcasts are according to ITU-RM.823 and transmitted messages are according to RTCM SC-104, number 3, 6, 9 and 16. The rate of transmission is 100 bps. The DGPS- stations are supervised by the SMA where the transmissions are monitored and kept for a certain time. The service is for the shipping and is free of charge. GPS uses WGS-84 and the correction transmitted by the SMA refer to EUREF 89, which differ less than 1 metres from WGS-84. From 1996 all Swedish nautical charts refer to WGS-84.



The reference station at Kullen lighthouse.