Geodetic Institute
Norwegian Mapping and Cadastre Authority

Interface Control Document

Satref Extended Message Protocol

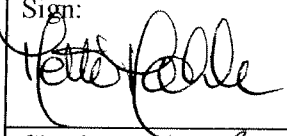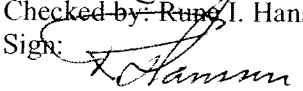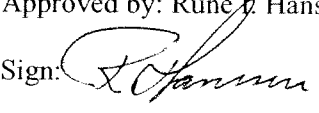SACOS:SEMP – UPP – ICD – 010100 – NMA

Date: 22.08.01

NMA
Geodetic Institute

REVISION HISTORY

1.1	Added new message class for different types of GPS receivers	22.08.01
1.0	First version	12.12.99
Rev.	**Description**	**Date**

	Prepared by: Mette Maehle Sign:	Date: 22.08.01
STATENS KARTVERK	Checked by: Rune I. Hanssen Sign:	Date: 22.08.01
	Approved by: Rune I. Hanssen Sign:	Date: 22.08.01

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1.2. Tables

1.3. Figures

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2. <u>About this document</u>

2.1. Purpose

This document describes the Satref Extended Message Protocol that is used by various applications running in SATREF™ Control Centre and the SATREF™ GDIMS.

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2.2. Definitions, acronyms and abbreviations

GDIMS   *GNSS Data Integrity Monitoring System*

GLONASS   *GLObal'naya NAvigatsionnaya Sputnikovaya Sistema, (Rus)*

GNSS   *Global Navigation Satellite System*

GPS   *Global Positioning System, (US)*

PGS   *Permanent Geodetic Station*

RIBEX   *Receiver Independent Binary Exchange Format*

SACOS   *Satref Control Centre System. The main building block in the Satref Control Centre*

SATREF™   *System that provides GNSS corrections for accuracies down the cm-level in real time and mm-level for post-processing.*

SEMP, Satref Extended Protocol   *High level message-based protocol*

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3. <u>The SATREF™ Extended Message Protocol</u>

The protocol used for the communication in the SATREF™ environment is the
SATREF™ Extended Message Protocol (SEMP). The SEMP consists of a header with a
fixed length, followed by a data field with a variable length (Ref Figure 1 - **Satref
Extended Message Protocol**).

2 bytes	1byte	1byte	4 bytes	2 bytes	2 bytes	N Bytes
SI	MC	MT	RT_W	RT_F	LEN	Data Field

Figure 1 - Satref Extended Message Protocol

*All fields in the header longer than 1 byte shall be in "big endian" format (network byte
order). The format of the data field is dependent on the message class (MC) and type
(MT)*

The various data fields in the header is explained in Table 1 - Description of the Satref
Extended Message Header.

Name	Description	Units	Range	Type	Format
SI	Source Identification. Identifies the PGS, process or module generating the message		0 - 32,767	Short Integer	
MC	Message Class Identification		1-255	Char	
MT	Message Type. Unique within the Message Class		1-255	Char	
RT_W	The reference time (RT) of the message in whole seconds. (For GNSS observation data this is the same as the sampling time of the epoch)	sec		Long	Whole GPS seconds. May be connected to the msec field for higher precision.
RT_MS	Fractional part of the reference time(RT) of the message in msec. RT=RT_W + RT_MS	msec		Short	Fractional part of GPS seconds. Must be connected to the msec field
LEN	Number of bytes in the data field		0 - 32,767	Short integer	
DF	Data field. Message contents.		Max. 32,767 bytes	Char	The format is dependent on the message class

Table 1 - Description of the Satref Extended Message Header

SI, Source Identification: For MC = 2 (RIBEX), the SI = the identification number of the PGS and identifies on which station the data has been generated.

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3.1.1. SATREF™ Extended Message Classes

Several message classes are defined in the SATREF™ Extended Protocol. (Ref. Table 2 - Satref Extended Message Classes). Every message class can have up to 255 different message types:

Message class number	Message class definition
1	Generated RTCM corrections Version 2
2	RIBEX data
3	Monitored Corrections
10	NCS data (Network Correction Stream from Trimble Control Centre)
11	Local integrity monitoring data
12	Generated RTCM corrections Version 3
13	Ashtech Raw Data
14	Trimble Raw Data
15	Javad Raw Data
16	Leica Raw Data
17	Novatel Raw Data
18	Turbo Rouge binary raw data
20	EGNOS ESTB reference stations observable (GPS, GEO and GLONASS)
21	EGNOS ESTB reference stations post observables (GPS, GEO and GLONASS)
22	EGNOS ESTB reference stations eph's
23	EGNOS ESTB reference stations post eph's
24	EGNOS ESTB reference stations local integrity monitoring data
31	SATREF™ Configuration Server File Transfer
32	SATREF™ Configuration Server Commands

Table 2 - Satref Extended Message Classes