06SERIES Brochure

This brochure provides general information of SkyDec's 06SERIES (Military) Navigation host-system and an insight on options and features.

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1 Contents

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2 Introducing SkyDec

SkyDec is a renown innovative Dutch company supplying Defense markets around the world with highly robust, precise and reliable navigation solutions.
Our in-house R&D enables short response times when it comes to new developments or re-design, being SME we can act fast without the burden of heavy overhead.
The family range of products is designed and manufactured in accordance with relevant Military Standards so that they can withstand severe operational conditions without performance loss.
Interfaces with other platform's equipment are tailor made to customer's requirements, meaning that the systems can be interfaced with all kind of new or legacy (in case of an overhaul) equipment.
DDU functionality is incorporated in most of our host systems.

3 SkyDec' s 06SERIES

3.1 Physical appearance

The 06SERIES is a 19" rackmount unit, 3U high and approximately 400 mm deep (without handles), and weights approximately 7,5 kg. A general drawing can be found in Annex 1. The outside box is made out of anodized aluminum panels that are attached onto the inner frame-parts.

On the front panel all operating controls can be found:

- The on/off switch
- The Zeroize switch (to erase krypto-keys)
- Display dimming control
- A maintenance port
- A touchscreen display for system information

The back panel is equipped with:

- A power connector
- Data connectors
- RF connectors
- A grounding stud
- Fuse holders

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3.2 Nature

The mainboard and auxiliary boards that are inside the system, are designed by SkyDec's in-house R&D team based on a rich history and experience in the Military sector. The team achieved to develop boards that bring highest precision, reliability and robustness, also diminishing latency for the multiple interfaces and DDU functions. An overview of features can be found in Annex 2.

3.3 Turnkey performance

Although being host systems for Military SAASM GPS receivers, the 06SERIES delivers robust navigation, timing and synchronization straight out of the box by means of its embedded multi GNSS receiver. The multi GNSS receiver can be individually configured to perform on GPS, Galileo, GLONASS, BeiDou and QZSS

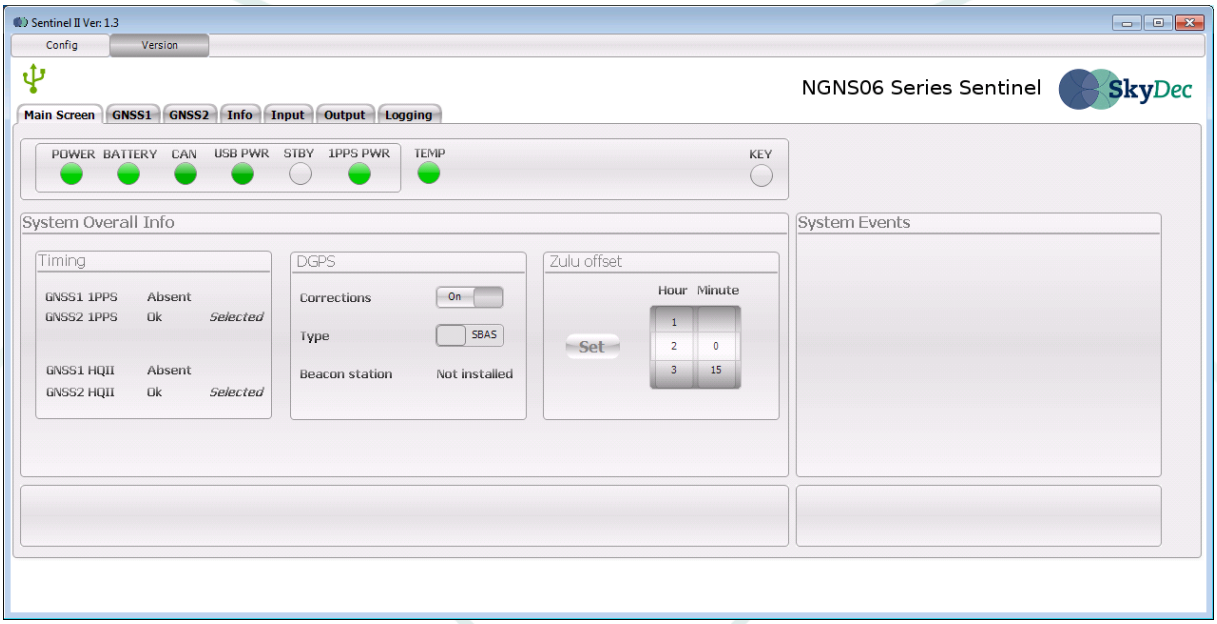
Interfaces are mutual agreed and laid down in an Interface Control Document (ICD) in the pre-production phase. During FAT all functions and interfaces are tested against that ICD, so it will be pretty much plug and play when the systems come on board. For general specifications see Annex 3

3.4 Proven concept

The 06SERIES is a proven concept that is widely in use by various Naval Forces for many years for both surface and submarine application. A selection of SkyDec customers is given in Annex 4 , note that a number of programs need to remain un-disclosed.

3.5 BIT functionality

The 06SERIES is delivered with the Sentinel monitoring/maintenance program that can run on a Windows laptop or PC. The graphical interface brings status information of all critical components of the system. It is also used for installation and Software upgrades.



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4 Options

4.1 Internal encrypted Military SAASM GPS, M-Code

The 06SERIES is designed to host MIL SAASM/M-Code GPS receivers made by a variety of manufacturers, like Trimble, Rockwell Collins, L3 , Novatel and others. Where applicable TAA's are in play, giving us authorization and all needed integration details to host said receivers.
Krypto-key loading and handling is in accordance with corresponding - mandatory - guidelines.
Procurement of MIL SAASM/M-Code GPS receivers is controlled by the United States Government.
06SERIES support with KOI-18/KYK-13/DS-102/DS-101 crypto loading (other protocols on request).

4.2 Internal eLoran receiver module

In addition to satellite based navigation systems, the 06SERIES can hold an internal eLoran module aside the GNSS/GPS receiver as an option. Based on the low frequency signals, transmitted from land stations with high antennas, eLoran positioning can hardly be jammed or spoofed, making it very reliable. The internal eLoran receiver will be kept calibrated by GNSS as long as that is available, to achieve highest possible accuracy in a situation that GNSS/GPS is denied. eLoran is backwards compatible with Loran-C.

4.3 Internal DDU module

As an option, 06SERIES can be extended with incorporated basic DDU functionality, providing up to 12 x IO processing.

4.4 DGPS

If requested, the system can hold a DGPS receiver board enabling the use of DGPS corrections. Satellite based augmentation systems (SBAS) are embedded by default. The use of correction signals enhances position accuracy.

4.5 External displays

The 06SERIES can be equipped with a dedicated interface for a choice of (third party) displays. That enables displaying navigation information on the bridge (if no ECDIS is present), the chart room or in e.g. the commander's cabin.

4.6 External signal extenders

In case that the amount of physical interfaces on the back panel of the 06SERIES is not enough to provide all needed connections, the set-up may include one (or more) signal extender(s).

5 Maintenance package

As applies for all our systems, we can offer a maintenance package that covers all repairs and updates for a period of 15 years after warranty ending for a fixed price per year and per system. This allows the customer to keep only a little set of first-response spare-parts.

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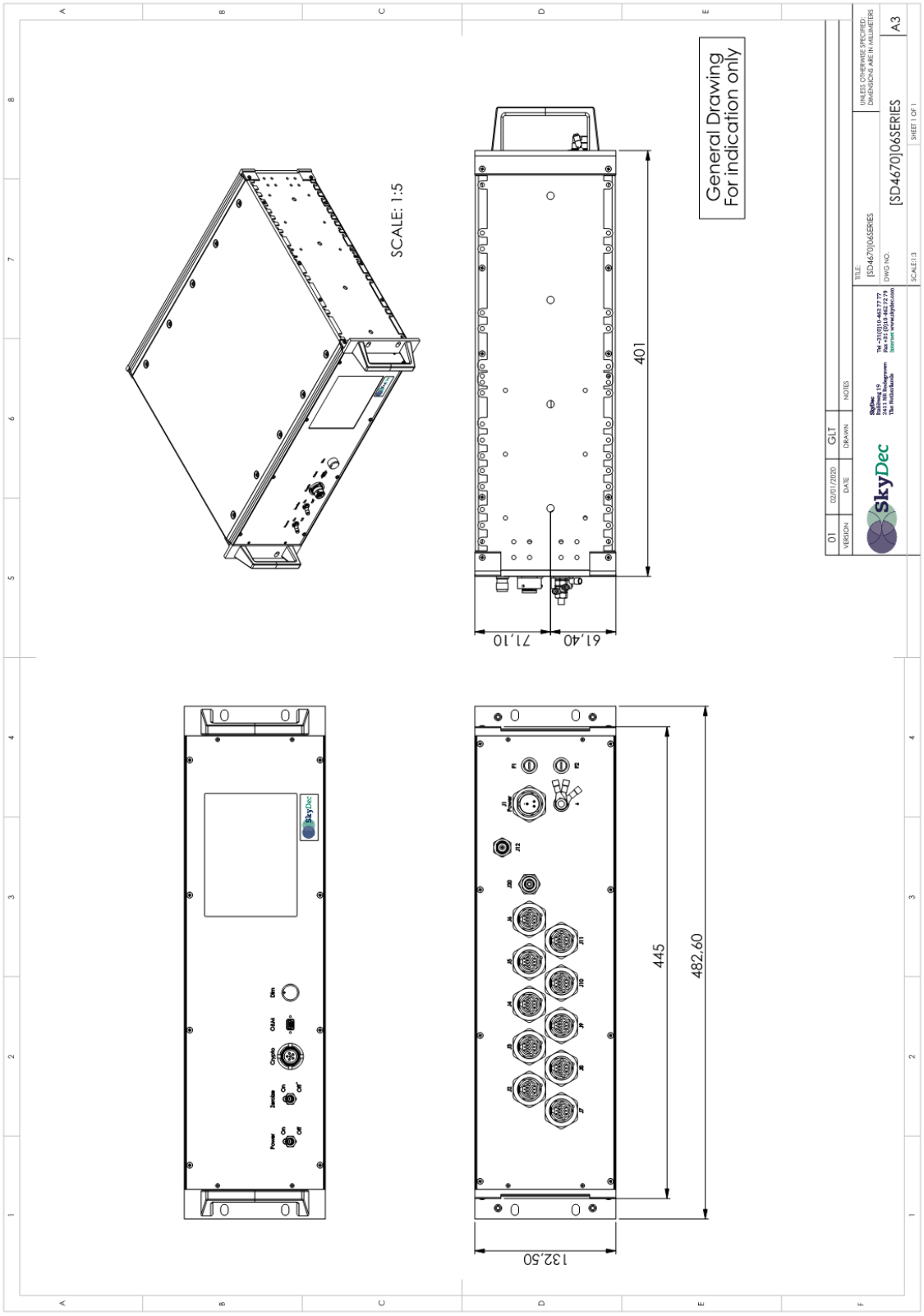
Annex 1, 06SERIES general drawing



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Annex 2, 06SERIES feature list

- Up to 12 independent interfaces for sensor input and configurable NMEA output, customized to customers' requirements.
- Can simultaneously hold and use a CIV (GNSS) and MIL (GPS) receiver, built-in degradation options available.
- Galileo, GPS, Glonass, Beidou, WAAS/Egnos, DGPS
- Factory configurable 1PPS interfaces
- Fast start option available, enabling fast position acquisitions. (input from rubidium clock and INS needed) Only available with combination of Trimble F524D, other receivers on request.
- Advanced BIT functions.
- Integrated status and information display.
- Dynamic lever-arm corrected position. (Heading, Roll and Pitch input required)
- Outputs can be configured to refer to both corrected and un-corrected position.
- USB port to enable user-performed Diagnostics and Software Updates
- Compatible with a variety of MIL GPS (SAASM/M-Code) receivers, to be obtained via FMS
- eLoran option available

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Annex 3, 06SERIES general specifications

GENERAL	
Description	- Maximum of 10 physical output connectors based on end-user requirements - Configurable outputs: a max. of 12 x RS-422 Independent galvanic isolated, 1 x CAN galvanic isolated, 8 HQIIA Independent galvanic isolated and 4 1PPS outputs (receiver dependent) - Integrated touchscreen - Compatible with a variety of MIL GPS (SAASM/M-Code) receivers, to be obtained via FMS - Compatible with M-Code receivers - Standard equipped with on board non-SAASM GPS/GNSS receiver including 1PPS and HQII capability, providing basic functionality. Configuration is defined in a mutual agreed Interface Control Document (ICD), the unit will get an unique ID related to the platform name.
Dimensions	19” wide, 3U high and approximately 400 mm deep (without handles)
Interfaces	**NMEA0183** - IEC 61162-2 **LAN** - 100BASE-TX /10BASE-T - TCP server/client - IEC 61162-450 (UDP) **Havequick (RS422/TTL)** **1PPS (5V or 10 V)** Other formats and customized interfaces on request.
Weight	Approximately 7,5 kg
Power	85-264 VAC 47-63Hz or 19-36 VDC (others on request)
Power consumption	<35 Watt, depends on opted receiver(s)
Display	5,7 “ Touch TFT-LCD
	Dimmable from 0-100%
	On screen information: PVT, Diagnostics, GPS Status (GPS mode, 2DRMS, Satellite information, Signal strength)

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GNSS		
Receiver type	72-channel GPS engine GPS L1C/A SBAS L1C/A QZSS L1C/A GLONASS L1OF BeiDou B1 Galileo E1B/C 2, ready for E5, E5a, E5b, E6	
Horizontal position accuracy CEP, 50%, 24 hours static, -130 dBm, > 6 SVs , Constellation: GPS & GLONASS, GPS	Autonomous: SBAS:	2,5 m 2,0 m

eLOran (OEM info)	
Timing	• Timing Specifications: ETSI EN300 462-6-1 / ITU G.811 Maximum Time Interval Error: < 50ns from UTC; < 25ns for 100s intervals; < 100ns for intervals <1000s • Hold-over: < 5 µs / 24 hrs • Timing source: 1 to 3 radio transmitters with automatic handover
Positioning	• Time to First Fix: 30 seconds • Position Update Rate: 1 Hz • Accuracy (95%): 10-20m Stand-alone eLoran absolute positioning accuracy in differential eLoran mode • Stations tracked: All in view
eLoran Engine	• Sensitivity: 30-120 dB µV/m • Dynamic Range: 96 dB • Signal Processing: Band pass/notch filtering, cross-rate cancellation, moving average TOA integration • Loran Data Channel: Eurofix, 9th / 10th pulse • Heading: <1 degree with H-field antenna

Shock, Environmental and EMC		
Shock	According to BR3021 and STANAG 4137	
Vibration	According to MIL-STD 810F and IEC 60945/60068-2-6:2007	
Operational temperature	-15 to 55°C (IEC 60945), +60°C (ROSE)	
Storage Temperature	-30 to +70°C	
Operational Humidity	95% (ROSE)	
EMC	According to MIL-STD 461F and IEC 60945	
	Standard Magnetic Compass	Steering Magnetic Compass
Compass safe distance	0,95m	0,55m
Compass safe distance, reduced	0,60m	0,35m

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Annex 4, References list

As an amount of programs needs to remain un-disclosed, this listing only shows a selection of customers where SkyDec supplied 06SERIES systems.

Customer	Amount (PCS)
Algerian Navy	2
Royal UK Navy	>10
Royal Danish Navy	>20
Royal Norwegian Navy	8
Turkish Navy	>30
Dutch Navy	6
Belgian Navy	6
Polish Navy	8
Damen South-America	20
Royal Canadian Navy	8
Indonesian Navy	>5

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