Apogee Series

ULTIMATE
ACCURACY MEMS

Inertial Navigation System

ITAR Free

0.005° RMS

INS
MRU
AHRS

Motion Sensing & Georeferencing

APOGEE SERIES makes high accuracy affordable for all surveying companies. On the fields of hydrography, mobile mapping, or remote sensing, the Apogee joins robustness, simplicity to high performance.

SBG SYSTEMS

Apogee Series

HIGH QUALITY HIGH ACCURACY

SBG SYSTEMS manufactures high quality, high accuracy inertial navigation systems from the concept to the production. The Apogee benefits from our high level of expertise in integrated design, IMU calibration, testing, and filtering. Apogee makes high accuracy affordable for all surveying companies.

Highly Accurate

ATTITUDE AND POSITION

	GNSS L1/L2/L5	DGPS	RTK*	PPK**	RTK 60 sec outage	PPK 60 sec outage
Roll/Pitch	0.01°	0.01°	0.008°	0.005°	0.01°	0.005°
Heading - Single antenna	0.05°	0.05°	0.02°	0.015°	0.02°	0.015°
Heading - Dual antenna (2m baseline)	0.02°	0.02°	0.02°	0.015°	0.02°	0.015°
Heading - Dual antenna (4m baseline)	0.01°	0.01°	0.01°	0.01°	0.02°	0.01°
Position (X/Y)	0.6 m	0.3 m	0.01 m	< 0.01 m	0.3 m	0.1 m
Altitude (Z)	1.0 m	0.5 m	0.03 m	< 0.02 m	0.1 m	0.07 m

HEAVE (MARINE)

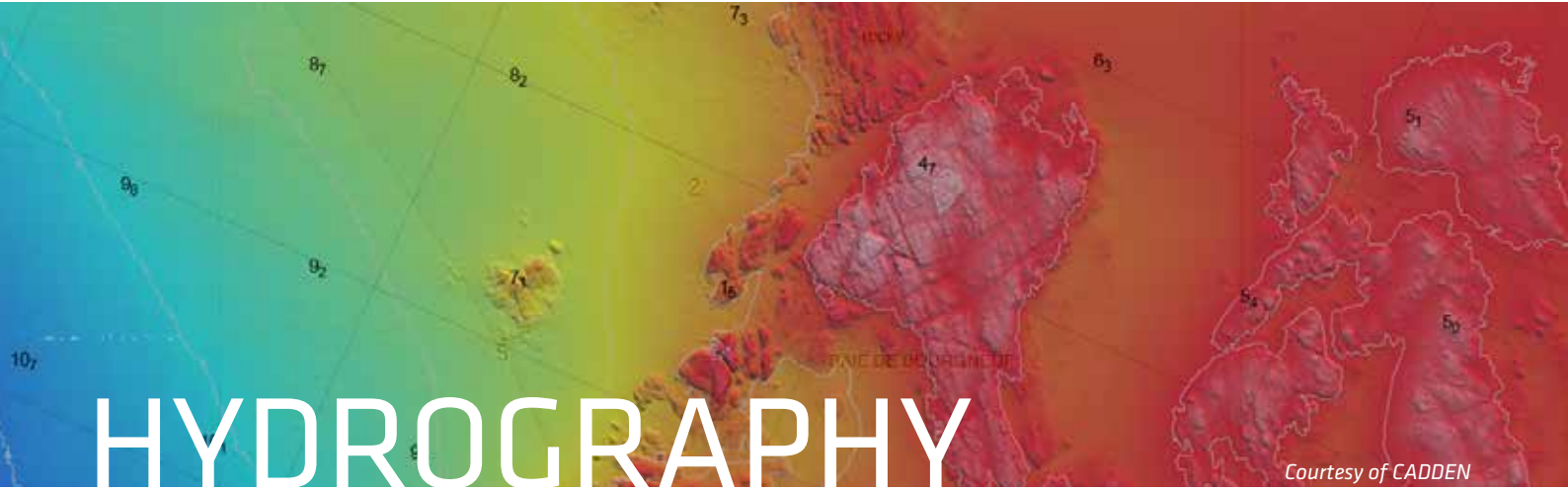
	Accuracy	Wave Period	Remarks
Real-time Heave	5 cm or 5 %	Up to 20 seconds	Automatic adjustment to every sea conditions
Delayed Heave	2 cm or 2 %	Up to 40 seconds	On board computation

VELOCITY AIDED POSITIONING

Odometer (DMI)***	< 0.1 % of Travelled Distance
DVL***	< 0.2 % of Travelled Distance

**Real Time Kinematic*
*** Post-processing Kinematic*
****Depends on velocity aiding accuracy*

RMS values for typical survey trajectories
Performance may be affected by atmospheric conditions, signal multipath, and satellite geometry.
All specifications subject to change without notice.



HYDROGRAPHY

Courtesy of CADDEN

Motion Compensation & Data Georeferencing

- VERY ACCURATE MULTIBEAM SONAR MOTION COMPENSATION
- ROBUST POSITION DURING GNSS OUTAGES
- DELAYED HEAVE FOR DIFFICULT SEA CONDITIONS
- SEAMLESS POST-PROCESSING WORKFLOW

RIVER & COASTAL SURVEY

Georeferencing ashore or near the coast with:

- TerraStar
- OmniSTAR (through SplitBox)
- RTK corrections
- Post-processing
- DVL input for river and canal

MARINE DEEP WATER SURVEY

Georeferencing offshore with:

- Veripos
- Marinestar through SplitBox
- Compatible with C-Nav, and Seastar through external receiver
- Post-processing

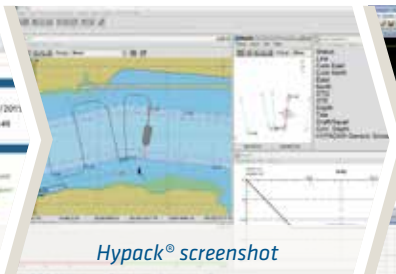
Smooth Workflow

SplitBox

EASY CONNECTIONS

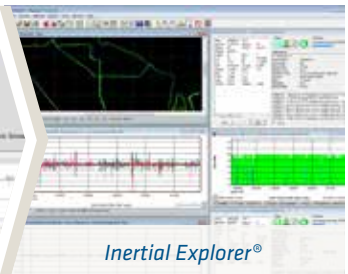
Embedded Web Interface

WEB CONFIGURATION



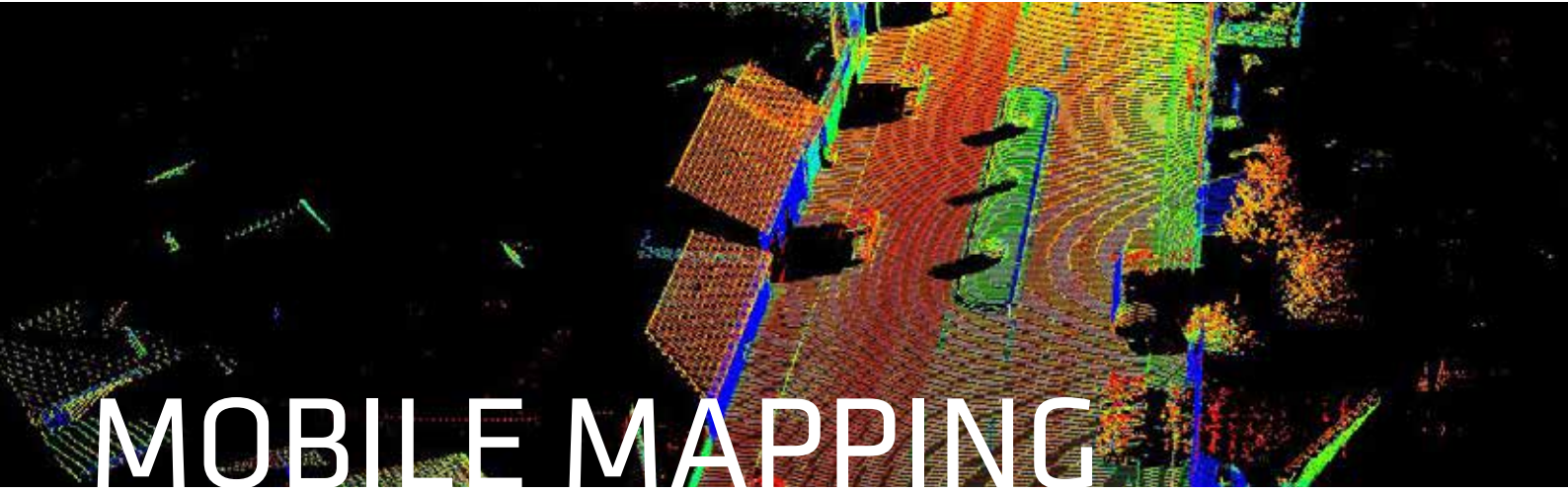
Hypack® screenshot

COMPATIBLE WITH ALL HYDROGRAPHIC SOFTWARE



Inertial Explorer®

POST-PROCESSING



MOBILE MAPPING

Precise Trajectory & Direct Georeferencing

- ACCURATE TRAJECTORY DURING GNSS OUTAGES
- VERY LOW NOISE GYROSCOPES
- LATEST GENERATION OF TRI-FREQUENCY GNSS RECEIVER
- INTERNAL 8 GB DATA RECORDER

LAND MOBILE MAPPING

Robust position in urban canyons, forest, tunnels thanks to:

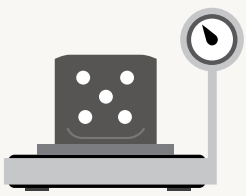
- Continuous fusion with Inertial and odometer data
- Real time and off-line RTK corrections
- Post-processing software
- Tight GNSS integration for optimal position in multipath environments

AERIAL SURVEY

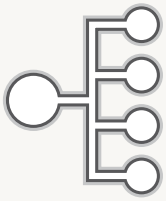
High accuracy real-time external orientation and direct georeferencing thanks to:

- RTK, TerraStar, or OmniSTAR corrections
- Low latency (3 ms)
- High resistance to vibrations (can be used on helicopter)
- Post-processing software

Easy Integration, Precise Synchronization

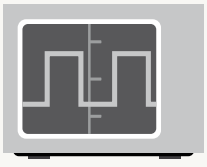


COMPACT, LIGHTWEIGHT & LOW POWER



ETHERNET, RS-232, RS-422, CAN PROTOCOLS

ACCURATE UTC TIME STAMPING (1 µs)



UP TO 5 EVENT INPUT MARKERS

Specifications

Preliminary

All parameters apply to -20 to 60°C temperature range, unless otherwise stated.
Full specifications can be found in the Apogee User Manual available upon request.

PRODUCT LINE




Model	Apogee-A Motion Sensor	Apogee-E INS & SplitBox GNSS	Apogee-N INS/GNSS	Apogee-D INS/Dual GNSS
Roll, Pitch, Heading	●	●	●	●
Heave (Marine)	●	●	●	●
Navigation		●	●	●
GNSS receiver		SplitBox GNSS with Dual antenna L1/L2/L5 GPS + GLONASS Option: GALILEO, BEIDOU	Single-antenna L1/L2/L5 GPS + GLONASS Option: GALILEO, BEIDOU	Dual-antenna L1/L2/L5 GPS + GLONASS Option: GALILEO, BEIDOU
DGPS		●	●	●
Omnistar / Marinestar*		●		
Terrastar / Veripos*		○	○	○
RTK 30/30		●		
RTK 10/10		○		
RTK		○	○	○
Post-processing (raw data)**		○	○	○
External Aiding	GNSS for optimal orientation, heave, and navigation perf.	Up to two external GNSS receivers, Odometer (DMI), DVL, Depth Sensor		

● *Standard* ○ *Option*

PHYSICAL CHARACTERISTICS

Model	Apogee-A/E	Apogee-N/D
Weight	< 690 grams 1.52 pounds	< 900 grams 1.98 pounds
Dimensions (L x W x H)	130 x 100 x 58 mm 5.12 x 3.94 x 2.28 ''	130 x 100 x 75 mm 5.12 x 3.94 x 2.95 ''
Consumption	< 3 W	< 5 W / < 7 W
Supply	9 to 36 VDC	9 to 36 VDC

SENSOR PERFORMANCE

	Accelerometers		Gyroscopes
Measurement range	2 g	10 g	100 °/s
Bias in-run instability	< 2 µg	< 15 µg	< 0.08 °/hr
Random walk	< 15 µg/√Hz	< 75 µg	< 0.012 °/√hr

INTERFACE

Aiding Sensors (input)	2x GNSS, RTCM, Odometer, DVL, Depth
Protocols	Output: NMEA, ASCII, Binary, TSS, Simrad Input: NMEA, Trimble, Novatel, Septentrio, Hemisphere, Veripos, Fugro, PD0, PD6
Output rate	0.1 to 200 Hz
Logging Capacity	8 GB or 48 h @ 200 Hz
Serial RS-232/422	Model N/D - 2 outputs / 4 inputs Model A/E - 3 outputs / 5 inputs
Ethernet	Full Duplex (10/100 base-T)
CAN	1 CAN 2.0 A/B bus up to 1 Mbit/s
Pulses	Inputs: PPS, Event marker up to 1 kHz Outputs: SyncOut, Trigger, PPS 5 inputs / 2 outputs

ENVIRONMENTAL

IP rating	IP68
Specified temperature	-20 to 60 °C / -4 to 140 °F
Operating temperature	-40 to 71 °C / -40 to 160 °F
MTBF (computed)	50,000 hours
Operating vibrations	20 Hz to 2 kHz as per MIL-STD-810G Accelerometer 2 g: 1 g RMS Accelerometer 10 g: 8 g RMS

**Subscription available from third party PPP service provider*
***Raw data are compatible with Novatel Inertial Explorer® software*

SBG SYSTEMS

SBG Systems is a leading supplier of MEMS-based inertial motion sensing solutions. The company provides a wide range of inertial solutions from miniature to high accuracy. Combined with cutting-edge calibration techniques and advanced embedded algorithms, SBG Systems products are ideal solutions for industrial & research projects such as unmanned vehicle control, antenna tracking, camera stabilization, and surveying applications.

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