THE RUSSIAN INSTITUTE OF RADIONAVIGATION AND TIME

OPEN JOINT STOCK COMPANY

RIRT

NAVIGATION USER EQUIPMENT

INTEGRATION

The INTEGRATION combined multifunctional navigation user equipment (NUE) operates from GLONASS/GPS signals as well as signals of ground-based LORAN-C/CHAYKA pulse-phase radionavigation systems (PPRNS). This NUE can receive and process corrections in EUROFIX format as well as those from medium-wave marine radio beacons in RTCM SC-104 format.

The NUE is purposed for navigation support of marine ships when navigating at open sea and coastal region, going over narrow waters, approaching harbors and maneuvering within these; for navigation support of river ships when navigating at lakes, water storage basins, rivers, and channels as well as for high-accuracy position/velocity solution for land vehicles.

The INTEGRATION NUE is designed for operating at marine/river transportation means which velocity does not exceed 70 knots.

FUNCTIONS

Determination:

- ship's geodetic coordinates*;
- actual speed vector (path, angle, actual speed);
- UTC (Russia) and UTC (US) time.

Reception and processing LORAN-C and/or CHAYKA signals.

Reception, processing and registering of corrections transmitted as the symbols by ground-based LORAN-C and/or CHAYKA stations.

Input and storage of up to 1000 waypoints.

Input and storage of up to 20 courses or fairways (up to 50 waypoints in each one).

Calculation (in loxodrome and great circle course):

- time of ship's arrival to the waypoint of the specified position with the specified speed;
- distances and courses between two waypoints;
- parameters of deviation against the specified route.

Voice and visual signaling:

- when approaching a waypoint at a specified distance;
- when going beyond the selected fairway width.

** Output of the navigation data in WGS-84, PZ-90, SK-42, SK-95, or any other reference frame*

INTEGRATION

Certificate of type approval of equipment of the Ministry of Transport of the Russian Federation
4/3-2151-2007A of 01.08.2007

Type approval certificate of the Russian Maritime Register of Shipping
№ 07.03510.011 of 25.12.2007

Certificate of approval of typified product of Russian River Register
№ 56-06-3.10.1 of 24.12.2007

MAIN TECHNICAL PARAMETERS

Architecture:	
- GNSS Receiver Module	16 channels for receiving GLONASS/GPS signals of standard accuracy and WAAS, EGNOS signals (with arbitrary channel distributions between systems)
- PP RNS Module	Reception and processing up to 10 signals of stations from no more than two of arbitrary PPRNS chains
- DCR Module	Three independent parallel channels for receiving signals in a frequency band of (283.5-325.0) kHz with manual or automatic selection of frequencies being received
Root-mean-square positioning/timing errors, no more than:	
- position, m	
• *from GLONASS*	30
• *from GPS without SA*	18
• *from GLONASS/GPS*	16
• *in differential mode*	10
- velocity, m/s	0.05
- time, μs	0.3
GNSS Integrity Monitoring (RAIM)	Autonomously
Mean time to first fix, s, no more than:	
- «hot» start	6
- «warm» start	60
- «cold» start	180
Communication with external devices	
Input/output ports	RS-422
Maximum data rate, bit/s	38400
Data update rate, Hz	1
Communications protocols	IEC 61162 (NMEA 0183 V.2.3)
Electrical Characteristics	
Supply voltage, V:	
- DC	27.0 ± 10 %
- AC, 50 Hz	220 ± 10 %
Consumption power, W, no more than	10
Enviromental Conditions	
Operation temperature, °C:	
- INTEGRATION NUE	From –15 to 40
- combined antenna GLONASS/GPS and RS	From –40 to 55
- pulse - phased RNS antenna	From –40 to 55
Humidity at 40 °C, %:	
- INTEGRATION NUE	98
- combined antenna GLONASS/GPS and RS	98
- pulse - phased RNS antenna	98
Vibration over a frequency band of (1-60) Hz, g, no more than	7
Speed, knots, no more than	70
Physical Parameters	
Dimensions*, mm:	
- INTEGRATION NUE	321×265×85
- combined antenna GLONASS/GPS and RS	160×160×131
- pulse - phased RNS antenna	53×90×665
Weight, kg, no more than:	
- INTEGRATION NUE	4.5
- combined antenna GLONASS/GPS and RS	1.1
- pulse - phased RNS antenna	1.3

* **Without regard for dimensions of receptacles for connectors and cables**

RIRT

2, Rastrelli Square, St.Petersburg, 191124, Russia
Phone: +7 (812) 274-1488, 577-1071. Fax: +7 (812) 577-1041, 274-1894
E-mail: sales@rirt.ru, office@rirt.ru
http://www.rirt.ru

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