DECLARATION

OF DESIGN AND SPECIFICATIONS

Airborne Equipment of Satellite Navigation

СН-4312 ТДЦК.461513.077

(The component part is designed for installation on civil aircrafts and helicopters)

Moscow
2007

DDS Change sheet

Changes	Number of section	No. of sheets			Total number of sheets in the document	Brief description of the change. Document which applies changes	Signature	Date
		replaced	new	cancelled				
1	4, 10	2,6,19			21	Software version change, Certificate No423/01		
2	4, 10	2,6,19			21	Software version change, Certificate No 031/01-08/40 dated 11 Aug 2008		
3	4, 10	2, 6, 8-11, 19			21	Software version change, technical data correction, Certificate No 031/01-08/70 dated 25 Sep 2008.		
4	1, 4, 5, 10	2, 3, 6-13, 19			21	Software version change, technical data correction, Certificate No 031/01-08/30 dated 27 Apr 2009		

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DECLARATION OF DESIGN AND SPECIFICATIONS

Airborne Equipment of Satellite Navigation

СН-4312 ТДЦК.461513.077

1 Name and Address of Designer and Manufacturer

Closed joint-stock company “Navigation System Design Office” (“NAVIS”)
127411, Moscow, POB 11; Dmitrov highway, building 157
tel. (495) 665-61-48, fax (495) 665-61-49,
E-mail: navis@navis.ru http://www.navis.ru

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2 Product Type and Designation

Airborne equipment of satellite navigation (AESN) ТДЦК.461513.077, СН-4312 code, and its modification – airborne equipment of satellite navigation ТДЦК.461513.077-02, СН-4312-02 code, (hereinafter referred to as the equipment, if information relates to СН-4312 and СН-4312-02 equipment) have relation to AESN of A1, B1, C1 classes according to КТ-34-01 Qualifying Requirements “Airborne equipment of satellite navigation” (3rd edition) and designed for use in airborne equipment systems (AES) of aircrafts and helicopters for solving both off-line and jointly with AES of navigation problems in all stages of flight from take-off to approach.

СН-4312-02 is different from СН-4312 through the use of А101П passive antenna and LNA-SSF amplifier instead of the antenna unit.

The equipment provides continuous determination of navigation parameters for aircrafts and helicopters by GLONASS and GPS SNS signals, and also using of navigation information, received from airborne equipment (AE) in order to navigation solving assistance and improving availability of RAIM monitoring when geometry of satellites is unsatisfactory.

3 Hardware Configuration

3.1 Hardware configuration is shown in Table 3.1:

Table 3.1

	Airborne equipment of satellite navigation for aircrafts and helicopters of civil aviation Index – CH-4312	*ТДЦК.461513.077*	
1	Antenna unit (AU)	ПКАН.434854.011	1 pc.
2	Receiving indicator and control unit (RICU)	ТДЦК.467855.039	1 pc.
3	Uninterruptible power supply (UPS)	ТДЦК.436434.006	1 pc.
4	Mounting part set (MPS)	ТДЦК.468911.020	1 set
5	List of operating documents	ТДЦК.461513.077 ЭД	1 set
6	Package	ТДЦК.305642.048	1 set
	Airborne equipment of satellite navigation for aircrafts and helicopters of civil aviation Index – CH-4312-02	*ТДЦК.461513.077-02*	
1	А101П antenna (A)	ПКАН.464656.005	1 pc.
2	LNA-SSF amplifier	АПМА.434816.034	1 pc.
3	Receiving indicator and control unit (RICU)	ТДЦК.467855.039	1 pc.
4	Uninterruptible power supply (UPS)	ТДЦК.436434.006	1 pc.
5	Mounting part set (MPS)	ТДЦК.468911.020-02	1 set
6	List of operating documents	ТДЦК.461513.077-02 ЭД	1 set
7	Package	ТДЦК.305642.048-01	1 set

4 Technical Specifications and Software Version

СН-4312 equipment meets the requirements of technical specifications ТДЦК.461513.077 ТУ.

СН-4312-02 equipment meets the requirements of technical specifications ТДЦК.461513.077-02 ТУ.

Software:

-GNSS module version	01.12;
-CPU version	VM4312.01.03;
-peripheral controller version	VK4312.01.03.

The software level is 2 according to КТ-178А Qualifying Requirements “Requirements to software of airborne equipment and systems when aerotechnics certification”.

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5 Basic Specifications

5.1 The equipment is designed for:

- navigation task solving and aeronavigation process control on all stages of flight from take-off to approach, along airways and random routes, on equipped and unequipped airways, at any time of the day by means of GLONASS and GPS SNS;
- producing the control signal to ACS (САУ);
- centralized control of radio equipment (VOR, DME) in automatic and manual modes;
- operation using standard world and user aeronautical database;
- display of flight-navigation information and operating modes in alpha-numeric and graphic form;
- forming and output of navigation information for its displaying on flight-navigation instruments and on displays of electronic display system (or multipurpose displays).

CH-4312 is designed for installation both independently and as a part of flight-navigation system in aircrafts and helicopters of civil aviation.

5.2 Calculation of navigation parameters

5.2.1 The equipment receives and processes navigation information from all navigation space vehicles (NSV), which are located in antenna directional pattern irrespective of their appurtenance to GLONASS or GPS SNS.

The equipment has 24 receiving channels of NSV signals.

Automatically, continually, in real time, in flying line and in flight the equipment calculates the following navigation parameters on signals from GLONASS, GPS SNS, as well as using data receivable from airborne equipment (AE) of the aircraft:

– geographic coordinates of aircraft position;
– aircraft geodetic altitude;
– aircraft ground speed components;
– ground speed;
– path angle;
– UTC time.

The calculation of mentioned above parameters using SNS is provided when no less than 4 satellites of one system are available in view.

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5.2.2 The equipment has automatic or manual (operator option) selection of AESN operating modes according to Table 5.1 depending on the availability and quality of navigation satellite signals and signals received from airborne equipment system:

- data from heading and vertical systems, ADS;
- data from distance measuring equipment (DME) and VHF omnidirectional ranges (VOR);
- commands of ground augmented check and maintenance.

The selected mode is displayed in output data of RICU.

Table 5.1

No	Operating modes
1	Self-controlling
2	Search
3	SNS navigation
4	DME/DME navigation
5	VOR/DME navigation
6	ADS navigation
7	Ground augmented check
8	Off-line test

5.2.3 The equipment provides a receiver autonomous integrity monitor (RAIM) by calculation of HDOP, VDOP, HIL, VIL, HFOM and VFOM values.

5.2.4 The equipment performs fault detection and exclusion function of failed navigation satellite signals (FDE function).

5.2.5 The equipment sets automatically or manually an integrity signaling threshold. In case of automatic setting the signaling threshold is set according to flight phase: en route - 3,6 km; in terminal area – 1,8 км; in approach -556 m when non-precision approach.

5.2.6 In “SNS navigation” mode the errors do not exceed values required by КТ-34-01 (3^{rd} edition). In “DME/DME navigation” and “VOR/DME navigation” modes the errors are defined by calculation depending the distance to radio beacons on geometrical position of aircraft and beacons.

5.2.7 Forecasting of RAIM function for navigation point is provided within 12 hours, from the set time of calculation start with the desired pitch set by operator. RAIM function availability forecasting is provided in any time when the equipment has received the full almanac.

Additional information about the health of satellites at estimated time is used for NOTAM prediction.

5.2.8 The equipment allows measures providing the continuity of data output and excluding incorrect data output in passing of GPS 1024-week cycle to initial condition.

5.2.9 The equipment displays the following additional parameters: number of each tracking satellite, azimuth, elevation angle, S/N ratio with GLONASS or GPS system indication.

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5.2.10 Based on navigation parameters and WPT input coordinates, equipment provides a calculation of:

- particular great circle coordinates of aircraft position (S_{PGC}. and Z);
- distance from the current aircraft position to the following WPT;
- specified path angle, true or magnetic;

- actual path angle, true or magnetic;

- corrective turn angle (correction for heading), equal to the difference between specified path angle and actual path angle, true or magnetic;

- ground speed;

- flight time from the current aircraft position to the next WPT and to the final WPT along desired track;

- flight time of the next WPT and final WPT along desired track

5.2.11 The equipment provides an output of the current coordinates in WGS-84 both for display and external users.

5.2.12 On command from control panel the equipment displays the current coordinates in SK 42 and PZ-90 reference systems.

5.2.13 The equipment provides digital data input and output:

- RICU has eight inputs for data reception from aircraft sensors at transmission rate 12÷14,5 (100±1%) kBits/sec. and four outputs for producing data at transmission rate 12÷14,5 (100±1%) kBits/sec. according to GOST 18977-79, PTM 1495-84 (ARINC-429) requirements, route information including WPTs, SID/STAR/Approach procedures and the current coordinates of aircraft position to aircraft systems (to multipurpose display), information for airborne storage devices, data transmission;

- RICU outputs digital information according to Tables 1 and 2, Appendix B of КТ-34-01 (3rd edition);

5.2.14 The equipment provides the forming and output of the following analog electric signals:

a) signal of aircraft proportional deviation from desired track in the form of DC voltage varied from minus 150 mV to + 150 mV, on loading from 200 Ohms to 1000 Ohms.

Deviation range is changed automatically depending on the flight phase:

- from minus 5 km to plus 5 km en route;

- from minus 1 km to plus 1 km when flying in terminal area;

- from minus 0,5 km to plus 0,5 km during approach.

If deviation range occurs automatically message output is provided to RICU display and airborne equipment;

b) “desired track readiness” signal in the form of DC voltage having nominal value +27 V on loading 1000±100 Ohms, which describes the readiness of deviation analog signal from desired track;

c) “**Y-desired”** for automatic flight execution en desired route which is varied between (10±1) V and minus (10±1) V on loading no less than 1000 Ohms,

for aircraft bank control in the range ±30° with 0,33 V/degree steepness, information updating period no more than 0,1 c and ripple no more than 100 mV “from peak to peak”;

d) “**Y-desired readiness”** signal in the form of DC voltage having nominal value +27 V on loading (1000 ± 100) Ohms, which describes the readiness of **“Y-desired”** analog signal;

e) the equipment every second generates a pulse (1000±1мс), time mark having the form and load characteristics according to ARINC 743A4 requirements;

f) the equipment provides the forming and output of information in analog form to horizontal situation indicators (HSI):

- on flight «TO/FROM» WPT;
- on deviation of the aircraft from desired track («+» - right, «-» - left);
- “desired track readiness” signal.

g) the equipment provides the output of the following drive signals to aircraft indicator panels:

- OFFSET – flying a parallel route;
- RAIM – failure of receiver autonomous integrity monitor;
- WPT – intermediate WPT flying over;
- MSG – equipment operating mode (message);
- ACTV – approach switch on;
- Terminal area – while in terminal area;
- SNS readiness **–** if navigation solving and testing positive results are available;
- switch on RTUA (РТСП) – when performing the following conditions for selected terminal: $400 \le H \le 1500$, $12000 \le Y \le 30000$, $-|X| \le 0{,}6\,|Y|$,

where: H is the altitude of aircraft, meters,
X is lateral deviation from runway center, meters,
Y is the distance from runway threshold, meters;

signals are outputted in the form of “ground/open”. The switching current of drive signals on the panel is 200 mA, voltage drop in commutation circuit is no more than 0,7 V.

In the form of DC voltage having nominal value +27 V on loading 1000±100 Ohms the following signals are output:

- ARM- when the aircraft executes APPROACH procedure, two miles before FAWP flying over;
- TO/FROM – signal describing the flight **TO** WPT.

5.2.15 The equipment provides WPT flying over calculation and signal generation for aircraft heading alteration (with linear lead of turn or without it).

5.2.16 The equipment provides SID/STAR/APPROACH procedure execution using navigation database (NDB), created according to КТ-200А.

5.2.17 The equipment provides the execution of the following problems:

- display of flight route with indication of navigation references, the capability of route orientation to the north or on desired path angle (or actual path angle) scalable;
- display on RICU in the graphic form of departure, arrival and approach standard procedures;

5.2.18 In “DR navigation” mode errors of horizontal coordinates are determined by errors of aircraft sensors (airspeed sensor and heading sensor).

5.2.19 The equipment operates using all navigation satellites located in its radio coverage area. By default the equipment operates using mixed GLONASS/GPS constellation. The manual selection of GLONASS or GPS constellation is possible with indication of the mode.

5.2.20 When interfacing with airborne sensors of aircraft movement parameters the equipment provides flight dead reckoning including the value output of navigation parameter accuracy (“CBC navigation” mode).

5.2.21 Assignment requirements are executed:

a) in flying line, during movement on the airfield, while in flight;

b) at any time of the year and day, at any physiographic conditions irrespective of weather conditions (if parameters of environment which has an effect on the equipment do not exceed values suitable to specified code of exposure factors);

c) in the range ±180˚ in longitude and ±90˚ in latitude;

d) during the change of aircraft flight parameters within:

- ground speed - from 0 to 1300 km/h;
- roll angle and pitch angle – from minus 30˚ to plus 30˚;
- vertical speed - from minus 50 to plus 50 m/s;
- drift angle – from minus 180˚ to plus 180˚;
- acceleration - to ±30 m/s^2 (±3 g);
- path angle - from 0 to 360˚;

barometric altitude – from minus 500 m to 15000 m.

5.2.22 The equipment is able to adjust the display light intensity.

The display indicates navigation parameters in the following sequence:

a) geographic coordinates - degrees, minutes, hundredth of minutes;

b) particular great circle coordinates:

- deviation from desired track, if the value of deviation is from 1 km to 9,99 km, in 0,01 km (NM), if the value of deviation is from 10 to 99,9 km, in 0,1 km (NM);
- remaining distance, if the value of remaining distance is to 999,9 km (NM), in 0,1 km. (NM), if the value is from 1000 to 99999 km (NM) - в км (м.м.);

c) altitude - meters (feet);

d) ground speed – kilometers per hour (knots);

e) path angle and correction to TK - degrees;

f) current UTC time - hours, minutes, seconds;

g)- flight time to WPT - hours, minutes, if remaining time is more than 1 hour, if remaining time is less than 1 hour;

- WPT time – hours, minutes.

Note – Change in dimension of displayed parameters to dimension indicated in brackets is executed during switching from the metric system to Anglo-Saxon one.

5.2.23 If the aircraft flies en programmed route the current leg is displayed automatically by means of WPT indication.

5.2.24 CH-4312 equipment provides flight execution from the current position to any desired WPT by means of:

- resequencing of WPT fly over which was specified in the flight plan;

- return to WPT fly over sequencing specified in the flight plan;

- input of a new WPT;

- flight along parallel desired track with the desired offset value relatively desired track which was input to flight plan in the range ±99 km with 1 km discretisation;

- input of a new path angle (without WPT input).

The equipment provides input, storage, use, updating and display (before use in flight plan) of WPTs and other named and user points which were specified by identifiers and geographic coordinates.

Manual input of WPT latitude/longitude is provided in the equipment with resolution 0,01 minute.

The equipment puts out a distance/azimuth to the following WPT and has the resolution 0,1 km and 0,1 degree respectively.

The equipment has “Flight plan” function.

5.2.25 The equipment makes possible of:

- operating input of commands for WPT fly over change (skip of one or more WPTs);

- operating route reprogramming by means of identifier input of the other WPTs (retargeting to WPT which is not entered the route);

- route continuation programming by means of identifier input of new WPTs.

5.2.26 First count time of navigation parameters is no more than 2,5 minutes during “cold“ start. The running time is 24 hours.

5.2.27 The equipment provides protective measures from the use of uncertain satellite signals before and after appropriate information acquisition in satellite signals.

5.2.28 The equipment has built-in monitoring aids which provide performance monitoring as well as forming and output of integrity and accuracy estimate of the current navigation data values for display and to users.

5.2.29 The equipment provides input, storage, use, updating and display of navigation database (NDB) having geographic coordinate resolution 0,01 min. The equipment provides input capability no less than 90 flight routes to 144 WPTs in each and to 1000 user WPTs which are determined by the crew.

The equipment has nonvolatile memory size which provides NDB storage capacity for aircraft flights in expected operating conditions. The equipment presents NDB validity information and about NDB expiration of validity.

On-line data base (flight routes, USER′s WPT) is nonvolatile.

5.2.30 The equipment provides maneuver execution capability according to procedures from NDB including turns of Fly-By and Fly-Over types.

5.2.31 The equipment provides maneuver execution capability and the following trajectory types maintaining according to ARINC-424 recommendations:

- coming to approach starting point;
- flight on the leg between two WPTs;
- flight to desired WPT having desired track angle;
- flight from desired WPT having desired track angle;
- flight from the current position DIRECT-TO desired WPT.
- fixed radius arc flight.

5.2.32 The equipment provides data updating rate 10 Hz.

5.2.33 The equipment provides special functions according to КТ-34-01 requirements (3rd edition).

5.2.34 To provide RNP-1 RNAV requirements two equipment sets are installed in aircraft side. The equipment provides two RICUs automatic interaction on data transmission and operating modes during two equipment sets control from one of the RICUs. During execution of the following operations using one of the RICUs:

- setting of parameter values in **Limit Data** window;
- formation (editing) of user WPTs;
- formation (editing) of routes;
- route activation;
- flight activation in **DIRECT-TO** mode;

the same operations are executed automatically in the other RICU.

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6 Qualification Basis

СН-4312 airborne equipment of satellite navigation, ТДЦК.461513.077, meets the requirements of Qualification Basis for СН-4312 airborne equipment of satellite navigation, ТДЦК.461513.077, 2nd edition, agreed by Deputy Director of "Aeronavigation" State Science Research Institute, Chief of Independent Inspectorate, approved by Director General of NAVIS and adopted by AR МАК on 20 Aug 2007.

7 Exposure Factors (EF) and Their Specifications According to KT-160D

7.1 The equipment ensures its operability under exposure factors having parameters according to KT-160D categories.

Table 7.1

Exposure factors	Exposure factor categories		
	RICU	UPS/AA	AU/A
Temperature			
• low operating temperature	minus 20°C	minus 40°C/ minus 55°C	minus 55°C
• high operating temperature	55°C	55°C	70°C/85°C
• short exposure of high operating temperature	70°C	70°C	85°C
• change of temperature from low to high operating temperature	from minus 20°C to 55°C	from minus 40°C to 55°C / from minus 55°C to 55°C	from minus 55°C to 70°C/85°C
• low limiting temperature	minus 55°C	minus 60°C	minus 60°C
• high limiting temperature	85°C	85°C	85°C
Humidity	A	A	C
Altitude (pressure)	to 15200 m (87 mm HG)	to 15200 m (87 mm HG)	to 15200 m (87 mm HG)
Vibration	R	R	R
Operating shock loads and destruction safety	B	B	B
Sand and dust	X	X	D
Salt fog	S	S	S
Funginertness	F	F/X(requirements are not specified as to a sealed device)	X (requirements are not specified as to sealed devices)
Waterproofing	W	W/X (requirements are not specified as to a sealed device)	X (requirements are not specified as to sealed devices)
Contaminative liquids	X	X	F (except NGJ-5У and 1,1,1 of trichlorethane)
Icing	X	X	A

8 Arrangement of Equipment

8.1 Explosion risk requirements (paragraph 9.0 of КТ-160D) are not specified.

8.2 The equipment relates to category J on susceptibility to audible noise which comes on power supply inputs (paragraph 18.0 of КТ-160D).

8.3 The equipment relates to category C on susceptibility to induced noise affected across communication wires and equipment bodies (paragraph 19.0 of КТ-160D).

8.4 The equipment relates to category W on RF susceptibility (RF emission and conductance) (paragraph 20.0 of КТ-160D) (field intensity 100V/m in bandwidth from 10 kHz to 18 GHz. Conducted interferences of category W, radiated field of interferences, category W.)

8.5 The equipment relates to category H on radiation of RF energy (paragraph 21.0 of КТ-160D).

8.6 The equipment relates to category A1XXX on susceptibility to transient processes lightning-induced (paragraph 22.0 of КТ-160D).

8.7 The equipment relates to category 2B on lightning direct effect (paragraph 23.0 of КТ-160D) for antenna and passive part of antenna unit.

8.8 The equipment relates to category Z on power supply requirement (paragraph 16.0 of КТ-160D). Equipment power supply is executed from primary DC supply system with voltage +27 V. Equipment consumption current is no more than 0.65 A with voltage 27 V.

9 Restrictions and Requirements to Interfaced Devices and Systems

9.1 To provide stable operation of equipment external influences should not exceed the following values of:

- operating ambient temperatures:

from minus 20°C to 55°C for RICU;
from minus 40°C to 55°C for UPS;
from minus 55°C to 55°C for antenna amplifier;
from minus 55 до 70°C/85°C for antenna unit/antenna;.
short exposure of elevated operating temperature (within 30 min.) 70 °C is allowed for RICU, antenna amplifier, UPS and 85 °C for antenna unit.

- limiting temperature:

minus 60°C (minus 55°C for RICU)
plus 85°C.

9.2 When equipment installation it is necessary to take into consideration spaces and acceptable values of equipment unit vibration parameters.
Unit spaces/influence levels:

-for aircrafts:
RICU - toolpads, consoles, dashboards /B1A;
UPS, antenna amplifier –fuselage / C1A;
antenna unit, antenna – tail section/ Z

-for helicopters:
RICU - toolpads, consoles, dashboards /G;
UPS, antenna amplifier –fuselage /G;
antenna unit, antenna – tail section/ J

9.3 When equipment installation it is necessary to take into consideration:
- in HF cable from antenna to LNA-SSF the attenuation should be no more than 0.6 dB, in HF cable from LNA-SSF/AU to RICU the attenuation should be no more than 10 dB;

9.4 To provide a reliable reception of navigation satellite signals, antenna/antenna unit should be installed in the space which provides maximum visibility in upper hemisphere. Antenna/antenna unit should not be located near metal projected parts of aircraft or helicopter which are capable to shadow antenna/antenna unit coverage area. In close proximity to antenna/antenna unit any radiating antennas should not be available, particularly in antenna/antenna unit bandwidth.

9.5 Antenna/antenna unit radome should not be induced by contaminative liquids NGJ-5У and 1,1,1 trichlorethane.

9.6 Equipment units should not be located in explosive environment areas of aircrafts and helicopters.

10 Evidentiary Documents

1) Qualification Test Certificate No 423/59 of CH-4312 airborne equipment of satellite navigation dated 03 Dec 2007;

2) Protocols of the tests which are Appendices to the Certificate;

3) Check Flight Testing Certificate of TU-154M master aircraft, No 85809, equipped with CH-4312 satellite navigation equipment for implementing RNP-5 requirements when flying in European Region of B-RNAV system, dated 21 Nov 2007;

4) Letter of software compliance of CH-4312 airborne equipment of satellite navigation ТДЦК.461513.077 to КТ-178А requirements;

5) Type Test Certificate No 423/01 of CH-4312 airborne equipment of satellite navigation ТДЦК.461513.077, СН-4312-02 ДЦК.461513.077-02 (software version: 01.11 GNSS module), dated 28 Jan 2008

6) Test Result Certification No 031/01-08/40 of BPO SYSTEM program, GNSS module ТДЦК.468173.007-02 of BPSN-2, BPSN-2-01, CH-4312 equipment dated 11 Aug 2008.

7) Test Result Certification No 031/01-08/70 of software KVU ARM 7, PXA 255 central processor, GNSS module of RICU ТДЦК.467855.039 of CH-4312 ТДЦК.461513.077 and CH-4312-02 ТДЦК.461513.077-02 equipment, dated 25 Sep 2008.

8) Type Test Certificate No 031/01-08/30 of software KVU ARM 7, PXA 255 central processor, GNSS module of RICU ТДЦК.467855.039 of CH-4312 ТДЦК.461513.077 and CH-4312-02 ТДЦК.461513.077-02 equipment, dated 27 Apr 2009.

9) Extract from Technical Certificate No №74ТК-300Д.700.002.Д3-09 AN-74ТК-300D aircraft Certification tests of normal design master change - Сертификационные испытания главного изменения типовой конструкции – “Modified Avionics” and secondary change “Reconfiguration of aircraft passenger compartments”.

10) Check Ground Flight Test Certificate of IL-76TD aircraft, “Aviacon Citotrans” joint stock company, equipped with CH-4312 satellite navigation equipment which is connected to САУ-1Т-2БТ.

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11 Operational Documentation

ТДЦК.461513.077 ЭД	Airborne equipment of satellite navigation List of operational documents
ТДЦК.461513.077 РЭ	Airborne equipment of satellite navigation Maintenance guide. Maintenance. Part 1.
ТДЦК.461513.077 РЭ1	Airborne equipment of satellite navigation Maintenance guide. Operator manual. Part 2.
ТДЦК.461513.077 РО	Airborne equipment of satellite navigation Maintenance schedule
ТДЦК.461513.077 ПС	Airborne equipment of satellite navigation СН-4312. Summary certificate.
ТДЦК.461513.077-02 ЭД	Airborne equipment of satellite navigation List of operational documents
ТДЦК.461513.077-02 РЭ	Airborne equipment of satellite navigation Maintenance guide. Maintenance. Part 1.
ТДЦК.461513.077-02 РЭ1	Airborne equipment of satellite navigation Maintenance guide. Operator manual. Part 2
ТДЦК.461513.077-02 РО	Airborne equipment of satellite navigation Maintenance schedule
ТДЦК.461513.077-02 ПС	Airborne equipment of satellite navigation СН-4312-02. Summary certificate.
ТДЦК.467855.039 ЭТ	Receiving indicator and control unit. Label
ТДЦК.436434.006 ЭТ	Uninterruptible power supply. Label
ПКАН.464656.005 ЭТ	А101П. Label
АПМА.434816.034 ЭТ	LNA-SSF amplifier. Label
ПКАН.434854.011 ЭТ	Antenna unit. Label

12 Designer Declaration

Specifications indicated in this declaration are provided subject to use in accordance with ТДЦК.461513.077 РЭ, ТДЦК.461513.077 РЭ1, ТДЦК.461513.077-02 РЭ and ТДЦК.461513.077-02 РЭ1 under exposure conditions no more severe than indicated in sections 5 and 6 of this Declaration within limitation indicated in section 8.

The current and control sets of working design documentation are revised according to results of qualification tests, they reflect equipment standard design. The sets were verified and approved in the order set by Unified design documentation system, are fit for batch production and are kept in NAVIS.

We prove that data containing in this Declaration are authentic and they are extracted from the following functional documents: ТДЦК.461513.077 ТУ, ТДЦК.461513.077-02 ТУ, ТДЦК.461513.077 РЭ, ТДЦК.461513.077 РЭ1, ТДЦК.461513.077-02 РЭ, ТДЦК.461513.077-02 РЭ1.

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A.A. Voskoboynikov
Deputy Director General
NAVIS

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A.M. Koptev
Chief of Independent Inspectorate