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558 ARP
558 AIRCRAFT REPAIR PLANT

UPGRADE OF Su-25 AIRCRAFT

225320, Republic of Belarus,
Baranovichi, 50 let VLKSM, 7

ISO 9001

BBT

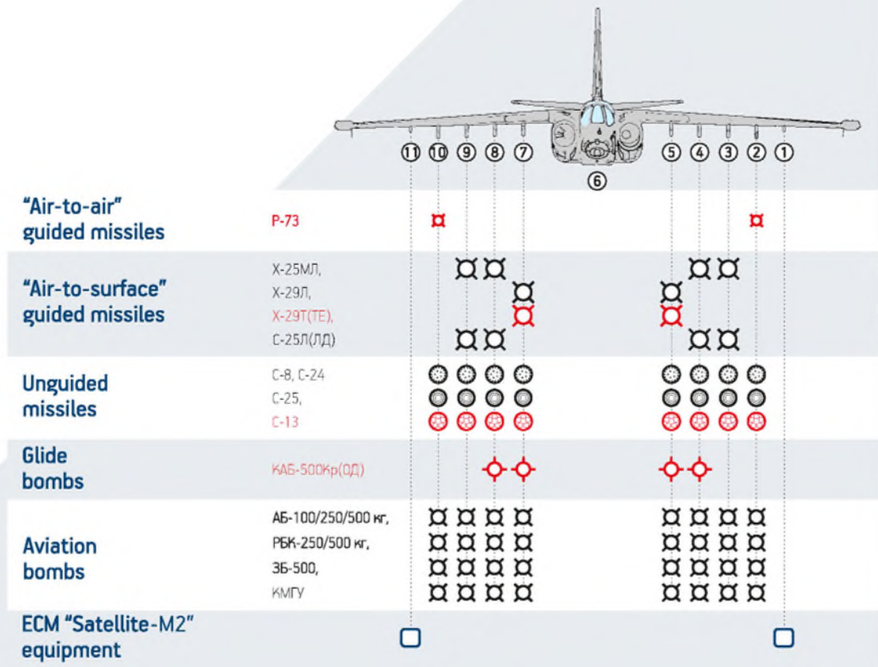
ISO 9001
BUREAU VERITAS Certification
№ BY228992Q-U

EN 9100
BUREAU VERITAS Certification
№ 7264005-REV0

ARMAMENT OF SERIES AND UPGRADED Su-25 AIRCRAFT

Armament of series and upgraded Su-25 aircraft

- Armament of series aircraft
- Additional armament of upgraded aircraft
- Electronic countermeasures protection means



Increase of combat capabilities of the upgraded aircraft is achieved as follows:

01 Installation of ПС-25 sight system, СОИ-25 data display system, applying expanded assortment of air weapons and implementation of "navigation air bombing" mode with application of free-fall bombs (day and night, any weather conditions);

02 Replacement of analog instruments on dashboard, that display navigation and sight information with multifunctional display (MFD) МФИ-10 and head-up display (HUD) ИЛС-31М;

03 Installation of СН-25 navigation system with increase in accuracy characteristics and performance of navigation in ICAO format;

04 Installation of flight parameters monitoring suite on SSD;

05 Installation of electronic countermeasures equipment "Satellite-M2" for protection of aircraft against fire damage by missiles with aviation and ADMS homing heads.

INSTALLATION OF СОИ-25 DATA DISPLAY SYSTEM

Cockpit of upgraded aircraft:

01 HUD ИЛС-31М ensures display of pilotic-navigation and sight information (indicator speed, barometric height, geometric height, heading scale, current heading, aircraft index, angle of attack scale, vertical velocity scale, tangage line, bank angle scale, range scale of station "Клен-ПС", aiming mark of the station "Клен-ПС".

02 TV camera as a part of СВР-12 complex is meant for video recording of back-cockpit area data during the flight and information from ИЛС.

03 ПУС-29 ensures control of Р-862 radio station and АРК-15(22) direction finder.

04 MFD МФИ-10 ensures display of pilotic-navigation data: indicator speed, true speed, barometric height, geometric height, M number, vertical velocity, current angle of affack, incidence limit, current overweight, bank, tangage, current heading, infended course, angle of drift, zone of course and glide beacon, azimuth and course angle of radiostation.

05 MFD МФИ-10 provides:
- display of aiming information (TV image from TV homing heads of applied weapons, zone of authorised release by range and azimuth, current target range; order "launch allowed";
- indication and on-board systems control;
- on-board data input about navigational (ППМ, АЭР, РМ, ПРС) and rates.

06 ИРП-5 provides reserve duplicating of the following data: angles of bank, tangage, prescribed track, side slipping, absolute and relative barometric height, vertical speed, indicator speed, M number.

INSTALLATION OF СН-25 NAVIGATION SYSTEM

СН-25 ensures:

99 points — Input and storage of turning point data, airfield, radio beacons for each type (6 points in series variant);

15 +/-, meters — Accuracy of determination of aircraft location current coordinates (+/- 700 meters in series variant);

8 routs — Data generation and storage (1 route in series variant);

0,2 m/s — Ground speed error detection;

VOR/ ILS, DME — Capability of navigation performance according to ICAO standard;

Flight en programmed route with automatic and manual change of navigation points in flight.

Target approach accuracy:

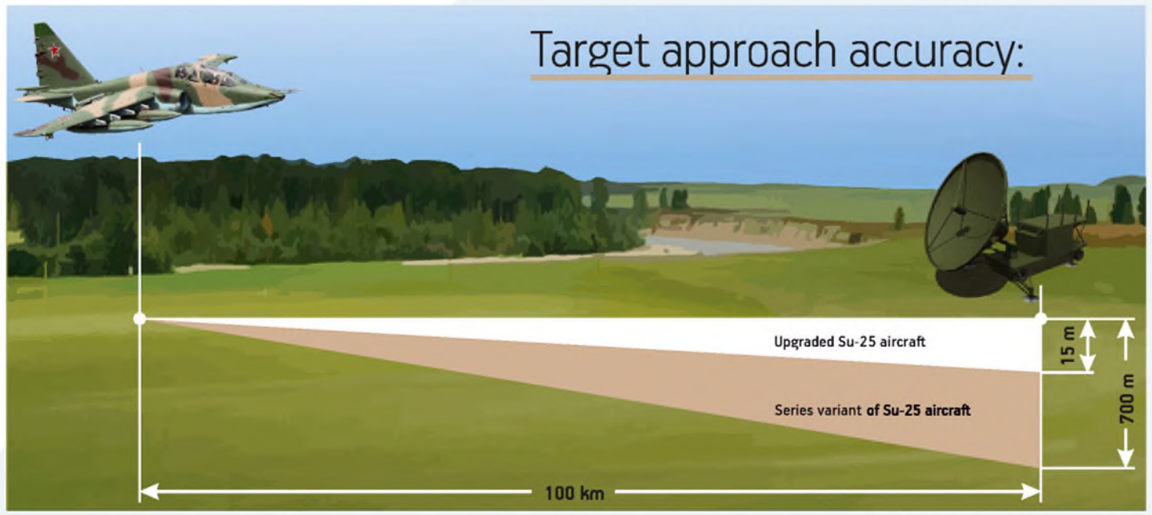


Image on MFD МФИ-10 screen in navigation mode:

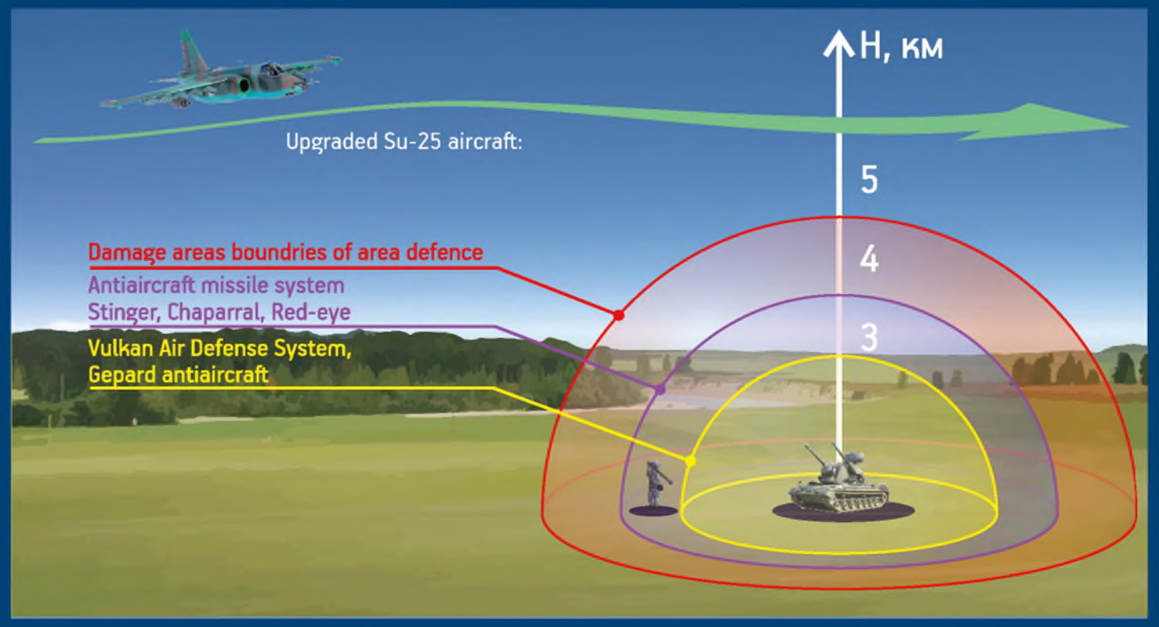
INSTALLATION OF ПС-25 SIGHTING SYSTEM

ПС-25 ensures:

01. Implementation of P-73 "air-to-air" guided missiles;
02. Implementation of X-29T "air-to-surface" guided missiles;
03. Implementation of smart airbombs КАВ-500Кр;
04. Implementation of "navigation bombing" mode.

Implementation of "navigation bombing" mode allows:

01. To bomb with free-fall air bombs in any weather conditions day and night without ground visibility;
02. Increase max bombing altitude up to 5000 m (without entering air defense area);
03. Enhance accuracy of bombing using free-fall bombs (root mean square deviation ±30 m).



Implementation of X-29T guided missiles and КАБ-500Кр smart airbombs

Image from TV homing head of X-29T missile

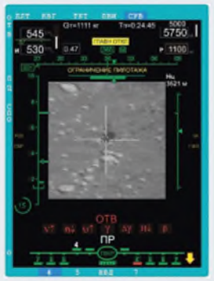


Image from TV homing head of КАБ-500Кр bomb

INSTALLATION OF OBJECTIVE CONTROL SYSTEMS

Video registration system is designated for in-flight video and audio data registration for objective control and post-flight analysis.

НС-12 portable mass storage

БС-12 juncture unit

КТ-12 TV camera

DATA FRAMES OF BACK COCKPIT AREA THROUGH HUD ИЛС-31М

DATA FRAMES FROM MFD МФИ-10 SCREEN

Navigation data display mode

Piloting data display mode

СОВИ-12 ground data processing system is used for ground video and audio data analysis.

INSTALLATION OF OBJECTIVE CONTROL SYSTEM

БУР-4-1-10 flight data control and registration system that is designated for control, registration and saving in case of flight accident of flight data on condition of powerplant and on-board aircraft systems.

Composition of БУР-4-1-10 system:

01. БСИ-4-10 data collection unit;

02. БР-4Т-10 solid-state registration unit;

03. БУ-10 control unit;

04. ПУ-4-10 console.

Ensures:

01 In-flight data reading-out and transfer to ground based system of information processing;

02 Carrying out of technological and gauging operations onsite;

03 Quick test of flight data;

04 Reproduction of voice information recorded via internal/external communication channels

05 Detailed control test of БУР-4-1-10 system as the part of aircraft;

06 Documentation of processed information results.

"Двина-М" ground program complex is used for reading-out and processing of data, carrying out express test of the parameters registered during the flight and their visual representation.

“ДВИНА-М” INFORMATION PROCESSING SYSTEM

System is designated for:

01 Reading;

02 Operational processing

03 Storage of flight information, registered by such devices as “Тестер”, “Гамма”, “МСПР-64”, “СОК УБД”, “Экран”, БУР-4, БР-4Т-3, БУР-1-2, БУР-4-1-10, БУР-СЛ-1.

«Двина-М» data processing system

Ensures:

01 Multiwindow operating mode, including operation on several monitors in all windows operating systems;

02 Multilanguage mode (Russian, French, English);

03 Urgent adjustment according to type of airborne device;

04 Flight data input into PC from flight data preparation unit of “Экран” system flash-cassette, airborne storage units from stock re-recording means as “УВЗ-3”, “Обзор-МС”, etc;

05 Urgent review and automated processing of flight data receiving diagrams, tables and statistics with printer output capability;

06 Simultaneous flight data analysis for “Экран” system from different airborne systems (ТЕСТЕР, БЦВМ-1,2, МВК РЛ etc.);

07 Express analysis and between flight data control of aircraft;

08 Terrain route compile using digital map or satellite images; dynamic vizualization of aircraft flight and primary instrument readings in 3D graphics reflecting ground profile, and displaying registered video images and audio data in a separate window;

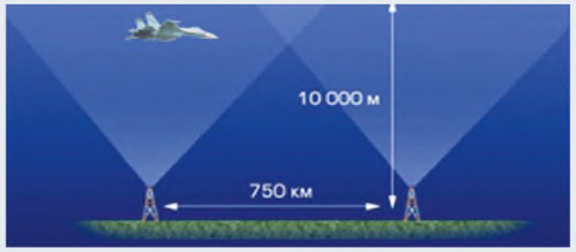
09 Archivation and long-term storage of flight data on portable storages.

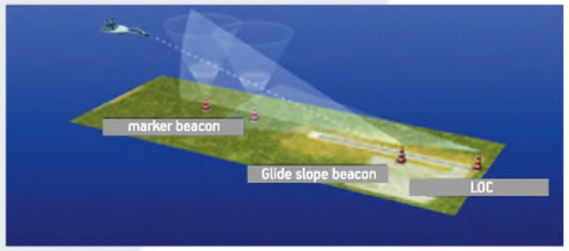
INSTALLATION OF ICAO STANDARD VOR/ILS/DME NAVIGATION AND LANDING EQUIPMENT

Installation of ICAO standard VOR/ILS/DME navigation and landing equipment

01 VOR/ILS (VIM-95) short-range navigation and landing equipment ensures determination of magnetic bearing of aerial vehicle in relation to VOR radio beacons and instrument landing as per ILS system.

02 DME range finder ensures determination of aerial vehicle slant range distance up to DME radio beacons.





"SATELLITE-M2"* – FIRE HITTING PROTECTION AGAINST HIGH-PRECISION RADIO GUIDED WEAPON

*** AIRBORNE ECM PROTECTION SYSTEM**

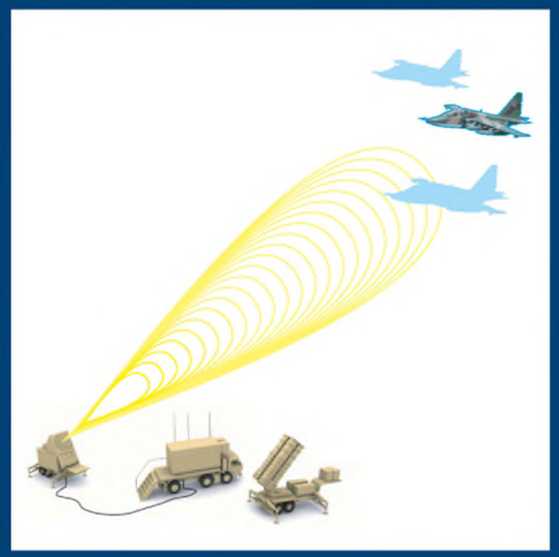
Designation

"Satellite-M2" individual airborne ECM protection system is designed for individual ECM protection system of the aircraft, whatever the type, from high-precision radio guided weapons launched from enemy Airborne Interceptor Missile Systems (IMS) and Air Defense Missile Systems (ADMS) ;

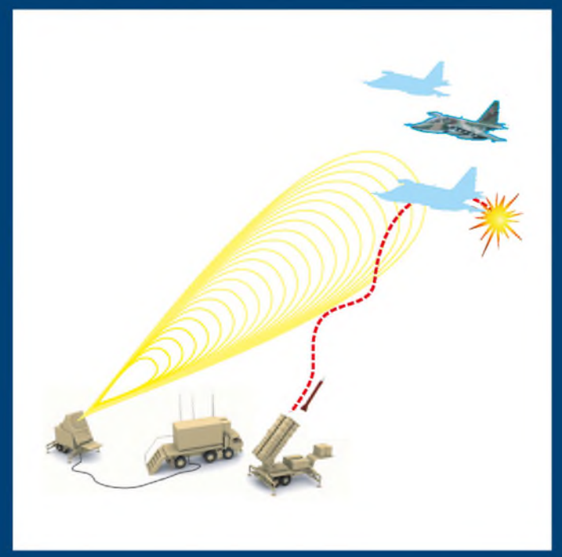
High-precision radio guided weapons include Airborne Interceptor Missile Systems and Air Defense Missile Systems carrying missile with semi active and active radar homing heads.

Operation principle

01. Survey stage



02. Lock-on tracking and launching missile on decoy target



"SATELLITE-M2"* – FIRE HITTING PROTECTION AGAINST HIGH-PRECISION RADIO GUIDED WEAPON

*** AIRBORNE ECM PROTECTION SYSTEM**

Reliable ECM protection is achieved by means of active jamming which effects:

01 angle measurement channels of fighter-interceptors and aircraft radio-location aiming complexes

02 active (semi-active) homing heads of guided aircraft missiles and antiaircraft guided missiles.

Jamming create concealed guided cripping of angle measurement follow-up systems, execute leads guided missile to:

– intense alternating overload;

– flight path deformation;

– significant decrease of flight range due to depletion of the engine energy potential;

– increase of current and terminal miss.

On Su-25 aircraft the system can be located in 2 pods.

Objects of ECM "Satellite-M2" impact:

01 – airborne radio-location aiming complex of Su-27, MiG-29, MiG-25, MiG-23, MiG-31, Su-30 aircrafts of all modifications, including phase array "БАРС" floodlight, F-15, F-16, F-18, F-22, Mirage-2000, EF-2000

02 – homing heads of P-27P, AIM-120 AMRAAM, AIM-7 "Sparrow", "Activ Sky Flash", "Matra Mica", MIM-23B, MIM-104, 9M38 missiles

03 – "Оса", "Тунгуска", "Roland", "Gepard", "Patriot", "БУК-М1" ADMS