



AIR TRAFFIC MANAGEMENT
SYSTEMS AND AIDS
SINCE 1946

Complexes of Air Traffic Control Automation Aids

COMPLEX OF AIDS FOR INTEGRATED FLIGHT PLAN PROCESSING SYSTEM AUTOMATION (IFPS) «**SINTEZ-PIVP**»







VNIIRA. AIR TRAFFIC MANAGEMENT
SYSTEMS AND AIDS

Information about the Company:

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All-Russian Scientific Research Institute of Radio Equipment (JSC VNIIRA) has specialized in the development, production, commissioning and maintenance of navigation and landing systems and aids, air traffic control automation, airborne equipment and weather radars.

Areas of activities:

- | automated ATC and ATM systems and facilities for various control areas and for large regions and separate countries;
- | simulator systems for AT controllers;
- | surveillance, approach control, secondary, and weather radars;
- | ground and airborne equipment of short-range radio navigation systems and instrument landing systems;
- | airborne equipment of range measuring, aircraft (A/C) collision avoidance, and early ground proximity warning systems, and transponders;
- | onboard integrated navigation and landing systems;
- | ground and airborne aids of the Automatic Dependent Surveillance-Broadcast (ADS-B).

In 2004 JSC VNIIRA has joined JSC «Concern PVO «Almaz - Antey».

When working out a solution, VNIIRA specialists prove again and again that they are capable of achieving more, inasmuch as each follow-on development surpasses the previous one. The long experience and our Customers' acknowledgements confirm it.

VNIIRA is far more than:

- | 70 years of the successful performance for the benefit of air safety;
- | 150 prototypes of radio-technical systems and the complex of ground and airborne radio instruments;
- | 1 300 Inventor's Certificates;
- | 60 complexes of ATC automation systems and facilities for airports and regional centers of Russia and other countries;
- | 100 types of home-produced aircrafts and helicopters employ the airborne equipment, navigation and landing facilities developed by VNIIRA;
- | 1 600 employees including 13 Doctors of Engineering Science and 48 Candidates of Engineering Science.

*VNIIRA is a long-standing developer of
the automated air traffic control systems
from 1975*



The complex of aids for integrated flight plan processing system automation (IFPS) «SINTEZ-PIVP» is designed for equipping the zonal centers and the Main center of the Joint ATM System.

IFPS «SINTEZ-PIVP» can be supplied as a separate unit, as well as together with the complex of air traffic control automation aids as an integrated part of the unified automated system of the air traffic management (ATMAS).

IFPS «SINTEZ-PIVP» is based on the principles of an open modular system with distributed structure and information processing. This provides for increasing the level of automation, productivity, connection of new sources of information, modernization or replacement of technical equipment or program modules.

IFPS «SINTEZ-PIVP» implements effective system of support of the actual state of planning and aeronavigation and reference information, which is based on the automatic and automated aids of local and centralized management of the databases.

IFPS «SINTEZ-PIVP» with the factory numbers 001 and 002 are currently being operated at Khabarovsk and Rostov zonal centers of the Joint ATM System.

The state tests of IFPS «SINTEZ-PIVP» are being fulfilled for Moscow zonal center and the Main center of the Joint ATM System.

SINTEZ-PIVP



IFPS
OF ZONAL
CENTER

05

>>> application
>>> processing
+ forbid
+ accepted
+ allow route

IFPS
ATC

АНС ПД и ТС
FMTR
ТСР/ІР, FTP, HTTP

Doc 4444
TC-2013
ADEXP

ARINC
AIMX 5.1.

>>> application
>>> processing
+ forbid
+ accepted
+ allow route

IFPS
OF MAIN
CENTER

01
ATC
IFPS

>>> application
>>> processing
+ forbid
+ accepted
+ allow route

02
ATC
IFPS

03
ATC
IFPS

PETERSBU

Minsk

MOSCOW
Zemt
Talovaya

ROSTOV-ON-DON

SOCHI

Volgograd

Uralsk

Aktobe

Atirau

Kostanay

Kokshetau

Pavlodar

Astana

Karaganda

Zhezkazgan

Balkhash

5/6



06
 >>> application
 >>> processing
 + forbid
 + accepted
 + allow route

>>> application
 >>> processing
 + forbid
 + accepted
 + allow route

IFPS OF
 AERODROMES



AIR TRAFFIC MANAGEMENT
 SYSTEMS AND AIDS
 SINCE 1946

**COMPLEX OF AIDS FOR INTEGRATED
 FLIGHT PLAN PROCESSING SYSTEM
 AUTOMATION**

SINTEZ-PIVP

ATC CENTRES OF THE JOINT ATM SYSTEM

- Moscow ZC 01
- ST. Petersburg ZC 02
- Samara ZC 03
- Rostov-na-Donu ZC 04
- Ekaterinburg ZC 05
- Novosibirsk ZC 06
- Khabarovsk ZC 07

KHABAROVSK
 Khabarovsk ATM
 CONSOLIDATED
 CENTER



AERODROMES

MANAGEMENT OF
AERONAVIGATION
REFERENCES

№	Название	Код ИКАО (рус)	Код ИКАО (ми)	Широта	Долгота	Страна
1	Разъездно-Московская	УНСР	UNSR	5500С	07601В	Россия
2	1 Северофестивальная	УНСФ	UNSF	5818С	07736В	Россия
3	15 ГКБ	УУНН	UUNN	5544С	03750В	Россия
4	183 км нефтепровода	УУНМ	UUNM	6508С	05719В	Россия
5	181 Северо-Восточная	УНСВ	UNSV	5622С	07822В	Россия
6	181 Собольная	УНСБ	UNSB	5622С	07822В	Россия
7	20 ГКБ	УУУУ	UUUU	5522С	03740В	Россия
8	203 А пункт	УУДД	UUXD	6420С	05723В	Россия
9	292 км нефтепровода	УНСД	UNSD	5818С	07951В	Россия
10	3-е отделение	УУУТ	UUNT	6336С	05342В	Россия

Точка	Точка	Кординаты	Аэродром	MTU Расстояние	Широта	Долгота	Ночт	Примечания к точкам	Примечания к участку
1	МЕТОН / МЕТОН	4854.00 04123.00	2271041	0100 - 12100	10	1	1		
2	ОСДВА / ОСДВА	4855.00 04113.00	2249947	0100 - 12100	10	1	1		
3	СТ / СТ	4846.00 04241.00	2061887	0100 - 3000	10	1	1	СД	
4	СУРБИ / СУРБИ	4846.00 04238.00	2061887	0100 - 12100	10	1	1	СД	
5	МОСГОР / МОСГОР	4821.00 04148.00	2047024	0100 - 12100	10	1	1	СД	
6	КА / КА	4737.00 04107.00	1871687	0100 - 12100	10	1	1		
7	НЕГАР / НЕГАР	4734.00 04078.00	1871687	0100 - 12100	10	1	1		
8	ДУБЕР / ДУБЕР	4862.00 04046.00	1871687	0100 - 12100	10	1	1		

STANDART ROUTES..... AERODROME ROUTES AND ZONES.....



PURPOSE

IFPS «SINTEZ-PIVP» provides for comprehensive unified military and civil planning and automation of the following functions:

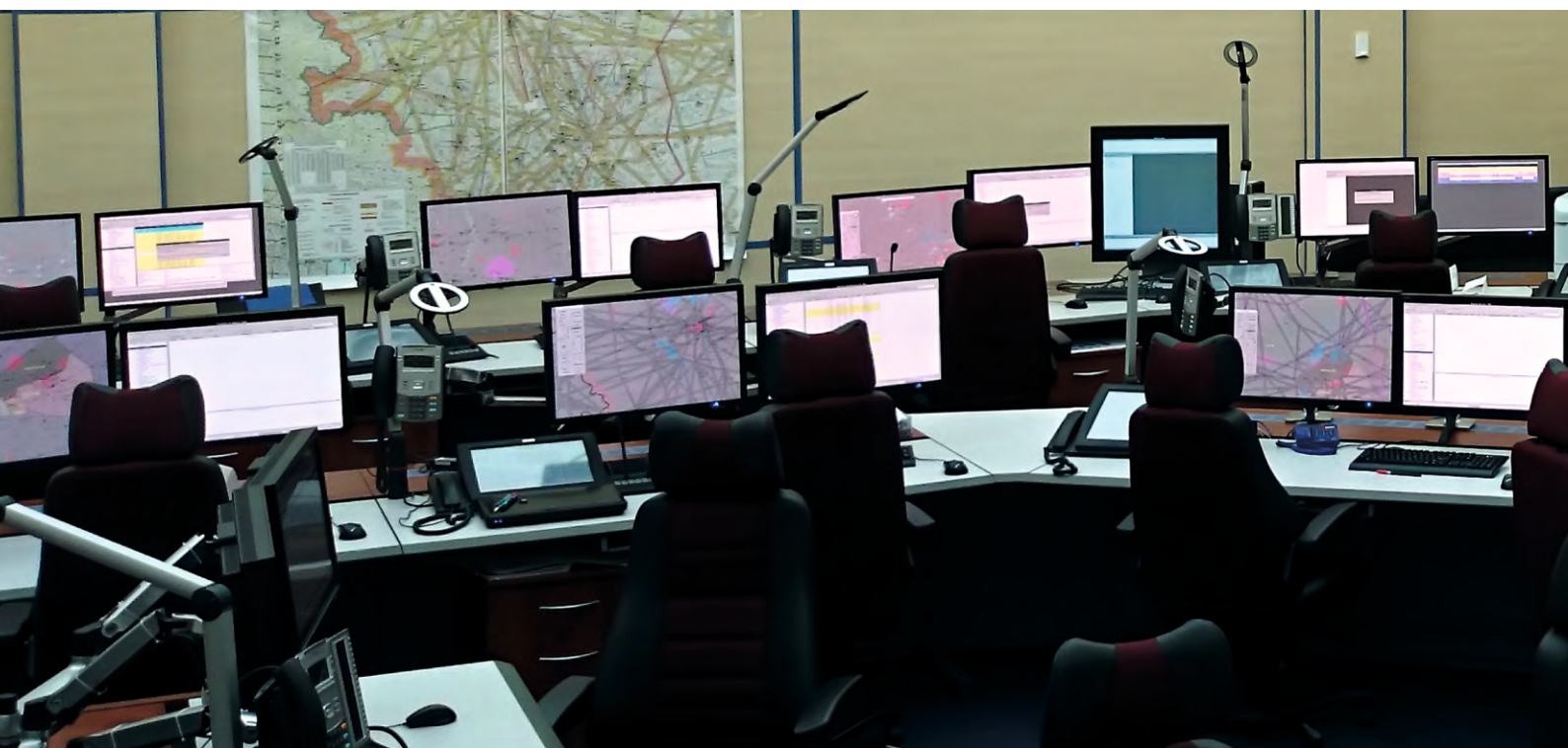
- ▮ Strategic, pre-tactic and tactic planning of the airspace using;
- ▮ Air traffic flow management (ATFM);

- ▮ Information support of ATC AS of the centers in planning information;

- ▮ Information interaction in planning and control, aeronavigation and reference information with the groups arranging air traffic management at the aerodromes, with local control centers,

command centers of the aerodromes of the state and experimental aviation, with the authorities of flight control of the airspace users, and authorities of air defense of the Joint ATM System area.

ATM ROUTES										LOCAL AIRLINES										WAYPOINTS									
МВЛ	Название	Зона	Точка	Регион	Название	Широта	Долгота	Тип	Другие имена	Название	Тип	Регламент	Ид. ВС (ру/и)	Код ВС (nat)	Название	Кат.урб.	Класс ВС	Скорость											
1	КД100 ЖОЖИЕР (мыс) - НИПУЙ (мыс)	ХАБАРОВСК	Жожиер (мыс), Александровск-Сахалинский, Зональное, По	52	Хабаровский край	Благодатное	4826	13528		19	A211	A211	A-211	L	4	170													
2	КД101 АЛЕКСАНДРОВСКО-САХАЛИНСКИЙ - УСТЬ-АГНЕВО	ХАБАРОВСК	Александр, Сахалинский, Владимировка, Усть-Агнево	53	Амурская область	Богучан	4917	13015		20	A212	A212	AB212, LH-1N, CH-135	L	2	190													
3	КД102 СМЫРНЬХ - ВЛАДИМИРОВО	ХАБАРОВСК	Смирных, Орлово, Трудово, Беллинсгаузен (мыс), Владимир	54	Хабаровский край	Бол.Каргель	5023	13723	Бол. Каргель, Большая Каргель	21	A22	A22	A-22 Prazha	L	4	523													
4	КД103 ИЛЬИНСКИЙ - ВЗМОРЬЕ	ХАБАРОВСК	Ильинский, Взморье	55	Хабаровский край	Болны	5020	13645		22	A223	A223	MAI-223 Klyuok	L	4	180													
5	КД104 СЛЕПИКОВСКОГО (мыс) - АНЧА (мыс)	ХАБАРОВСК	Слепиковского (мыс), Южно-Сахалинск, Корсаков, Утёское, Ч	56	Хабаровский край	Болонь	4953	13637		23	A225	A225	Aa-225 Mlyu	J	1	947													
6	КД113 НЕЛЬКАН - СЕДАНКА	ХАБАРОВСК	Нелькан, Батагага, г.г., Маймакан (гравер?), г.г., г.г., Анча	57	Хабаровский край	Болонь	4954	13608		24	A22J	A22J	C22J	L	4	482													
7	КД114 АНТЬКАН - НЕЛЬКАН	ХАБАРОВСК	Антыкан, г.г., Киран, г.г., Маймакан, г.г., Нелькан	58	Амурская область	Бурья	4949	12948		25	A23	A23	A-23 Dragon	L	4	160													
8	КД115 НИКОЛАЕВСК-на-АМУРЕ - УДСКОЕ	ХАБАРОВСК	Николаевск-на-Амуре, Орель-Ча, Усалин, Туур, г.г., г.г., Чу	59	Хабаровский край	Валдейм	4842	13258		26	A24	A24	A-24 Viking	L	4	165													
1	АВАНИНСКИЙ район аэродрома	РА	по регламенту работы аэродро	20	A212	A212	AB212, LH-1N, CH-135	L	2	190																			
2	АЙХАЛ район аэродрома	РА	по регламенту работы аэродро	21	A22	A22	A-22 Prazha	L	4	523																			
3	АЛДАН КДП МВЛ	КДП МВЛ	по регламенту работы КДП МВЛ	22	A223	A223	MAI-223 Klyuok	L	4	180																			
4	АЛДАН район аэродрома	РА	по регламенту работы аэродро	23	A225	A225	Aa-225 Mlyu	J	1	947																			
5	АНАДЫРЬ (Уольный) район аэродрома	РА	по регламенту работы аэродро	24	A22J	A22J	C22J	L	4	482																			
6	АНАДЫРЬ районный центр	РЦ	по регламенту работы районног	25	A23	A23	A-23 Dragon	L	4	160																			
7	АНАДЫРЬ РЦ (МДП)	РЦ (МДП)	по регламенту работы РЦ (МДП)	26	A24	A24	A-24 Viking	L	4	165																			
8	АЯН (Мууук) район аэродрома	РА	по регламенту работы аэродро	27	A25	A25	A-25 Breeze	L	4	180																			
9	БАТАГАЙ КДП МВЛ	КДП МВЛ	по регламенту работы КДП МВЛ	28	A27	A27	A-27	L	4	175																			
10	БАТАГАЙ КДП МВЛ	КДП МВЛ	по регламенту работы КДП МВЛ	29	A270	A270	Aa-270 bis, Spitt	L	4	407																			



ADVANTAGES OF IFPS «SINTEZ-PIVP»

Management of the unified military and civil plan of the airspace using:

- ▮ all plans of the airspace using shall be kept in one data bank;
- ▮ all plans are involved in assessment of the air traffic density;
- ▮ all plans are involved in assessment of loading of the controlled components of the airspace;
- ▮ all plans are accessible from any workstation of the system depending on the type of workstation and ATM controller access rights.

Effective system of support of the actual state of planning, aeronavigation and reference information, availability of the automatic and automated aids for local and centralized management of the databases:

- ▮ locally – ATM controller is provided with the set of automated functions for data input and modification, for monitoring of input fields, control over redundancy and integrity of data, selection and printing;
- ▮ centralized – the set of functions providing automatic and/or automated receipt of data from the Central databank

of Main center of the Joint ATM System and data export to the interacting controlled authorities, including in AIXM 5.1 format.

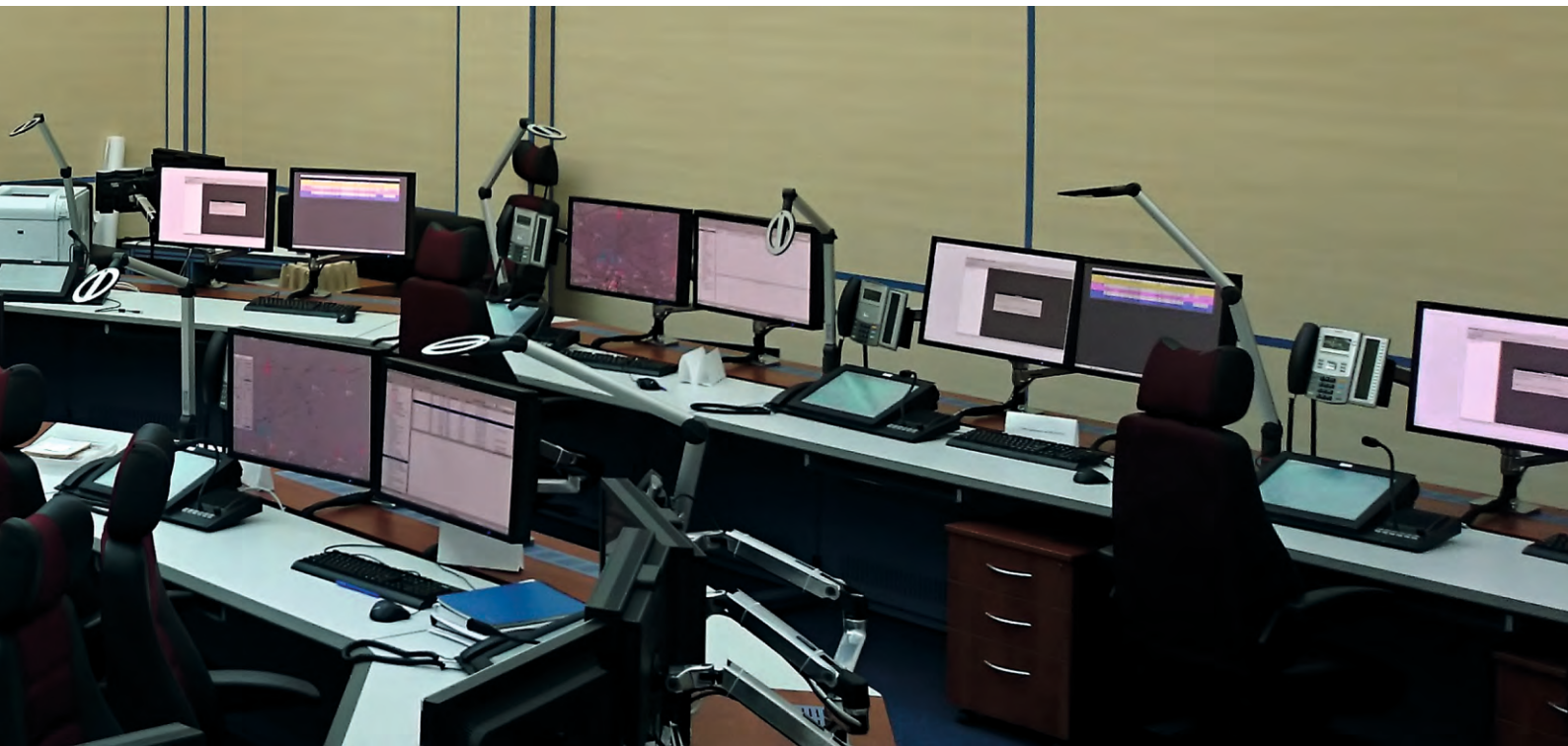
Receipt, automatic/automated processing and distribution of formalized messages in the ATM in the formats determined by:

- ▮ Aircraft movement in RF message report (TS-2013);
- ▮ ICAO document «Procedures for Air Navigation Services. Air Traffic Management» (PANS-ATM, Doc 4444), 15th edition;
- ▮ Revision 1 to «Procedures for Air Navigation Services. Air Traffic Management» (PANS-ATM, Doc 4444), 15th edition;
- ▮ Protocols of information and technical interfacing with the automated systems of the air traffic planning and management, including ADEXP format.

Assisting ATM controller in making decisions regarding approval non-approval of the airspace using plan. Automatic verification of all airspace using plans incoming to the system by the following criteria:

- ▮ Message format;
- ▮ Correct coding of denominations of ATM points and routes;
- ▮ Observation of flying direction by ATM route areas;
- ▮ Observation of the rules of separation (including RVSM);
- ▮ Observation of the rules of ATM routes areas use (only for internal flights; only by coordination, etc.);
- ▮ Observation of the modes and restrictions valid at the current day;
- ▮ Observation of operating procedures of the main and alternative airports;
- ▮ Observation of the rules of the airspace classes use;
- ▮ Acceptability of the announced types of aircrafts at the main and alternative aerodromes.

Monitoring of information incoming about implementation of the daily plan of air traffic (availability and timely incoming of PLN, DLA, DEP, ARR messages), as well as sequence of messages incoming (monitoring of the flight condition diagram).



Assisting ATM controller in development and management the short-term restrictions and local modes:

- ▮ Possibility of inputting restriction limits from the map using the mouse;
- ▮ Possibility of reviewing developed and current restrictions on the map;
- ▮ Possibility of making patterns of standard restrictions for aerodrome flights, operation of quarries and landfills for further coordination with the relevant airspace using plans;
- ▮ Automatic calculation of the corridor restrictions along the aircrafts routes;
- ▮ Automatic calculation of the ATM routes areas to be closed;
- ▮ Automatic detection of conflicts with other airspace using restriction areas;
- ▮ Automatic determination of the list of flights falling within the scope of developed mode/restriction;
- ▮ Automatic generation of RVM/RVI messages (short-term restrictions for use/cancellation of the short-term restrictions for use) and notices at NOTAM;
- ▮ Coordination of NOTAM messages with the airspace using modes/restrictions.

Displaying information about current airspace condition according to the data of the ATC AS received in the ASTERIX Cat.062 format.

Assistance to ATM controller in resolution of the tasks of the air traffic flow management:

- ▮ Analysis of the air traffic plans for overloads of the ATM sectors, ATM routes parts and aerodromes;
- ▮ Providing information about loading in the form of graphics and tables;
- ▮ Development of notifications regarding the forecast overloads and the ATFM measures and submitting such notifications to the interacting authorities of ATM and operators concerned;
- ▮ Operative informing of the Main center of the Joint ATM System about changes in the throughput capability of the controlled components of ATM system, structure of the airspace and aerodromes;
- ▮ Providing the interacting authorities of ATM with the information about loading of the airspace structure components and aerodromes in the automated remote access mode;

▮ Assisting ATM controller in development and assessment of the options of solutions for preventing overloads and regulating the air traffic flows.

Development of report regarding the aircrafts flights in the airspace of classes A, C, G, CG in the Joint ATM System area.



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AIR TRAFFIC MANAGEMENT
SYSTEMS AND AIDS

Complexes of Air Traffic
Control Automation Aids

Air Surveillance Aids

Navigation and
Landing Radio Systems

Weather Radar Systems

Airborne Navigation and
Landing Equipment

Antenna and Feeder
Systems and Devices

Automated Flight
Test System (ASLK)

ATC Training Systems



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