

MODERNIZATION OF THE JOINT ATM SYSTEM 2013 - 2014



3-6 JUNE 2014, SAMARA



FEDERAL TARGET PROGRAMME (FTP) “MODERNIZATION OF THE JOINT ATM SYSTEM IN THE RUSSIAN FEDERATION (2009-2020)”

In 2013-2014, the State ATM Corporation carried out activities aimed at:

- ✓ Establishment of consolidated ACCs;
- ✓ Enhancement of terminal and en-route ANS provision;
- ✓ Modernization of aeronautical telecommunications and data link network;
- ✓ Equipment of radar sites with secondary radars systems;
- ✓ Implementation of a single airspace management system;
- ✓ Transition to advanced CNS/ATM technologies;
- ✓ Implementation of automated ATC systems.



TARGET INDICATORS IN 2013 **(FTP “MODERNIZATION OF THE JOINT ATM SYSTEM”)**

The main focus has been placed on:

- establishment of consolidated ACCs;
- automation of ATC in the terminal area;
- automation of CNS facilities.

Establishment of consolidated ACCs

- The State ATM Corporation continued equipping **Irkutsk, Samara** and **Magadan** Consolidated Centres with Automated ATC Systems;
- Adler/Sochi Airport (Olympic facility) and CNS facilities of Kazan Airport were commissioned.



MOSCOW AUTOMATED ATC CENTRE STATE ATM CORPORATION

- Establishment of Flight Control Centre (FCC) of the Moscow Automated ATC Centre is in progress.
- It is to be commissioned in 2014 and will be delegated ATC functions.



MOSCOW AUTOMATED ATC CENTRE STATE ATM CORPORATION



Moscow Consolidated Centre



SAMARA CONSOLIDATED ACC

A transition to ASM/ATS planning with working positions in Samara Consolidated ACC within Samara Zonal Centre and Samara TMA including Ufa and Orenburg ACCs' airspace has been completed.



Technical building



Ops Room



MAGADAN CONSOLIDATED ACC

The reconstruction and technical upgrade of Magadan Consolidated Centre including the construction of a technical building (1300 m²) has been completed.

Magadan Consolidated ACC has been commissioned and a transition to ATS provision from working positions at the new technical building has been carried out.



Building's front side



Ops Room





ADLER/SOCHI AIRPORT (OLYMPIC FACILITY)

10 September 2013 - Terminal Automated ATC System was put into operation.

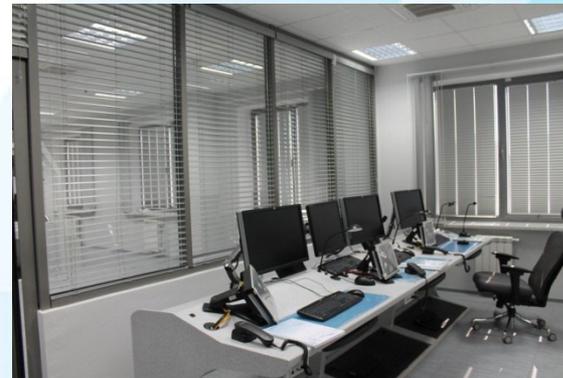
11 September 2013 - ATS is provided from working positions in a new Tower.





KALININGRAD ACC

Kaliningrad ACC has become operational.





EQUIPMENT OF OPERATIONAL FACILITIES WITH AUTOMATED ATC SYSTEMS

Currently, ATC and traffic planning is performed by **44 operational units of the Joint ATM System:**

- **ACCs, including Auxiliary ACCs - 36,**
- **Zonal Centres - 7,**
- **Main ATFM Centre - 1.**

In 2013, civil airports were equipped with automated ATC facilities:

✓ **Implementation of automated ATC facilities in 8 ATS Centres:**

(Kazan, Abakan, Bugulma, Igarka, Nikolaevsk-on-Amur, Sochi, Kirensk, Yuzhno-Sakhalinsk, Volgograd)



MODERNIZATION OF AIRPORTS WITH AUTOMATED ATC FACILITIES

Yuzhno-Sakhalinsk



Tower working positions

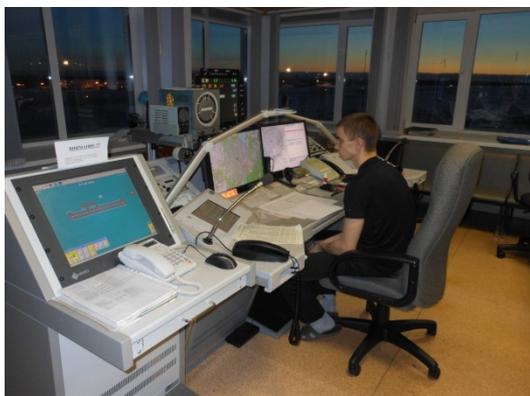


Automated working position

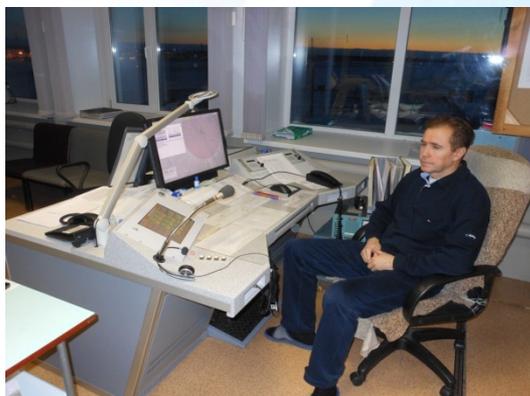


Supervisor's automated working position

Igarka



APP automated working position



Supervisor's automated working position



System engineer's automated working position



MODERNIZATION OF AIRPORTS WITH AUTOMATED ATC FACILITIES

Abakan



Tower automated working position



System engineer's automated working position



"Topaz ATS"
Automated ATC facility

Bugulma



Tower positions

Kirensk





MODERNIZATION OF AIRPORTS WITH AUTOMATED ATC FACILITIES

Sochi



Tower working positions



Automated working position



Ops Room

Kazan



Tower working positions



Ops Room



JOINT SYSTEM OF FIXED SATELLITE COMMUNICATIONS

Aeronautical Fixed Satellite Communications facilities have been installed in the following ATC Centres:

Anadyr (1), Seymchan (2), Markovo (3), Provideniye (4), Aldan (5), Ust-Maya (6), Khanty-Mansiysk (7), Amderma (8), Kotlas (9), Sochi (10).



Satellite earth station antenna post



FTP “MODERNIZATION OF THE JOINT ATM SYSTEM (2009-2020)” IMPLEMENTATION OF SURVEILLANCE AIDS

Terminal radars

Put into operation:

✓ **“Lira-A10” Terminal radar -**
Sovetskiy, Yekaterinburg.

✓ **1AC Terminal surveillance radar -**
Kirensk, Barnaul, Nikolaevsk-on-Amur,
Usinsk.

**Acceptance tests have been
completed; the radar is being
commissioned:**

✓ **“Lira-A10” Terminal radar -** Samara.

**The radar has been produced and
accepted from the manufacturer:**

✓ **“Lira-A10” Terminal radar -**
Voronezh, Ossora, Leshukonskoe



“Lira-A10” Terminal radar at Sovetskiy airport



FTP “MODERNIZATION OF THE JOINT ATM SYSTEM (2009-2020)” IMPLEMENTATION OF SURVEILLANCE AIDS

Update on Provideniye Bay and Ust-Khayryuzovo radar sites

- “Krona-M” MSSR radar to be installed at Providenie Bay has been produced and delivered to the site. The installation site is currently being prepared for construction. The radar is scheduled to be in full operation in 2015.
- Site construction and installation for “Krona-M” MSSR radar deployment are ongoing at Ust-Khayryuzovo. The full operation is scheduled for 2015. “Lira-T” en-route radar is to become operational in 2014. This radar has an in-built radar which supports RBS and ATC modes.



STATE ATM CORPORATION ACTIVITIES INVESTMENT PLAN (2013)

Activities on modernization of airports with navigation and surveillance aids are being carried out:

- ✓ Instrument landing systems - **18**
- ✓ NDBs - **67**
- ✓ Automated finders - **33**
- ✓ Terminal radars - **4**
- ✓ En-route radars - **1**



FTP “MODERNIZATION OF THE JOINT ATM SYSTEM (2009-2020)” IMPLEMENTATION OF RADAR FACILITIES

A-SMGCS

Put into operation:

- ✓ 2 «Atlantika» SMR sites+
- “Vega” A-SMGCS at Sochi airport

- ✓ MLAT system (Terminal MLAT) of P3D-AS AER type (ERA) at Sochi airport



«VEGA» A-SMGCS



FTP “MODERNIZATION OF THE JOINT ATM SYSTEM (2009-2020)” IMPLEMENTATION OF SURVEILLANCE AIDS

A-SMGCS



||| Two “Atlantika” SMR sites +
“Vega” A-SMGCS have become operational at Sochi airport



FTP “MODERNIZATION OF THE JOINT ATM SYSTEM (2009-2020)” IMPLEMENTATION OF SURVEILLANCE AIDS

Multilateration Surveillance Systems

A-SMGCS (ERA) at Sochi airport



“Vega” A-SMGCS + A-SMGCS (Era)



“Vega” A-SMGCS Display



ESTABLISHMENT OF NAVIGATION AIDS

Facilities are put into operation at following airports:

✓ **DVOR-2000/DME-2000** – Nizhny Novgorod, Khanty-Mansiysk, Podkamennaya Tunguska, Turukhansk, Vnukovo, Krasnoyarsk, Neryungry.

✓ **DME-90** - Cherskiy, Kirensk, Chita, Nikolaevsk-on-Amur, Barnaul, Vologda.

Facilities are put into operation in airports:

✓ **DME-90NP** -Krasnodar, Khabarovsk, Vnukovo (2 units), Ulan-Ude, Neryungry, Samara, Ukhta, Astrakhan, Irkutsk и etc. (33 sites)



DVOR-2000/DME-2000



DVOR-2000/DME-2000



ESTABLISHMENT OF NAVIGATION AIDS

Airports are being equipped with DMEs for RNAV procedures:



✓ DME-N(NP):

- Mogocho;
- Balakovo;
- Maykop;
- Keperveem;
- Severo-Evensk;
- Vuktil;
- Oymyakon;
- Severoyralsk;
- Kurgan.

✓ DME-90:

- Kirensk;
- Bratsk;
- Chita;
- Nikolaevsk-on-Amur;
- Ukhta;
- Khatanga;
- Ulyanovsk;
- Noyabrsk.





IMPLEMENTATION OF NAVIGATION AIDS

ILS/DME implementation

Put into operation:

- ✓ Vnukovo 2 units;
- ✓ Kazan 2 units;
- ✓ Ulan-Ude;
- ✓ Khabarovsk.

Work in progress at following airports:

- ✓ Ukhta;
- ✓ Mendeleevo (Kunashir island);
- ✓ Stavropol;
- ✓ Astrakhan;
- ✓ Makhachkala;
- ✓ Vorkuta и etc. (total 35 sites)



ILS (SP-200)



Equipped with:

✓ ADS-B 1090 ES facilities :

- 4 radar sites - Chulkovo, Bezhetsk, Kromy, Svetlaya.
- 6 aerodromes - Arkhangelsk, Murmansk, Sheremetyevo, Kaliningrad, Mys Kamenny, Kotlas

✓ ADS-B Mode 4 facilities :

- 3 sites - Yar-Sale, Pauta station, Junction №15

In 2014, **ADS-B Mode 4** will be deployed at:

- ✓ Sheremetyevo, Domodedovo
- ✓ Pulkovo, Kalinigrad, Velikiye Luki

Starting from 2013, an ADS-B network is being deployed in all consolidated ACCs of the FSUE «State ATM Corporation» (**ADS-B 1090 ES**):

- ✓ in 2014 – **24 positions** in Khabarovsk consolidated ACC and **11 locations** in Samara consolidated ACC.



**GBAS/GRAS facilities have been implemented
(local monitoring and correction station, LKKS-A-2000) at 74 airports:**

Mineralnye Vody	Kemerovo	Vladovostok	Ulan-Ude	K.-on-Amur
Rostov-on-Don	Tomsk	Gelendzhik	Polyarniy	Leshukonskoe
Grozny	Neryungri	Kyzyl	P. Tuguncka	Apatity
Norilsk	Magadan	Gorno-Altaysk	Khatanga	Orsk
Novosibirsk	Yuzhno-Kurilsk	Irkutsk	P-Kamchatsky	Anadyr
Saint-Petersburg	Bratsk	Blagoveshensk	Abakan	Igarka
Anapa	Mirny	Arkhangelsk	Yoshkar-Ola	Moscow(Sheremetyevo)
Salekhard	Barnaul	Kaliningrad	Kirensk	Moscow(Domododedovo)
Yekaterinburg	Vladikavkaz	Kurgan	Pevek	Vorkuta
Yakutsk	Krasnodar	Perm	Tiksi	Usinsk
Khabarovsk	Makhachkala	Chita	Magnitogorsk	Turukhansk
Surgut	Murmansk	Samara	Nalchik	Tura Gorny
Nadym	Novokuznetsk	Krasnoyarsk	Magas	Lensk
Noyabrsk	Yuzhno-Sakhalinsk	Tyumen	Kazan	Omsk
Vnukovo	Vologda	Begishevo	Penza	

During the implementation of the FTP “GLONASS” and «Modernization of the Joint ATM System” 26 airports were equipped with ADS-B facilities:

Yuzhno-Sakhalinsk	Khanty-Mansiysk	Kaliningrad	Mys Kamenny	Kromy
Selekhard	Tyumen	Arkhangelsk	Yar Sale	Kotlas
Surgut	Kurgan	Murmansk	St. Pauta	
Mys - Kamenny	Safonovo	Svetlaya	Junction #15	
Nadym	Dzerzhinsk	Burevestnik	Chulkovo	
Vorkuta	Talovaya	Moscow(Sheremetyevo)	Bezhetsk	



“Baltics-ADS” Project (Kaliningrad)



Станция «Лира-А3Н» Калининград



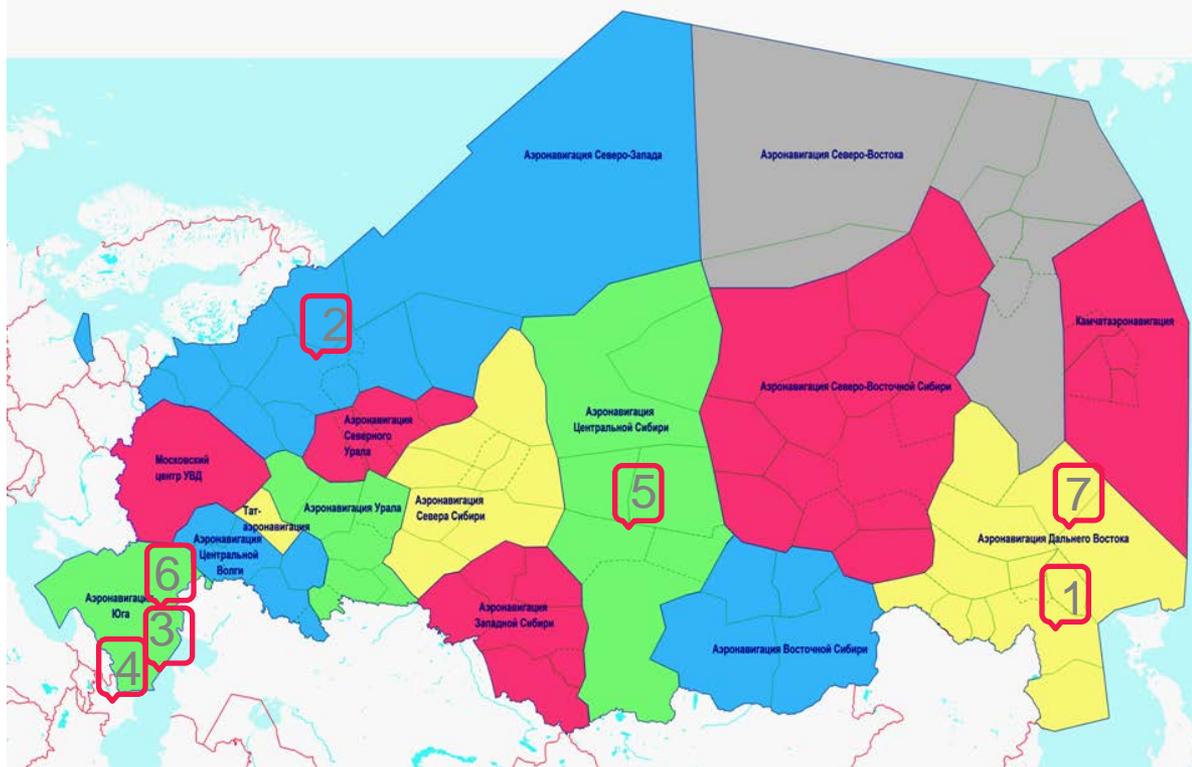
Establishment of radar sites

Terminal Radars put into operation:

Nikolayevsk-on-Amur (1),
Polyarny (2)

SSR:

Astrakhan (3), Kotlas (4),
Krasnoyarsk (5),
Sukhaya Buyvola (6)



Put in operation

Second “Atlantika” SMR put into
operation at Khabarovsk airport (7)



ADS-B Station 1090ES Mode and VDL-4 Mode in 2013-2014

ADS-B 1090ES stations have been deployed:

Kaliningrad

Pulkovo
(monopulse radar with
ADS (mode S))

Kotlas

Arkhangelsk

Murmansk

РЦ
КАЛИНИНГРАД

РЦ
САКТ-ПЕТЕРБУРГ

РЦ
АРХАНГЕЛЬСК

РЦ
ВОЛОГДА

РЦ
КОТЛАС

РЦ
МУРМАНСК

Kaliningrad

Velikiye Luki
mode VDL-4 and 1090ES

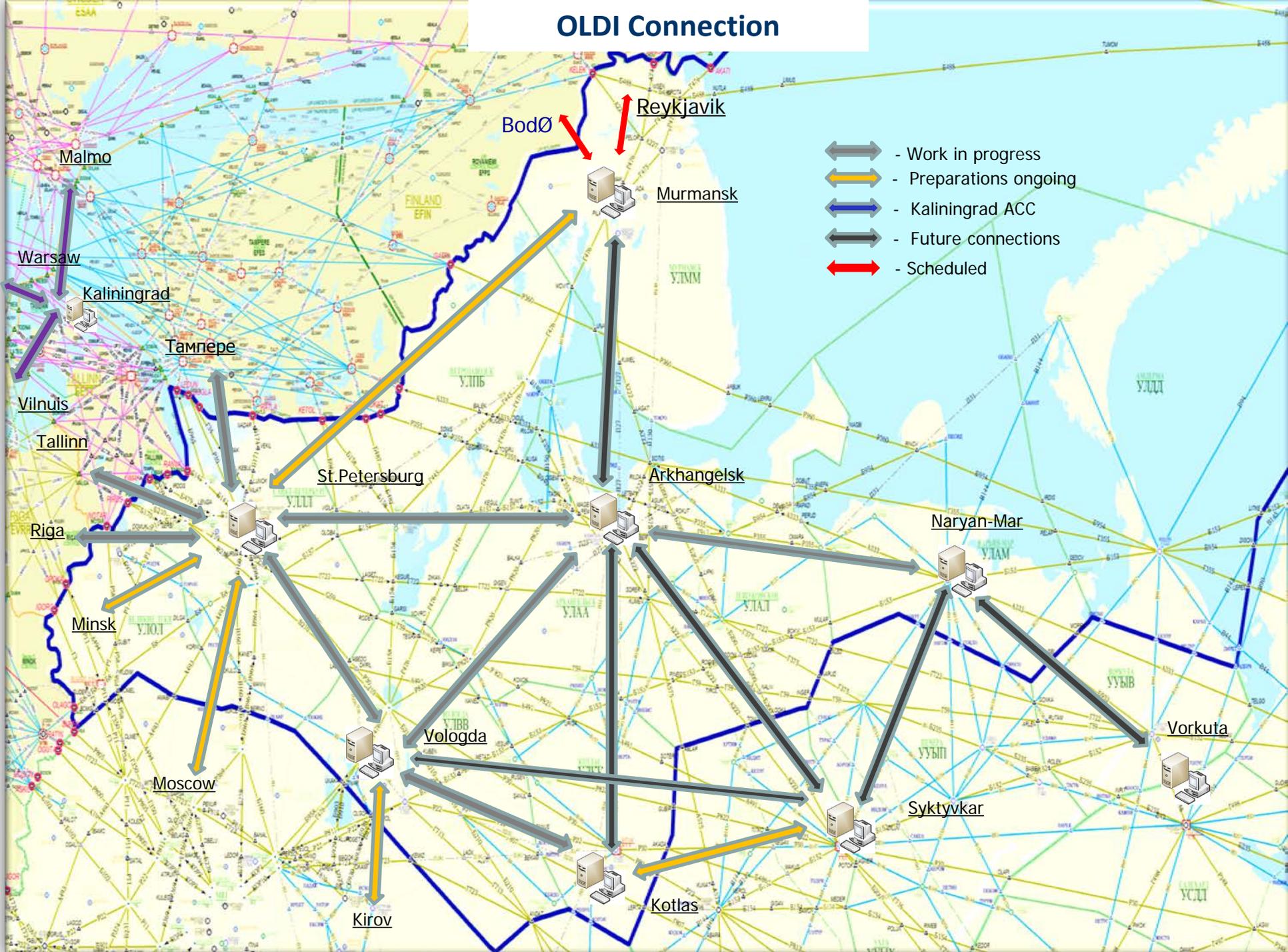
Pulkovo

During the 2013-2014, to establish a seamless
Moscow-Saint-Petersburg-Stockholm route
additional ADS-B VDL-4 facilities are being deployed

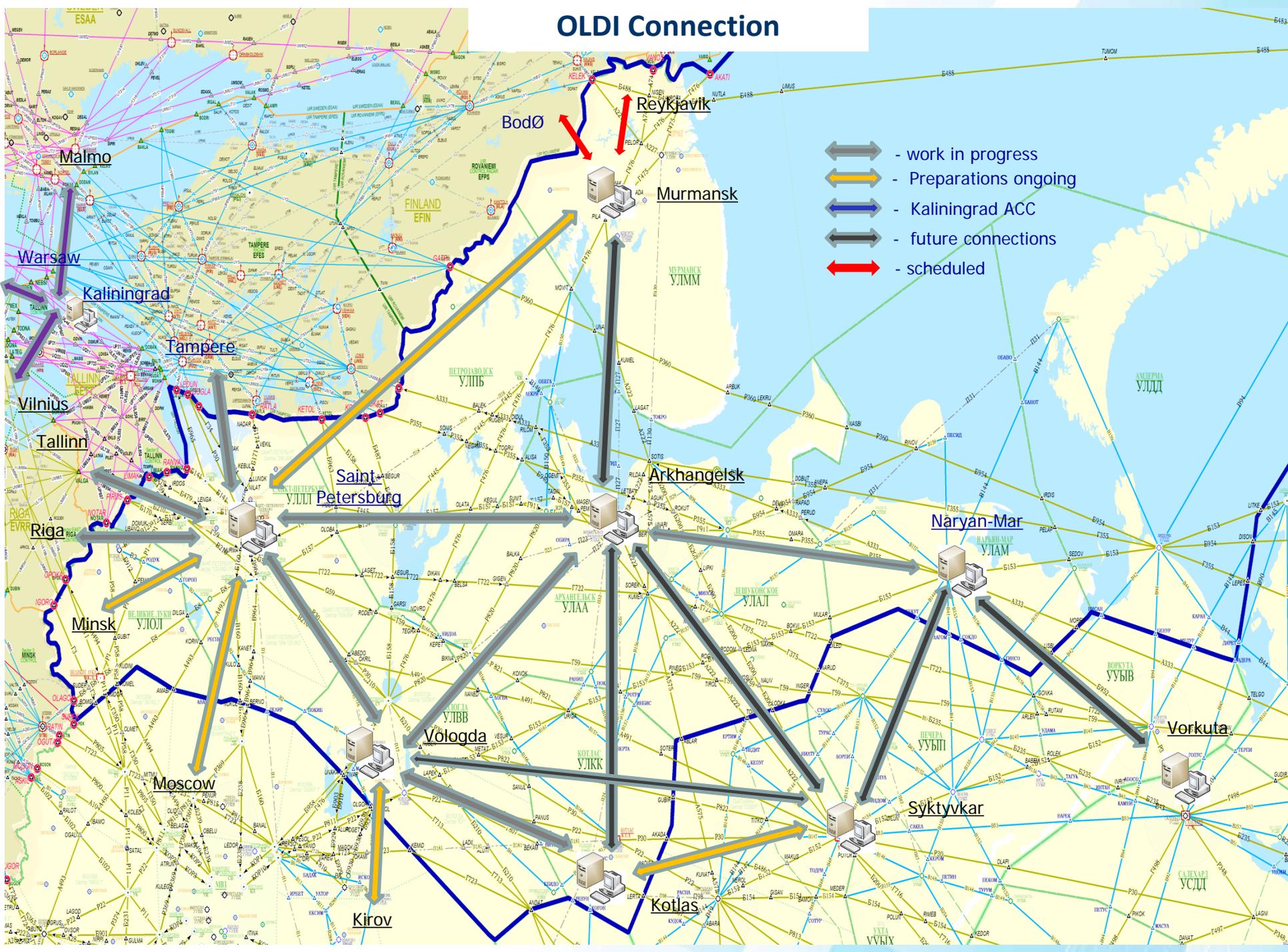
СЫКТЫВКАР



OLDI Connection



OLDI Connection





HF communication quality enhancement in the area of responsibility of Murmansk ACC :

- ✓ Six HF radio transmitters “PP-1000” with interface devices have been put into operation;
- ✓ Six eight-channel HF “RX 2000H” radio receivers have been supplied;
- ✓ Two bi-conical antennae “LW-Axi-2” and “W-Axi-” have been installed;
- ✓ One HF transmitting antenna “LW-Axi” has been installed
- ✓ These arrangements have enabled to considerably enhance quality and safety of aircraft operations in the area of responsibility of Murmansk ACC. In the future, Murmansk ACC will be additionally equipped with HF voice communication facilities and HF transmission ground stations.

Log-periodic antenna (Murmansk ACC)



HF Equipment (Murmansk ACC Radio Transmission Centre)





VHF communication quality enhancement in the area of responsibility of consolidated ACC:

- ✓ VHF automated radio transmission centres became operational in 2013: Sochi, Ukhta, Krasnodar, Belgorod, Kaluga, Sasovo, Yaroslavl, Vladimir, Voronezh, Nizhniy Novgorod, Chulkovo, Ryazhsk, Sheremetyevo, Vyazma, Stary Oskol.
- ✓ VHF transmitters were put into operation in 2013: Dalnerechensk, Kavaleroovo, Ayan, Khabarovsk, Zeya, Markovo, Keperveem, Batagay, Moma, Tigil, Sochi.
- ✓ System project for subsystem design has been developed which foresees radio communication and HF/VHF data transmission for consolidated ACCs. Its main objective is VHF full coverage at altitudes between 3000 and 14000 meters (en-route and off-route ATS sectors)



Within the framework of this project proposals on optimization of automated transmitting/receiving stations number, which operate on various channels and interact with switching systems of the main and back-up control centre of the consolidated centre through digital communication channels under the control of a monitoring and management subsystem have been developed.

It was suggested that a transmitting/receiving station should be installed on a number of locations on Sakhalin island (“Terpeniya Bay”) and Kuril islands in the area of responsibility of Khabarovsk ACC which will considerably enhance VHF coverage area at designated altitudes of this region.

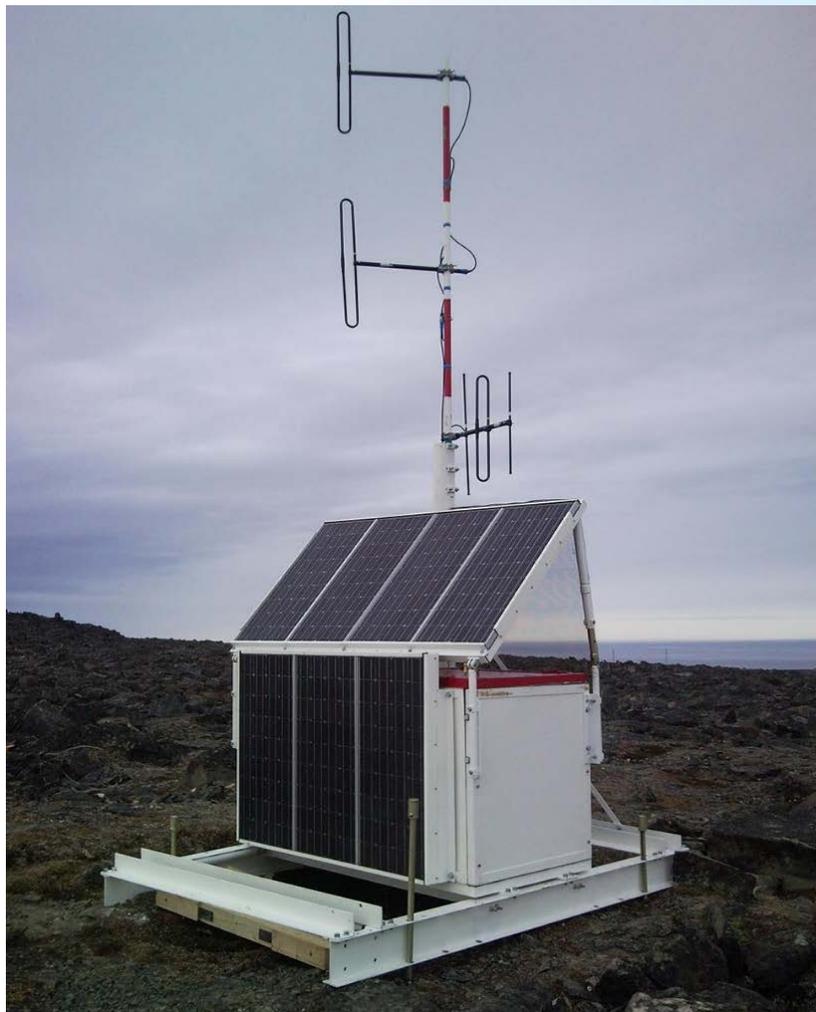


Automated Radio Transmission Centre





Automated radio relay



***THANK YOU FOR YOUR
ATTENTION!***