

# **MODERNIZATION OF THE JOINT ATM SYSTEM 2013 - 2014**



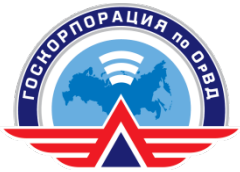
**3-6 JUNE 2014, SAMARA**



## ***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.

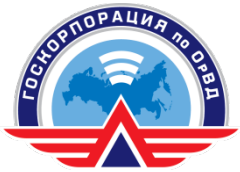




## ***MOSCOW AUTOMATED ATC CENTRE STATE ATM CORPORATION***



**Moscow Consolidated Centre**



## ***SAMARA CONSOLIDATED ACC***

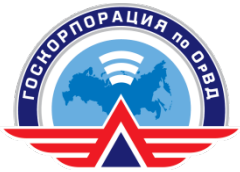
A transition to ASM/ATS planning with working positions in Samara Consolidated ACC within Samara Zonal Centre and Samara TMA including Ufa and Orenburg ACCs' airspace has been completed.



**Technical building**



**Ops Room**



## MAGADAN CONSOLIDATED ACC

The reconstruction and technical upgrade of Magadan Consolidated Centre including the construction of a technical building (1300 m<sup>2</sup>) 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



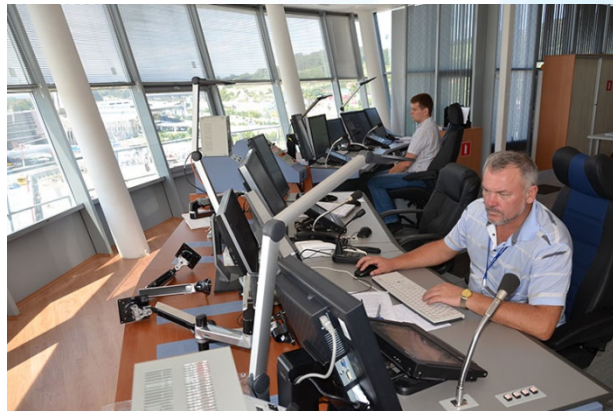




## ***ADLER/SOCHI AIRPORT (OLYMPIC FACILITY)***

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

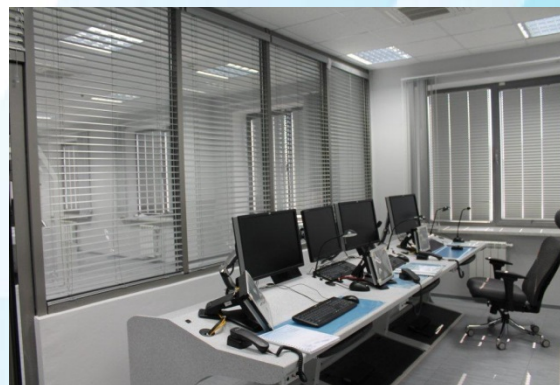
**11 September 2013 - ATS is provided from working positions in a new Tower.**

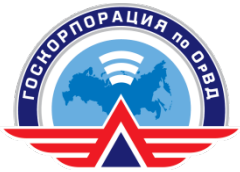




## KALININGRAD ACC

**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

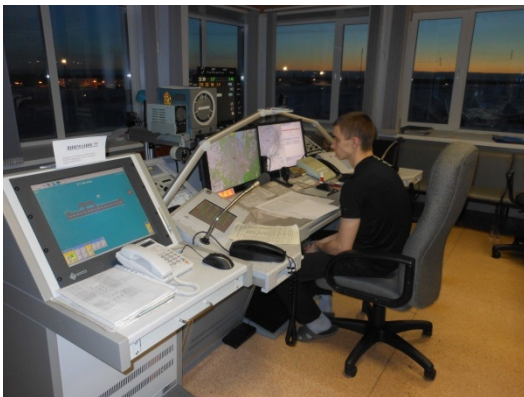


Automated working position



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



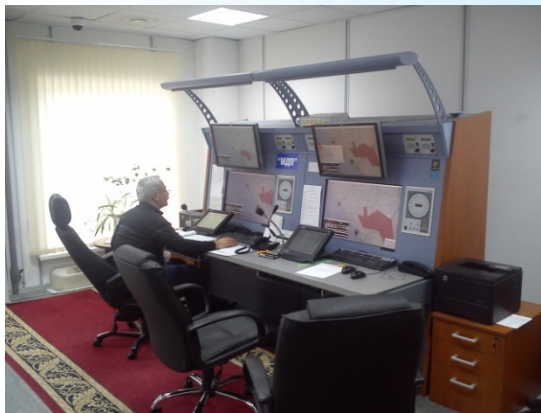


## MODERNIZATION OF AIRPORTS WITH AUTOMATED ATC FACILITIES

### Sochi



Tower working positions



Automated working position

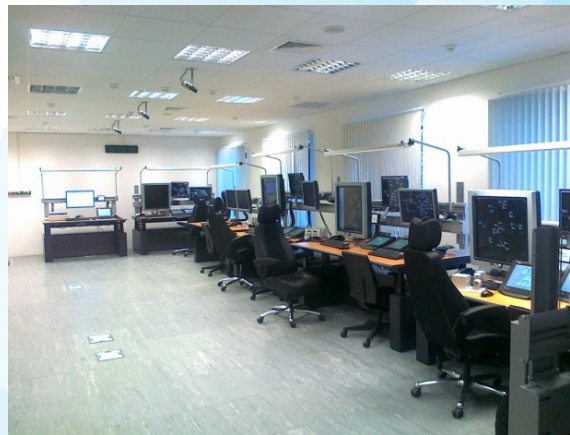


Ops Room

### Kazan



Tower working positions



Ops Room





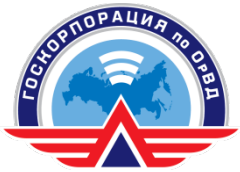
## JOINT SYSTEM OF FIXED SATELLITE COMMUNICATIONS

**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:**

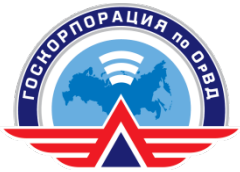
- ✓ **“Lira-A10” Terminal radar** - Samara.

**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:



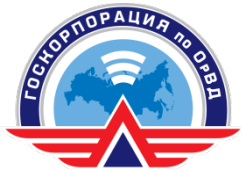
#### ✓ DME-N(NP):

- Mogocha;
- 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)



## FTP «GLONASS MAINTENANCE, DEVELOPMENT AND OPERATIONS (2012-2020)» ADS-B TECHNOLOGY IMPLEMENTATION ARRANGEMENT

### 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

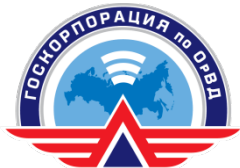
In 2014, **ADS-B Mode 4** will be deployed at:

- ✓ 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.





## FTP «GLONASS MAINTENANCE, DEVELOPMENT AND OPERATIONS (2012-2020)»

### 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 «Ли́ра-А3Н» Калининград

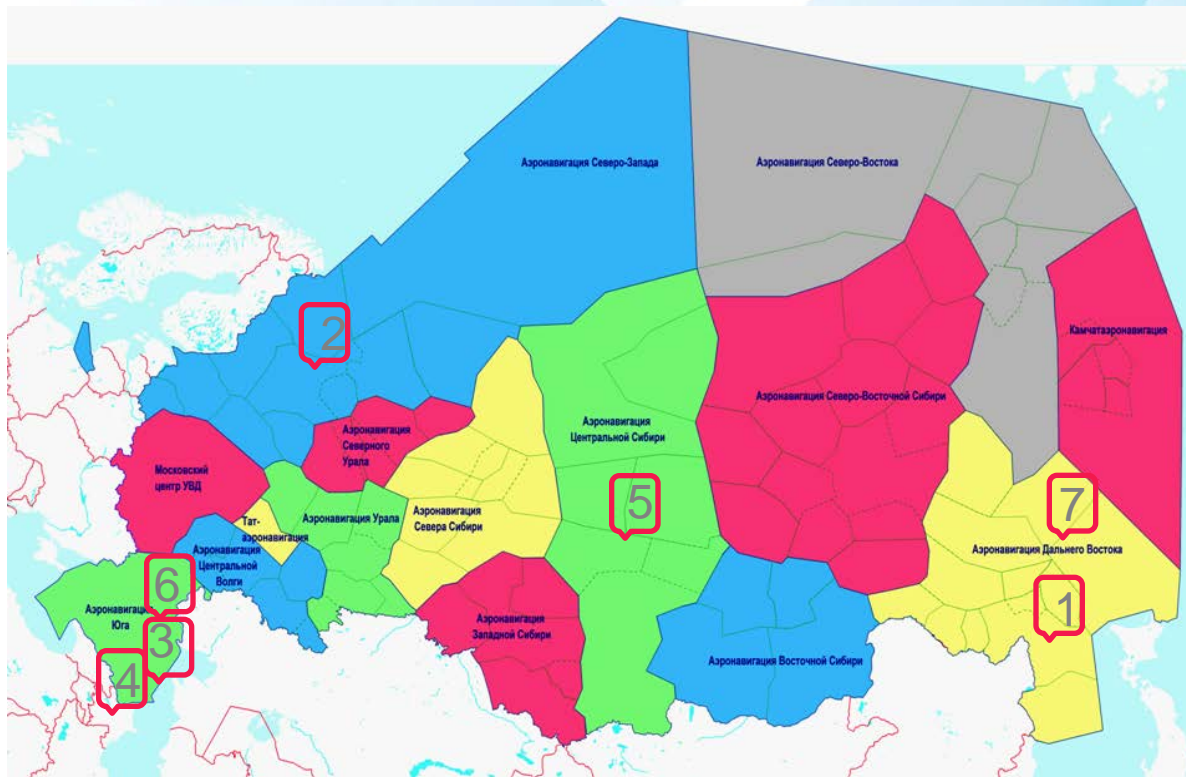


## Establishment of radar sites

### Terminal Radars

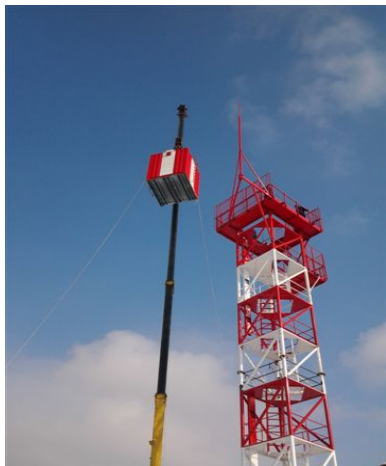
put into operation:

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)





# Implementation of Navigation Aids

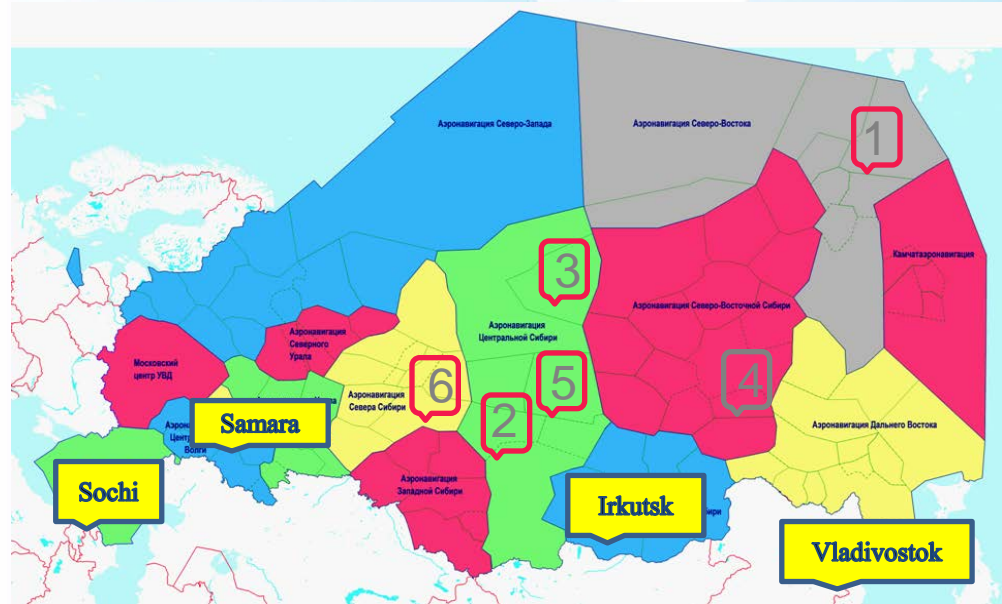
DVOR-2000/DME-2000

Facilities put into operation:

- ✓ **Irkutsk;**
- ✓ **Samara;**
- ✓ **Sochi;**
- ✓ **Vladivostok**

DVOR-2000/DME- 2000 being installed:

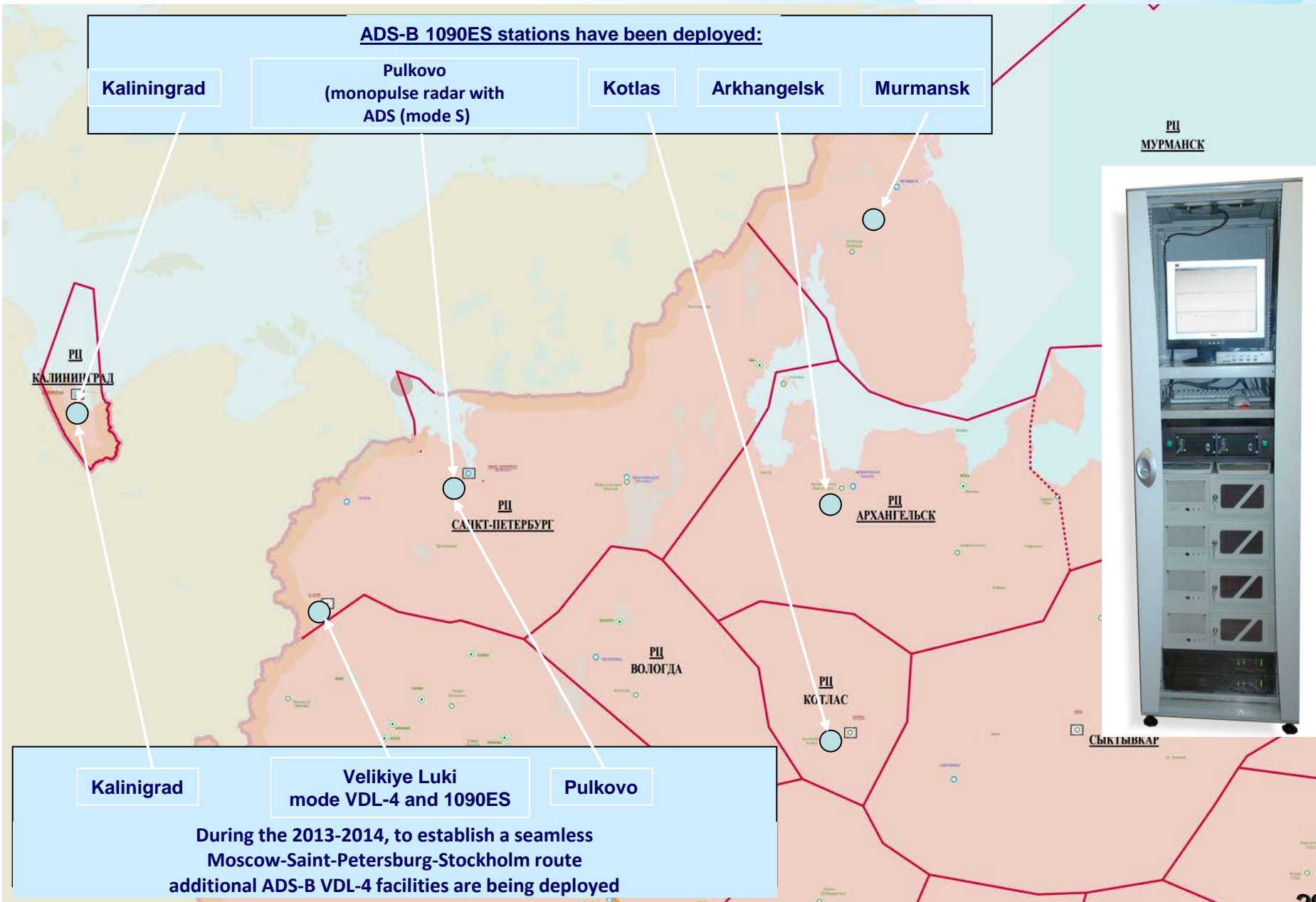
- ✓ **Magadan (1);**
- ✓ **Krasnoyarsk(2);**
- ✓ **Turukhansk (3);**
- ✓ **Neryungry (4);**
- ✓ **Podkamennaya Tunguska(5);**
- ✓ **Khanty-Mansiysk (6).**



DVOR-2000/DME-2000 in Sochi airport

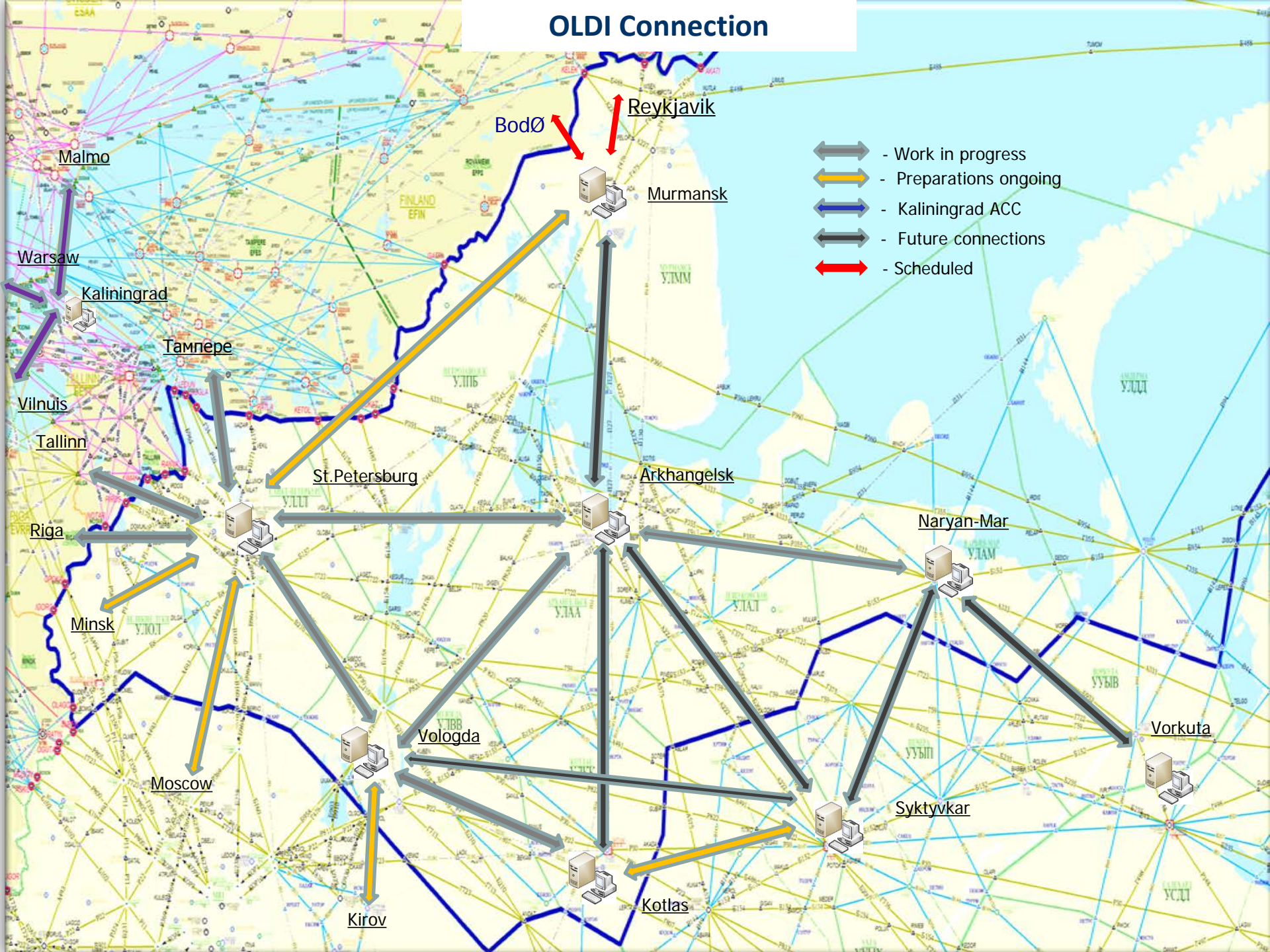


## ADS-B Station 1090ES Mode and VDL-4 Mode in 2013-2014



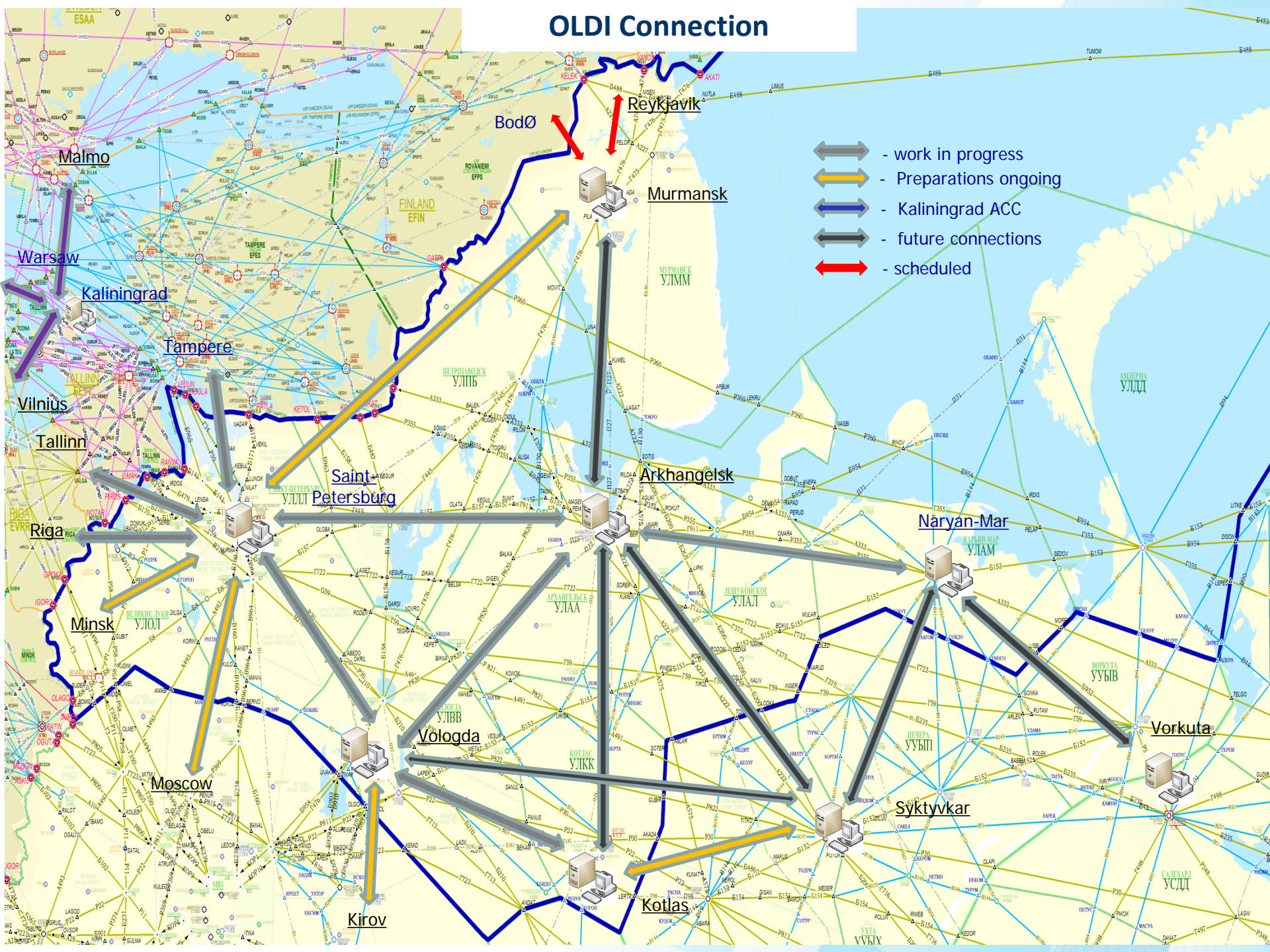


# OLDI Connection





# OLDI Connection



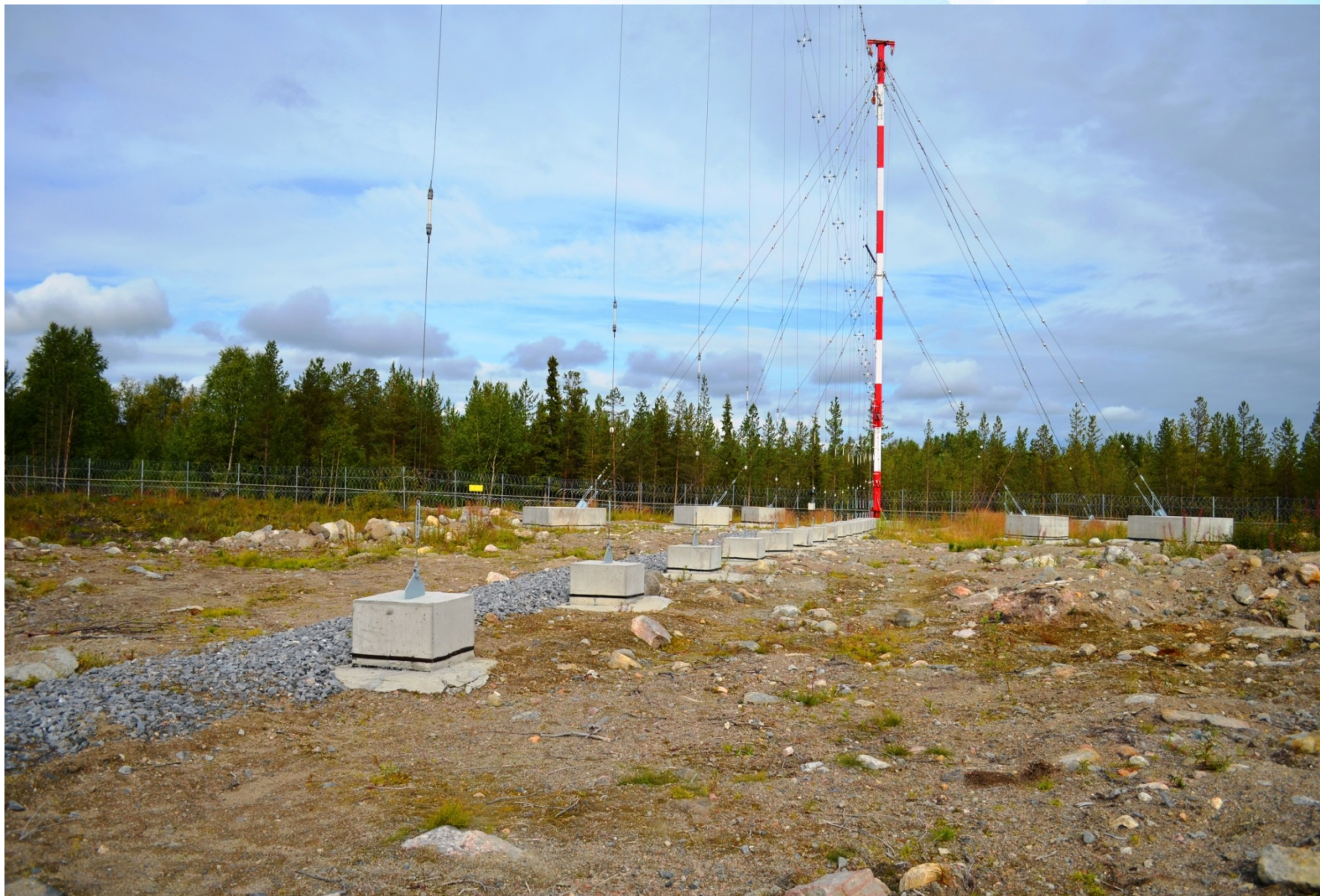




## **HF communication quality enhancement in the area of responsibility of Murmansk ACC :**

- ✓ 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.



## FEDERAL TARGET PROGRAMS AND THEIR IMPLEMENTATION IN 2013

Location of radio transmission centres and VHF radio relays:

Sochi(1), Ukhta(2), Krasnodar(3), Belgorod(4), Kaluga(5), Sasovo(6), Yaroslavl(7), Vladimir(8), Voronezh(9), Nizhniy Novgorod(10), Chulkovo(11), Ryazhsk(12), Sheremetyevo(13), Vyazma(14), Stary Oskol(15), Dalnerechensk(16), Kavaleroovo(17), Ayan(18), Khabarovsk(19), Zeya(20), Markovo(21), Keperveem(22), Bagatay(23), Moma(24), Tigil(25).







## ***FEDERAL TARGET PROGRAMS AND THEIR IMPLEMENTATION IN 2013***

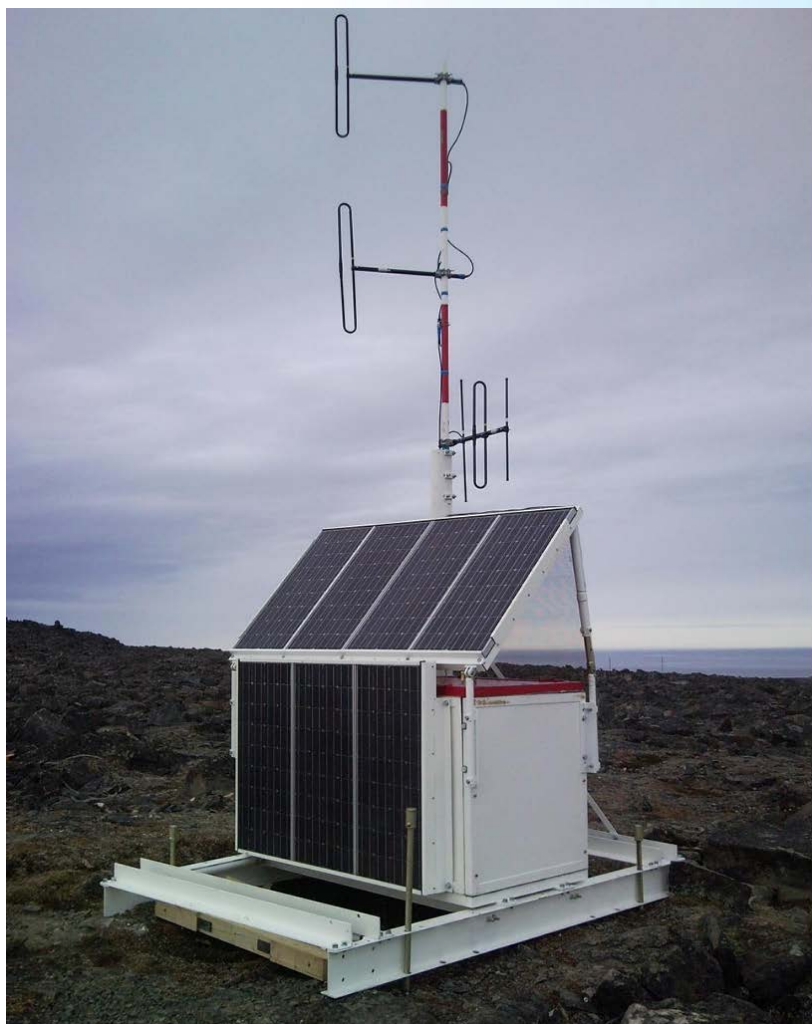
### **Automated Radio Transmission Centre**





## ***FEDERAL TARGET PROGRAMS AND THEIR IMPLEMENTATION IN 2013***

### **Automated radio relay**



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