

**Protocol of the Working Meeting on Preparation for the Establishment
of the Hydrometeorological Observatory in Tiksi**

**19-20 March 2009
St. Petersburg, Russia**

The meeting on the establishment of the hydrometeorological observatory (HMO) in Tiksi took place in the Arctic and Antarctic Research Institute (AARI), Roshydromet, during the period 19-20 March 2009. The main purpose of the meeting was to determine the actions on the preparations for establishing the HMO.

From the Russian side, the delegation was led by V.A. Martyschenko, Deputy Head, Department of Monitoring of Contamination of the Environment, Polar and Ocean Research, Roshydromet. From the U.S. side, the delegation was led by T. Uttal, Polar Processes Group Team Leader, NOAA\Earth Systems Research Laboratory.

Representatives from NOAA, Finnish Meteorological Institute (FMI), AARI, Main Geophysical Observatory (MGO), Yakutsk Regional Administration for Hydrometeorology and Environmental Monitoring, SPA Typhoon, CH2M Hill, and Polar Foundation participated in the meeting. A list of the participants is provided in Attachment 1.

During the meeting, status reports and presentations were given according to the agenda, which is provided in Attachment 2.

The leaders of the Roshydromet and NOAA delegations noted the progress in joint efforts after the meeting in July 2007 toward the resolution of the problem of shipment of foreign equipment to Yakutsk.

Russian side informed that Roshydromet had prepared a new request on delivery of foreign equipment to the territory of the Russian Federation. In 2008, the first stage of the system of receiving and transmitting data from Tiksi to St. Petersburg via satellite channel was organized. Roshydromet allocated more than 14 million rubles in 2009 for operation of the Tiski HMO.

The U.S. side presented information about the development of joint projects and the schematic plan of the many elements that are being considered in the organization of the operation of the observatory. The U.S. side noted substantial



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public response as a result of the establishment of the Tiksi HMO as well as the importance of the environmental data and their contribution to national and international programs such as GAW, BSRN, and CRN.

Both sides discussed the draft research program being planned for the Tiksi HMO, which includes an extended list of potential joint projects. Both sides agreed to finalize the program in the next two weeks to present to the heads of the delegations for approval by Roshydromet and NOAA. For each project, there were suggested responsible persons from the Russian side. The U.S. and FMI will appoint a scientific coordinator as well in one week.

The American side noted that they need to organize regular delivery of the flasks with air samples taken in Tiksi for calibration purposes and for expanding the nomenclature of the gases under investigation.

The Finnish representative noted the successful development of cooperation with Roshydromet on the organization of monitoring the gas content of the atmosphere, surface aerosol, turbulent heat flux, impulse, carbon dioxide, and methane.

The Russian side agreed with the suggestions made by the American side to use air samplers and flasks delivered by NOAA to Tiksi.

Both sides agreed to estimate costs of labor and prepare by May 1, 2009, a joint plan for training personnel to operate the HMO as well as preparation of detailed instructions for monitoring operations.

The Russian side indicated that since the beginning of August 2008, the weather station "Polyarka" has been in operation in the main building of the HMO, where the center for transmission of data is located, and the construction of the Clean Air Facility is 95% completed. During winter, positive air temperatures were maintained. New power lines were completed, and the road from Tiksi to the HMO was reconstructed. Since September 2008, a satellite channel for connection between Tiksi and St. Petersburg was established and works in text format. Four apartments in Polyarka station are being renovated for specialists to live in. The flux tower is not yet built. The backup source of power is not installed, and additional specialists are needed for operating the HMO.

The representatives from the Polar Foundation and the U.S. company, CH2M Hill Polar Services (CPS) indicated that the CAF is 95% ready for operation, the finalization depends on the proposed plan for the location of instruments.



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The Russian side noted that there are a number of defects in the completed weather facility, which includes loud low-level noise when the wind is more than 20 mps and the absence of sewer and water facilities.

During the meeting, the discussions of construction of the building and other structures, financing of joint operations, and data transmission took place inside working groups.

As a result of the discussion inside the working group on the construction of the building and other structures, the detailed plan of operations indicating responsible organizations and deadlines were identified, as contained in Attachment 3.

As a result of the discussion inside the working group on financing of joint operations, both sides considered four options of establishing appropriate contractual arrangements: requisition for services, a facilities contract, or a joint projects agreements. Another option would be through the WMO Voluntary Cooperation Program (VCP). Both sides defined responsible persons to work out details and engage them to have in place an appropriate mechanism by August 15, 2009.

As a result of the discussion inside the working on data transmission, a systems testing transmission plan was developed indicating responsible organizations and deadlines. The detailed telecommunications scheme and order of data transmission was also developed, as contained in Attachment 4.

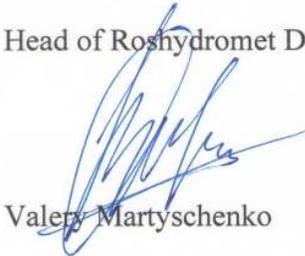
Both sides defined the preliminary time for the next meeting to take place in the autumn 2009.

Head of NOAA Delegation



Taneil Uttal

Head of Roshydromet Delegation



Valery Martyschenko

Attachment 1

List of participants

Delegation of Roshydromet:

Name of the participant	Organization/Position	e-mail
Valery Martyshchenko	Roshydromet Department of environment monitoring, polar and marine works Deputy Head of department , Head of delegation	seadep@mcc.mecom.ru
Tatiana Dmitrieva	Roshydromet Deputy Head of division, Department of scientific programs, international cooperation and information resources	dtunms@mcc.mecom.ru
Alexander Makshtas	Arctic and Antarctic Research Institute, Leading scientist	maksh@aari.ru
Vasiliy Kuzmich	Yakutsk Regional Administration of Roshydromet, Head	priemyugms@sakha.ru
Alexey Konoplev	SPA “Typhoon”, Head of the laboratory	konoplev@obninsk.com
Alexander Kuzmichev	Arctic and Antarctic Research Institute, Head of sector	kuzmichev@aari.ru
Alexander Reshetnikov	Main geophysical Observatory, Head of the laboratory	alexR35@mail.ru
Sergey Priamikov	Arctic and Antarctic Research Institute, Head of the Department of international science cooperation	priamiks@aari.ru
Sergey Shutilin	Arctic and Antarctic Research Institute, senior scientist	shutilin@aari.ru
Dmitry Apartsev	Arctic and Antarctic Research Institute, IT engineer	da@aari.ru

Delegation of NOAA:

Taneil Uttal	NOAA/OAR/ESRL/PSD, Polar Programs Leader	taneil.uttal@noaa.gov
Russ Schnell	NOAA/OAR/ESRL/GMD, Deputy Director Global Monitoring Department	russell.c.schnell@noaa.gov
Renee Tatusko	NOAA/NWS, International Activities Office NOAA Secretariat	Renee.tatusko@noaa.gov
Ludmila Matrosova	NOAA/CIRES, Deputy manager of Tiksi project	ludmila.e.matrosova@noaa.gov
Eric Estes	NOAA/PSD, IT security specialist	eric.estes@noaa.gov
Robert Albee	NOAA/PSD, Electronics engineer	Robert.Albee@noaa.gov

Representatives of other organizations:

Tuomas Laurila	Finnish Meteorological Institute Head of research group	Tuomas.Laurila@fmi.fi
Yury Sychev	Polar Foundation, Head	sychev@polarf.ru
Mike McKibben	CH2M Hill Polar Services	mike.mckibben@ch2m.com

Attachment 2

Working meeting on Development of Business Plan for Opening of Hydrometeorological Observatory in Tiksi

Arctic and Antarctic Research Institute, St. Petersburg, Russian Federation

19-20 March 2009

Agenda

March 19th, 2009

- | | |
|-------------|--|
| 9.00-9.20 | Opening meeting (Valery Martyschenko, Tanil Uttal). |
| 9.20-9.40 | The Information on the Program of scientific observations in the Hydrometeorological observatory in Tiksi and the organization of data transmission system of observations to foreign partners (Alexander Makshtas). |
| 9.40-9.55 | The Information on plans of NOAA on expansion of works in the Hydrometeorological observatory in Tiksi in 2009 - 2010 (Tanil Uttal). |
| 9.55-10.20 | The Information about statement of greenhouse gases observations in the Hydrometeorological observatory and about development of cooperation with the Finnish meteorological institute (Alexander Reshetnikov, Tuomas Laurila). |
| 10.20-10.40 | Coffee break. |
| 10.40-10.55 | The Information of SPA "Typhoon" on studying pollution of atmosphere in the region of the future Tiksi Hydrometeorological observatory (Alexey Konoplev). |
| 10.55-11.10 | The Information on modernization of infrastructure, meteorological and radiosounding complexes of weather station Tiksi (Vasily Kuzmich). |
| 11.10-11.30 | The Information about construction and modernization of infrastructure in the future Observatory (Yury Sychev, Mike McKibben). |
| 11.30-12.00 | Formation of working groups by directions of Hydrometeorological observatory organization: the group on construction of the buildings and other structures; group on financing of joint operations; group on communication system and data transmission. |
| 12.00-13.30 | Lunch |
| 13.30-16.30 | Sessions of working groups. |
| 16.30-17.30 | Reports of working groups. |

March, 20th, 2009

- 9.00-11.00 Continuation of sessions of working groups, preparation of briefs.
- 11.00-12.00 Presentation the drafts of documents, prepared by working groups.
- 12.00-13.30 Lunch
- 13.30-16.30 Discussion and signing of joint protocol following the results of the meeting.
- 17.00 Closure of the meeting.

**Attachment 3
Remaining Tiksi CAF Construction Items**

What	Action	Who	When
Towers			
	Flux		
	Final Location for Flux Tower	NOAA/FMI	4/10/2009
	Orientation of Flux Tower	NOAA/FMI	4/10/2009
	Identify Power Requirements and Location of Connections	NOAA	4/10/2009
	Radio Link Possibility?	NOAA	4/10/2009
	Define Communication Line Requirements	NOAA	4/10/2009
	Identify Location of Instruments	NOAA	4/10/2009
	Identify Clean Zone Around Tower	NOAA	4/10/2009
	Procurement of Cable and Other Materials	Polar Foundation	5/15/2009
	Color Determination	NOAA	4/10/2009
	Albedo Rack		
	Identify Final Location for 3 Albedo Racks	NOAA	4/10/2009
	Provide New Design to Yuri	NOAA	4/10/2009
	Identify Power Requirements and Location and Connection Details		4/10/2009
	Identify Communication Line Requirements		4/10/2009
	Identify Location of Instruments	NOAA	4/10/2009
	Color Determination	NOAA	4/10/2009
	Aerosol Stack	N/A	N/A
	None		
	General Power		
	Connection of Backup Power to Facility	Polar Foundation	8/15/2009
	Internal Layout - How Many Receptacles and Where	NOAA	4/10/2009
	Identify Single UPS Requirements	NOAA	4/10/2009
	Validate Roof Power Requirements and Locations	NOAA	4/10/2009
	Specify Cable and Conduit	NOAA	4/10/2009
	Purchase Cable and Conduit	Polar Foundation	5/15/2009
	FMI - Specify Cabin Power Requirements, Location and Connection Details	FMI	4/10/2009
	General Communications		
	Specify and Purchase Comms Between CAF and Weather Station (WiFi)	Roshydromet/Polar Foundation	8/15/2009
	Identify Location of Cable Runs	NOAA	4/10/2009
	Specify Communications Cables and Length	NOAA	4/10/2009
	Purchase General Communications Materials	Polar Foundation	5/15/2009
	Ship Lab Temperature Test System For Connectivity Test	NOAA	5/1/2009
	Perform Initial Communications Connectivity Test for NOAA	Roshydromet	6/15/2009
	Final Connection and Checkout of Communications Equipment	NOAA	8/30/2009
	Purchase Spare Sat Link Equipment	Polar Foundation	6/1/2009
	Specify and Purchase General Communications Systems Spare Parts	Polar Foundation	6/1/2009
	Security		
	Determine If Fence Can be Used and Location		
	Flux Tower Fence	NOAA	4/10/2009
	Albedo Towers Fence	NOAA	4/10/2009
	Fence Around CAF	NOAA	4/10/2009
	Fence Around FMI Cabin	FMI	4/10/2009
	Security System Specifications (Lights and IR)		
	CAF	Roshydromet/Polar Foundation	5/15/2009
	Towers	Roshydromet/Polar Foundation	5/15/2009
	Determine Impact of Lights		
	Fire Suppression		
	Determine CAF Fire Suppression System Design	Polar Foundation	5/15/2009
	Purchase and Install CAF Fire Suppression System	Polar Foundation	6/1/2009
	FMI Cabin		
	Determine Final Location of FMI Cabin	FMI	4/10/2009
	Specify Power Connection Requirements	FMI	4/10/2009
	Communications Connection	FMI	4/10/2009
	Identify Location and Installation of Small Tower	FMI	4/10/2009
	Polar Foundation to Purchase Tower	Polar Foundation	5/15/2009
	Construction Equipment		
	Provide Tiksi Construction Crew Vehicle(s) for Polar Foundation	Roshydromet	8/1/2009
		CPS/NOAA/Polar Foundation	3/27/2009
	Determine Schedule		
	CRN		
	Validate Final Location	NOAA	4/10/2009
	Determine Construction Support Requirements	NOAA	4/10/2009
	Specify Communications Requirements	NOAA	4/10/2009
	Identify Power Requirements	NOAA	4/10/2009
	Install CRN	NOAA/Polar Foundation	8/15/2009
	General CAF		
	Inspect Existing CAF Building and Repair as Required	Roshydromet/Polar Foundation	
	Provide Final Roof Instrument Location Layout	NOAA	4/10/2009
	Provide Final Floor Equipment Layout	NOAA	4/10/2009
	Resolve CAF Wastewater and Shower Design	Polar Foundation	4/30/2009
	Finalize Construction of Wastewater and Shower	Polar Foundation	8/15/2009
	Final Inspection of CAF and Towers - NOAA	NOAA	8/30/2009
	Checkout	NOAA	8/15/2009
	Identify Tools Required	NOAA	8/1/2009
	Shipment of Additional Cargo From Moscow		
	Identify Additional Science Cargo to Ship to Tiksi		5/15/2009
	Ship to Moscow Date	NOAA	6/1/2009
	Store Materials in Moscow to be Shipped to Tiksi	Roshydromet/Polar Foundation	
	CAF Furniture		
	Identify Requirements - Racks, Tables, Other Furniture	NOAA	4/15/2009
	Polar Foundation to Buy Furniture	Polar Foundation	5/31/2009
	Identify Weather Station Additional Outlets	Roshydromet/NOAA	4/15/2009
	Identify Additional Furniture Required for Weather Station	Polar Foundation	4/15/2009
	Resolve Weather Station Wastewater Design	Polar Foundation	4/30/2009
	Modification to Polar Foundation Contract With CPS	CPS/Polar Foundation	5/1/2009
	Roshydromet Point of Contact - Vasily Kuzmich		
	NOAA Construction Point of Contact - Rob Albee		
	FMI Construction Point of Contact - Tuomas Laurila		
	Polar Foundation Point of Contact - Yuri Sychev		
	CPS Point of Contact - Mike McKibben		

Attachment 4
Plan of data transmission organization

System Name	Device	Data Type	Protocol from Device to Computer	Protocol from Tiksi to AARI	Protocol from AARI to NOAA	Management Protocol	Date
BSRN							
	Windows PC	Collects all BSRN instrument data	N/A	SCP preferred, FTP optional	SCP	RDP	30 August
	Albedo 1 Campbell Data Logger *	Albedo1 radiation measurements and data logger voltage, temp, and time	RS232 9600 baud	SCP preferred, FTP optional	SCP	Proprietary loggernet software via RS232	30 August
	Albedo 2 Campbell Data Logger *	Albedo2 radiation measurements and data logger voltage, temp, and time	RS232 9600 baud	SCP preferred, FTP optional	SCP	Proprietary loggernet software via RS232	30 August
	Albedo 3 Campbell Data Logger *	Albedo3 radiation measurements and data logger voltage, temp, and time	RS232 9600 baud	SCP preferred, FTP optional	SCP	Proprietary loggernet software via RS232	30 August
	Primary Campbell Data Logger *	All roof-mounted radiation instruments, including data logger voltage, temp, and time	RS232 9600 baud	SCP preferred, FTP optional	SCP	Proprietary loggernet software via RS232	30 August
	Tracker	Elevation, azimuth, temp, time	RS232 9600 baud	SCP preferred, FTP optional	SCP	Proprietary loggernet software via RS232	30 August
FLUX							
	Windows PC	Collects all flux tower instrument data	N/A	SCP preferred, FTP optional	SCP	RDP	30 August
	Primary Campbell Data Logger *	Most instruments on flux tower, and data logger voltage, temp, and time	RS232 9600 baud	SCP preferred, FTP optional	SCP	Proprietary loggernet software via RS232	30 August
	Sonic 1	3D Axis wind velocity at 100 Hz sample 10Hz average	RS232 9600 baud	SCP preferred, FTP optional	SCP	Hyperterminal via RS232	30 August
	Sonic 2	3D Axis wind velocity at 100 Hz sample 10Hz average	RS232 9600 baud	SCP preferred, FTP optional	SCP	Hyperterminal via RS232	30 August
	Sonic 3	3D Axis wind velocity at 100 Hz sample 10Hz average	RS232 9600 baud	SCP preferred, FTP optional	SCP	Hyperterminal via RS232	30 August
	Licor Gas Analyzer	10Hz CO2 and H2O concentration data	RS232 9600 baud	SCP preferred, FTP optional	SCP	Proprietary Licor software via RS232	30 August
AEROSOL							
	Linux PC	Collects all aerosol instrument data	N/A	SCP preferred, FTP optional	SCP	SSH	30 August
	Aethelometer	Carbon concentration data	RS232 9600 Baud	SCP preferred, FTP optional	SCP	Hyperterminal via RS232	30 August
	Ozone Meter	O3 concentrations	RS232 9600 Baud	SCP preferred, FTP optional	SCP	Hyperterminal via RS232	30 August
TEST							
	Windows PC		N/A	SCP preferred, FTP optional	SCP	RDP	30 June
	Primary Campbell Data Logger *	2 temp and humidity probes in weather lab, and voltage, temp, time of data logger	RS232 9600 Baud	SCP preferred, FTP optional	SCP	Proprietary loggernet software via RS232	30 June
	UPS	Line voltage status reports	RS232 9600 Baud	SCP preferred, FTP optional	SCP	Hyperterminal via RS232	30 June
Roshydromet Point of Contact - Alexander Kuzmichev							
NOAA Point of Contact - Eric Estas							
* Data logger collects at 1-second rates, records 1-minute averages							