CGMS

CGMS-51
ROSHYDROMET-WP-01
24 April 2023

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Agenda Item: 5.2
Discussed in WG-I

# STATUS OF RUSSIAN DATA COLLECTION SYSTEM

This document addresses the current status and technical specifications of the Russian data collection system and related future plans. The DCS is established to provide collection and distribution of meteorological data from the remote areas and to support natural hazards warning system.

Roshydromet has developed and deployed the national DCS based on geostationary meteorological satellites of Electro-L series (14.5W, 76E, 165.8E) with a backup option via Luch series communication satellite and highly elliptical orbit satellite Arctica-M. There are 696 DCPs currently deployed. DCPs are distributed all over the Russian territory, including 141 DCPs in hard-to-reach areas.

The Russian DCS will be further complemented with the launch of the second highly elliptical orbit satellite Arctica-M.

# STATUS OF RUSSIAN DATA COLLECTION SYSTEM

## 1. INTRODUCTION

Russian data collection system (DCS) is established to provide satellite channels for meteorological data transmission from data collection platforms (DCPs) via meteorological satellites (backup option – via Luch communication satellites).

The DCS was developed according to the international requirements of WMO and CGMS and has to provide transmission of the messages every 3 hours (standard synoptic hours), and also storm warnings at any time.

## 2. TECHNICAL SPECIFICATIONS

DCS comprises of the network of DCPs at Roshydromet' observational sites, relay transponders at Russian satellites of Electro-L, Luch and Arctica-M series, and ground reception stations at SRC Planeta satellite centers.

DCP signals are transmitted via geostationary meteorological satellites at frequency ranges of 401.5-402.5 MHz (uplink) and 1696.5-1697.5 MHz (downlink), for highly elliptical orbit satellite of 402-403 MHz (uplink) and 1697-1698MHz (downlink) with transmission rate of 100 or 1200 bps. The message size is up to 15 000 bit. The transmission time is synchronized with GLONASS/GPS signals.

System capacity for geostationary meteorological satellites allows data transmission from 300 DCPs simultaneously providing total throughput of 3000 DCPs in 10 minutes, for highly elliptical orbit satellite from 100 DCPs simultaneously providing total throughput of 1000 DCPs in 10 minutes.

Russian DCS is developed for data transmission via geostationary meteorological satellites of Electro-L series (constellation of three spacecrafts to be located at 14.5W, 76E, and 165.8E), highly elliptical orbit satellites of Arctica-M series (constellation of two spacecrafts), and also geostationary communication satellites of Luch series.

The constellation of Electro-L geostationary satellites (with backup option via Luch communication satellites) provides realtime coverage of the territory from about 75ºS to about 75ºN, with Arctica-M series satellites covering high Arctic latitudes (see Figure 1). Non-realtime coverage of the whole globe provides by polar-orbiting meteorological satellites of Meteor series (constellation of three spacecrafts).

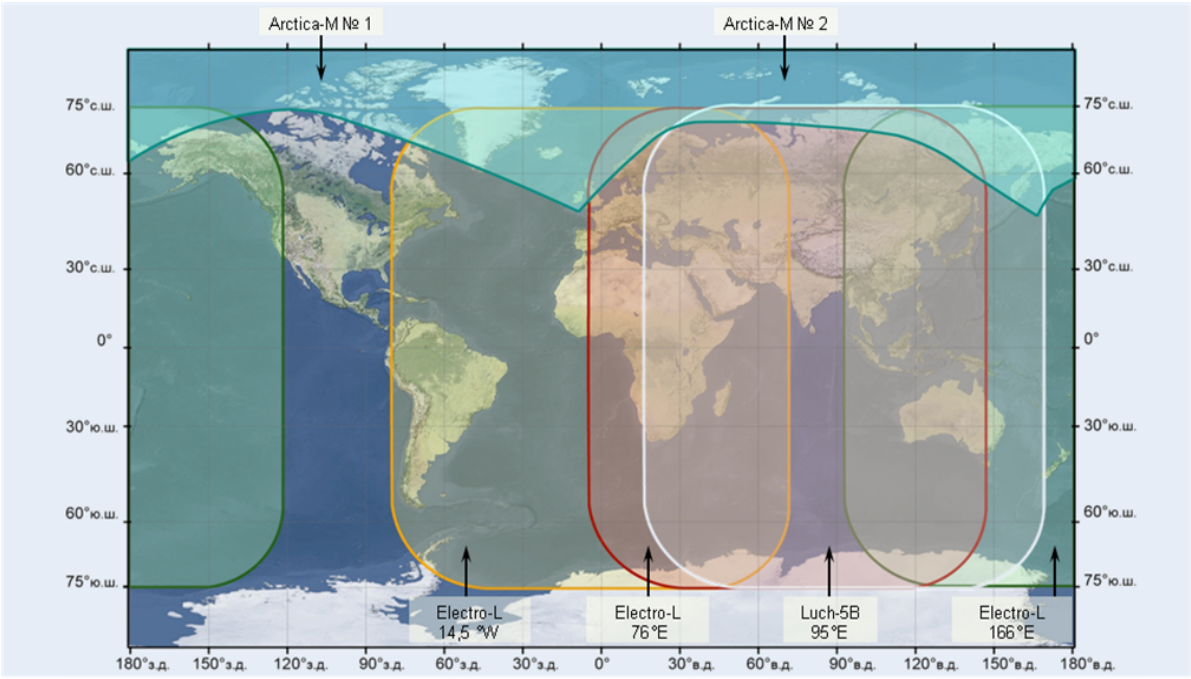


Figure 1: The coverage of Russian geostationary and highly elliptical orbit satellites.

## 3. CURRENT STATUS

Roshydromet has developed and deployed the national DCS based on geostationary meteorological satellites of Electro-L series, with a backup option via Luch series and highly elliptical orbit satellite of Arctica-M communication satellite.

As shown in Figure 2 messages transmitted from DCPs to Electro-L (14.5W, 76E,165.8E) and Luch-5B (95E) are relayed to the European (Moscow region), Siberian (Novosibirsk) and Far Eastern (Khabarovsk) satellite centers of SRC Planeta. Currently Arctica-M are relayed to the European satellite center in future it will relayed to all centers of SRC Planeta.

Geostationary meteorological satellite Electro-L №4 was launched on February 05, 2023 and placed at 165,8 E position.

There are 696 DCPs currently deployed (April 2023). DCPs are distributed all over the territory of Russia, including 141 DCPs in hard-to reach areas. The national DCS has a reliability of 99.8 % based on the number of messages successfully received.

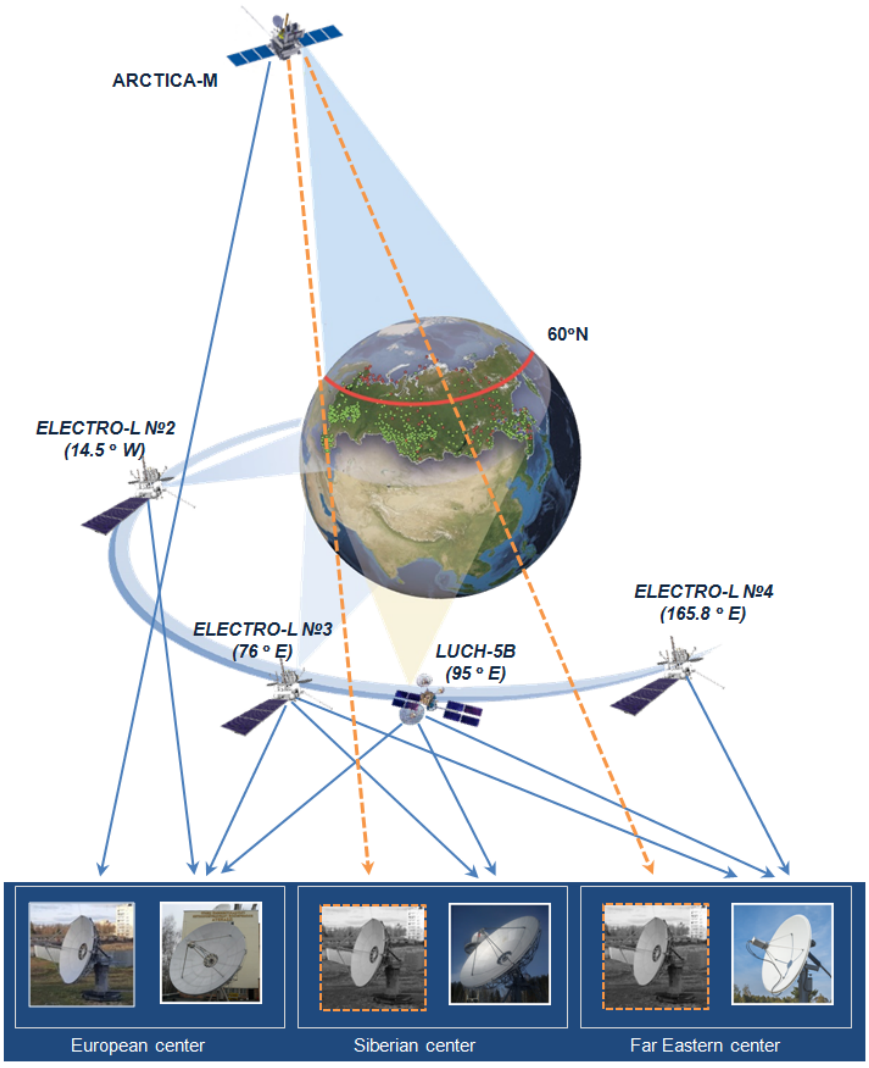


Figure 2: Current status of Russian DCS.

## 3. DEVELOPMENT PERSPECTIVES

The Russian DCS will be further complemented with the launch of the second highly elliptical orbit satellite Arctica-M.