

# Evaluation of Group Signal Transformation Efficiency for Earth Remote Sensing

V.V. Ivanov, I.O. Abdreev, E.A. Lopukhova, I.V. Stepanov, E.P. Grakhova, I.V. Kuznetsov

## Research Objective

Estimation of the impact of group signal transformation on energy efficiency and noise immunity of remote sensing systems for Earth.

## Group Transformation Principle

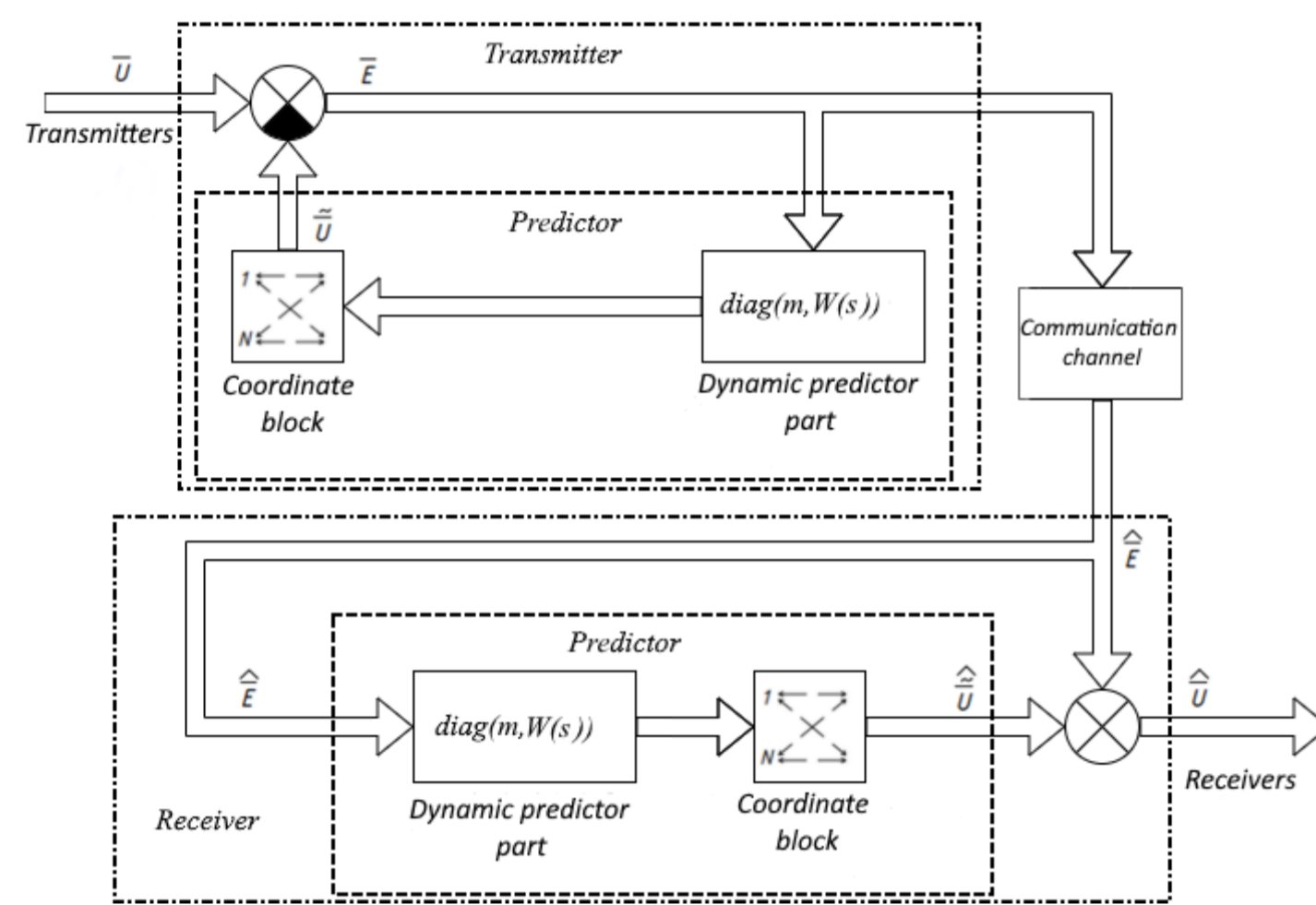


Fig. 1 The structure of signal forming with coordinated predictor.

## Prototype

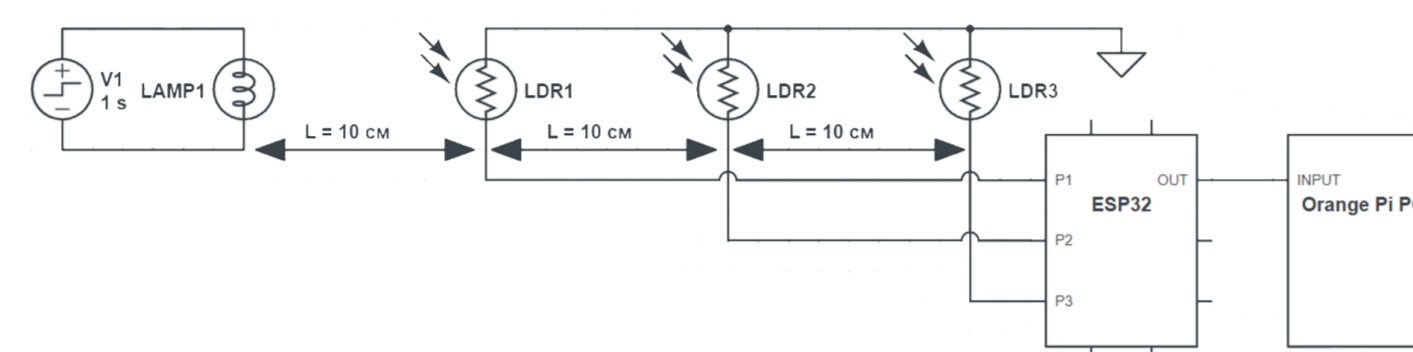


Fig. 2 Schematic diagram of the coordinated group codec prototype.

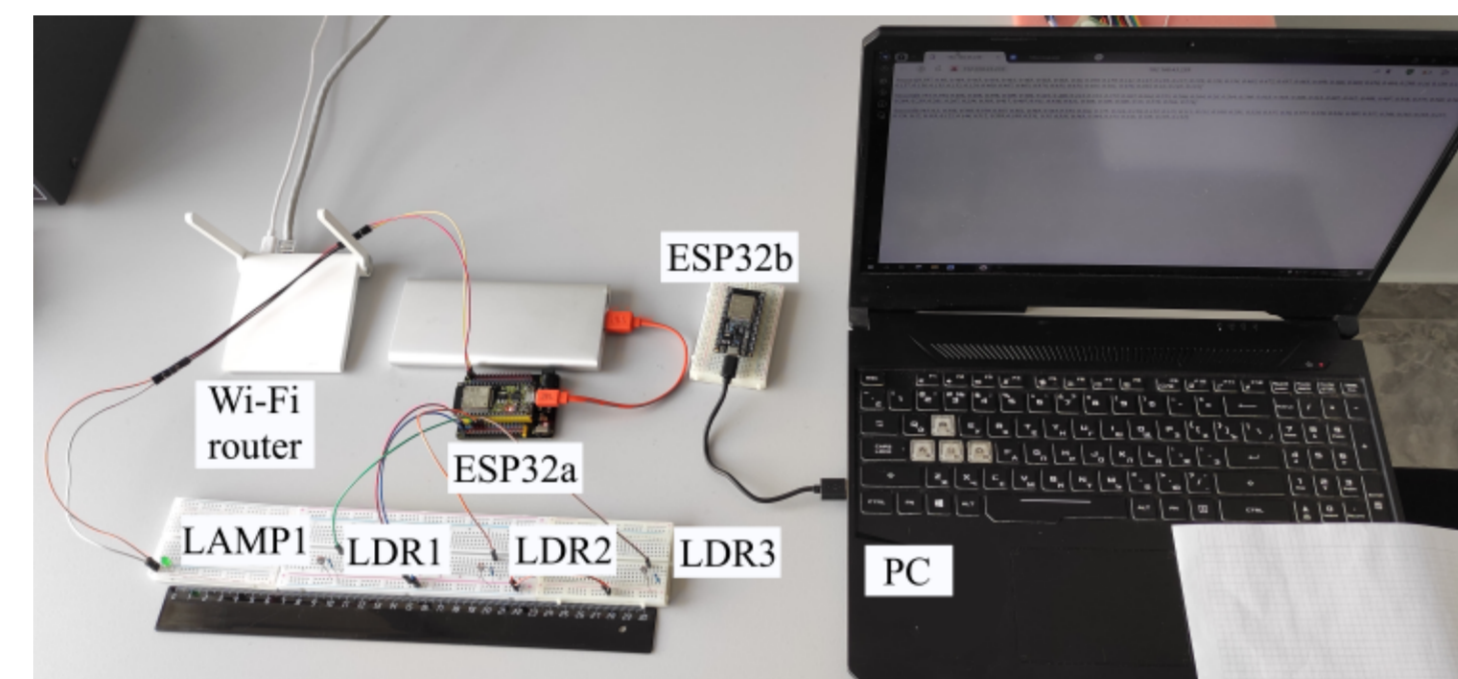


Fig. 3 Experimental layout: ESP32 microcontroller, sensors, PC and router.

## Experimental Results

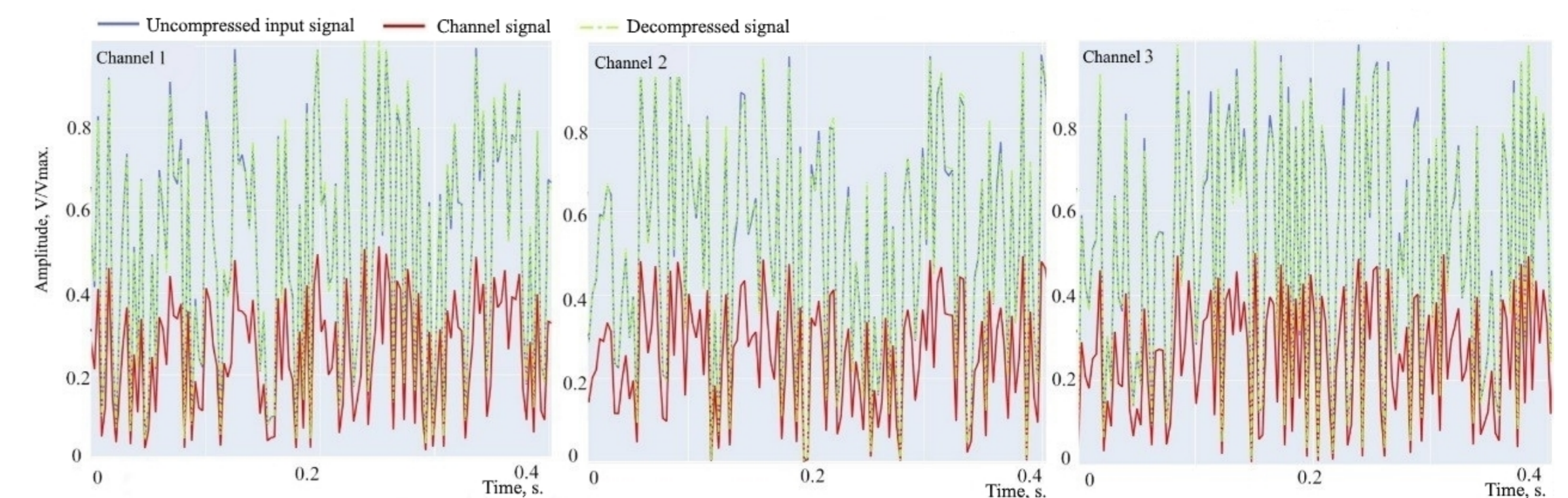


Fig. 7 Signals' oscillograms of signals for each channel of the multichannel system.

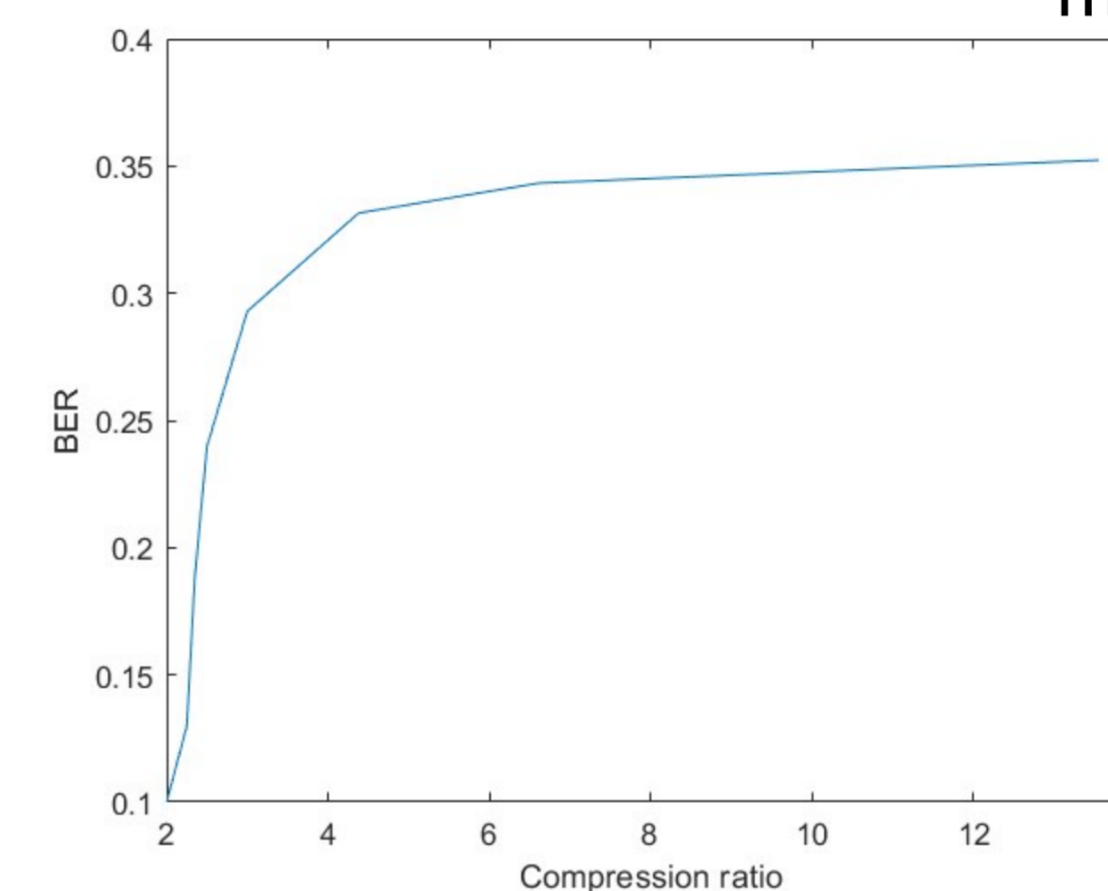


Fig. 8 Dependence of the BER parameter on the signal compression coefficient.

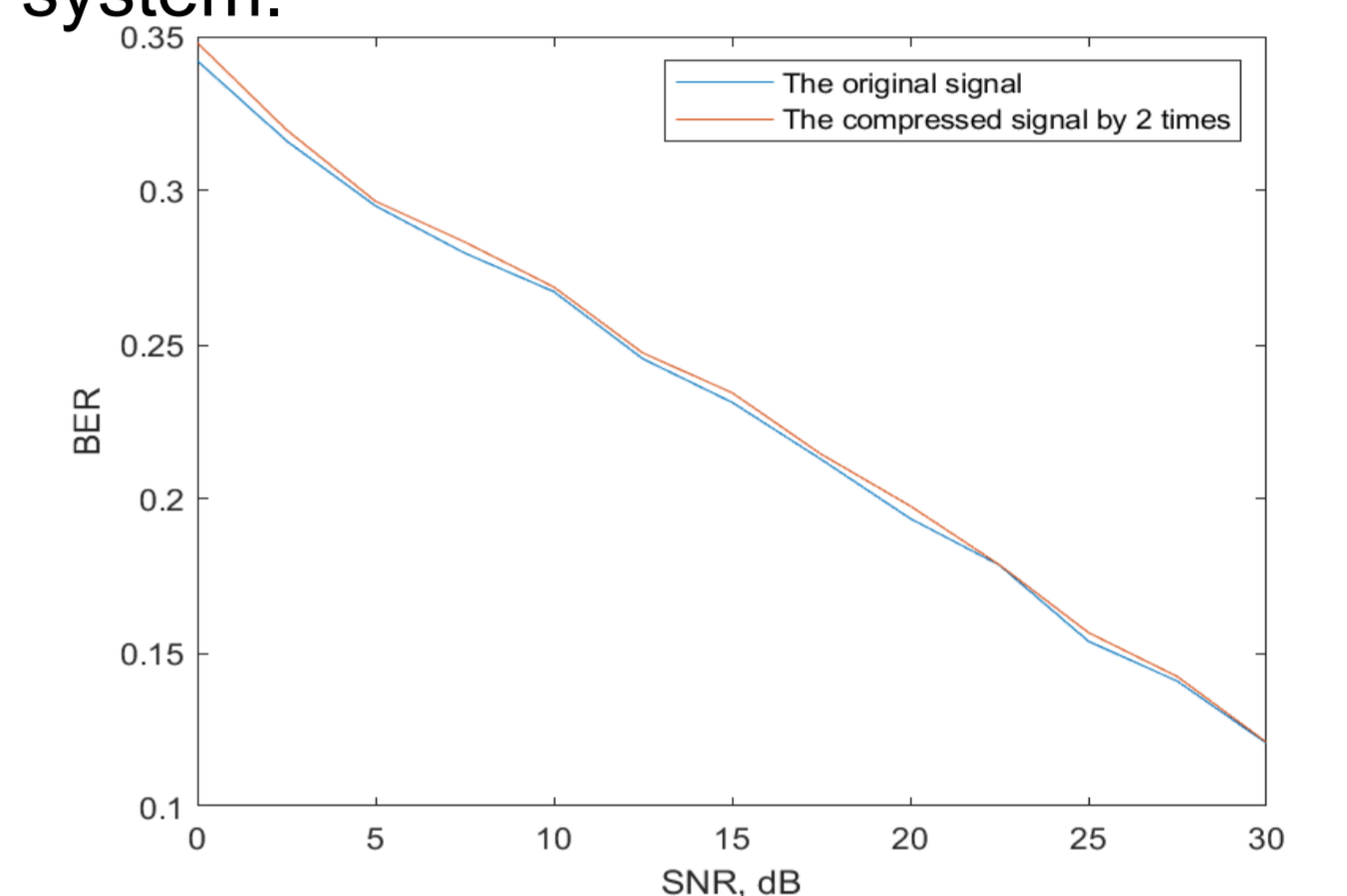


Fig. 9 Dependence of the BER on the signal-to-noise ratio.

## Image compression for transmission

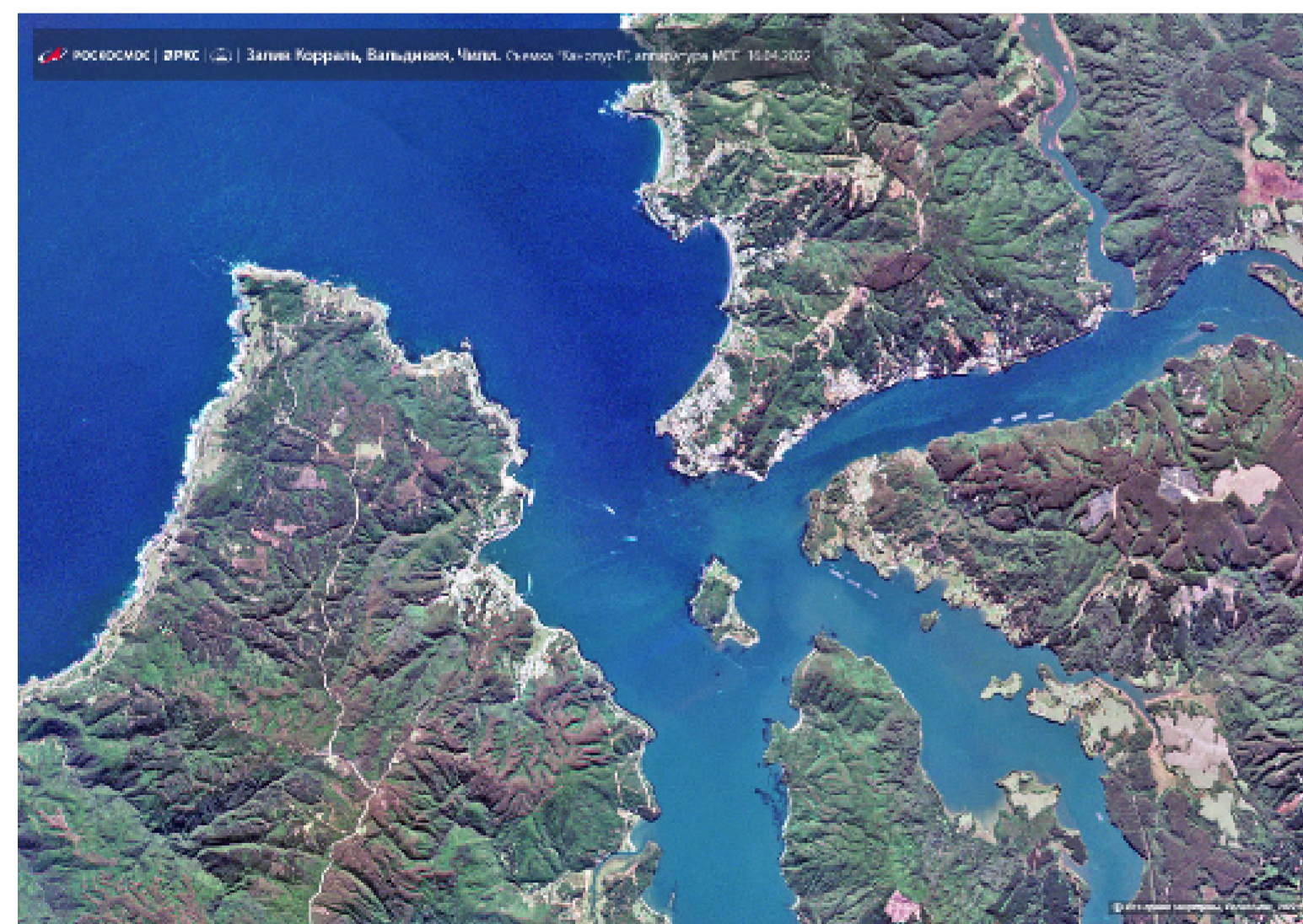


Fig. 4 The uncompressed image, size is 2 MB.

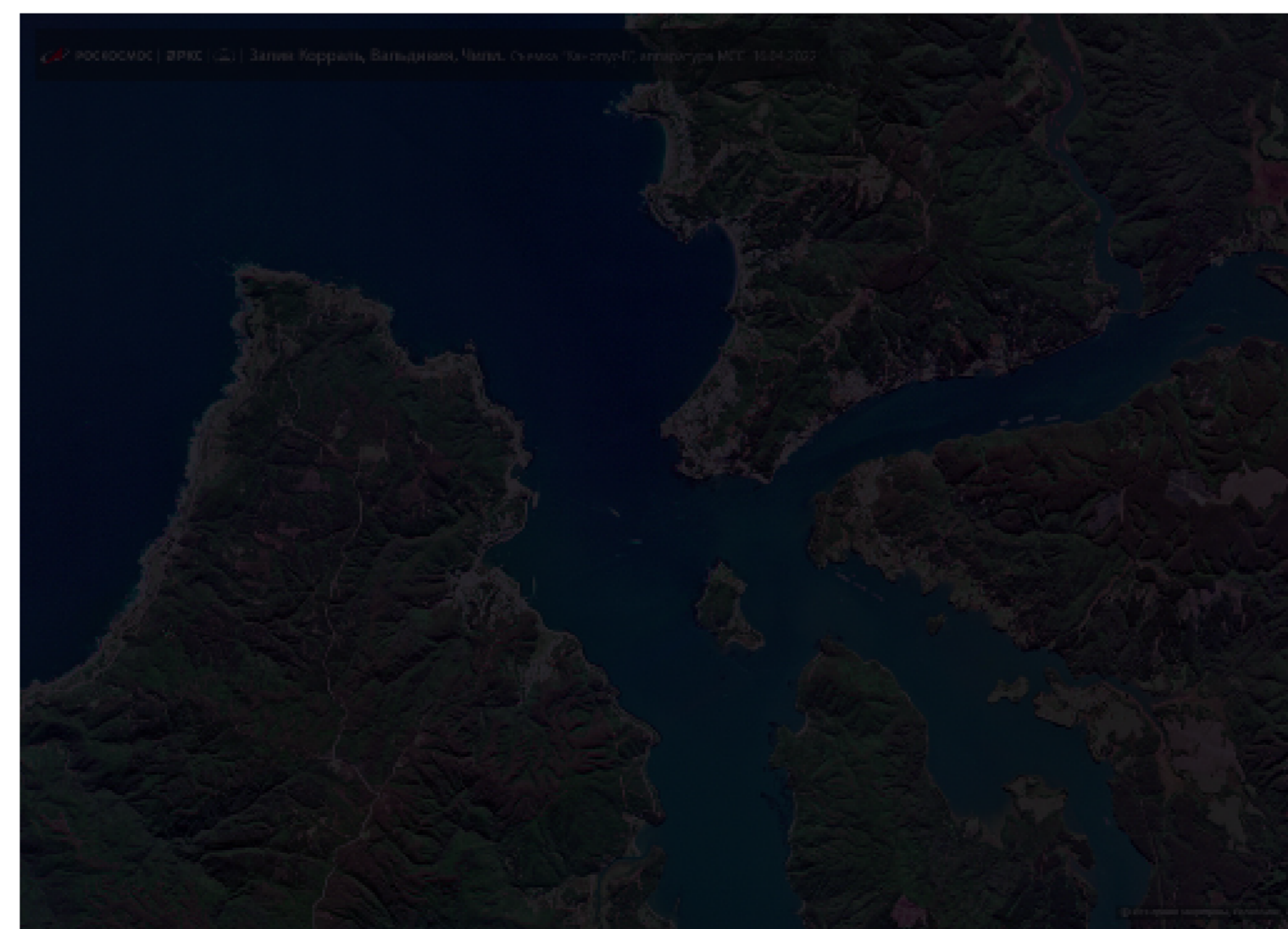


Fig. 5 The channel image, size is 1.03 MB.

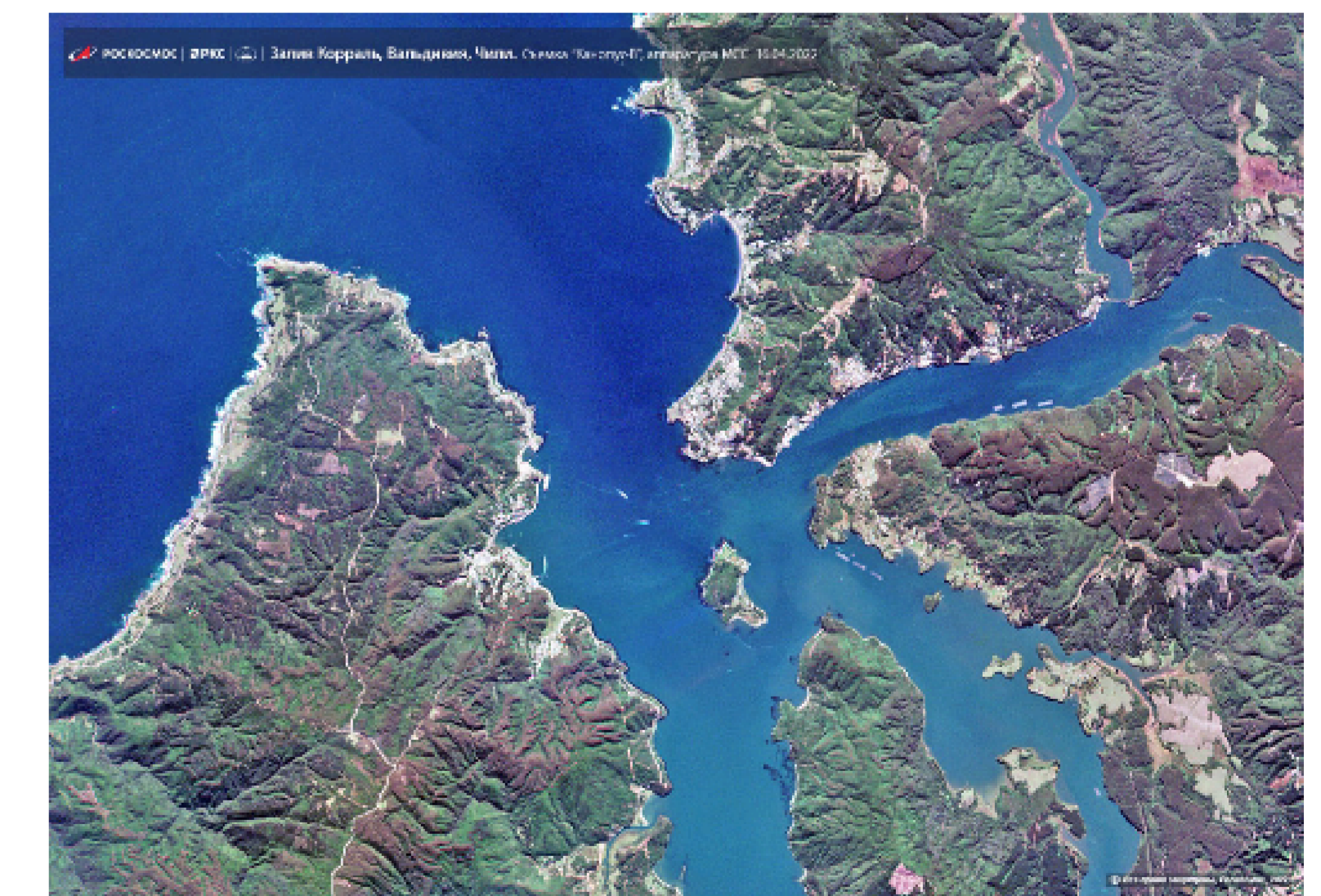


Fig. 6 The decompressed image, size is 1.61 MB.

