



Space Weather Activities in Ukraine Winter 2011 Report

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In brief

- Space weather (SWx) related missions launched in 2011:
 1. “Sich-2” EO S/C with “Potential” experiment was launched on August 17.
 2. “Spektr-R” S/C with “Plasma-F” experiment was launched on July 18.
 3. “Chibis-M” S/C was delivered to the ISS on November 2.
 4. “Phobos-Grunt” S/C was unsuccessfully launched on November 8.
- Planned SWx related missions:
 1. “Environment” instrument suite will be delivered to the ISS in 2012
 2. “Microsat” S/C with “Ionosat-Micro” experiment is scheduled for 2013
 3. “Resonance” S/C constellation is scheduled for 2014
 4. The launch of “Ionosat” S/C constellation is scheduled for 2015-2017
- The KIV magnetic observatory was certified by Intermagnet in May 2011
- 2 FP7 SWx projects with Ukrainian participation started in 2011
- 7 SWx meetings were held in Ukraine in 2011
- At least 5 SWx meetings will be held in Ukraine in 2012

Sich-2/Potential (status report)

Launch: 2011-08-17 0712 UTC from Yasny (OREN)

Designators: SCN 37794, NSSDC ID 2011-044G

Orbit: T = 98.64, 684x703 km, I = 98.25, RCS = 0.856

Launcher: Dnepr-1; **Spacecraft:** MS-2-8, mass: 176 kg

Designer: Yuzhnoye SDO, <http://www.yuzhnoye.com/>

Current status: Fully operational since 2011-10-10

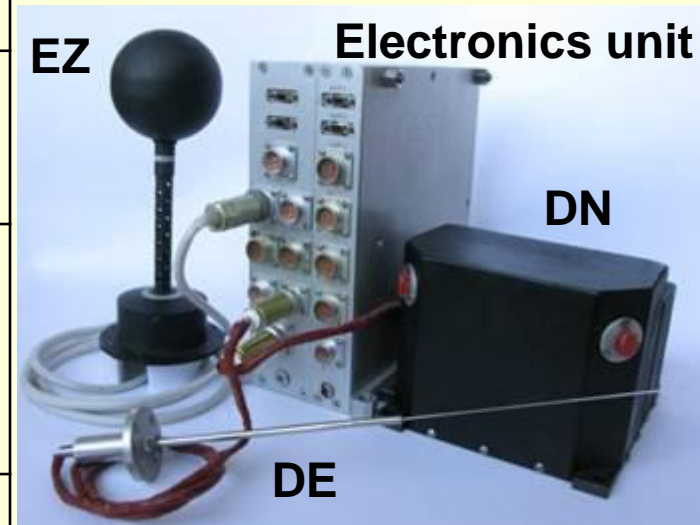
News releases (currently only in Russian, sorry) are available at the website of the Laboratory of Satellite

Near Space Exploration: <http://nearspace.ikd.kiev.ua/>

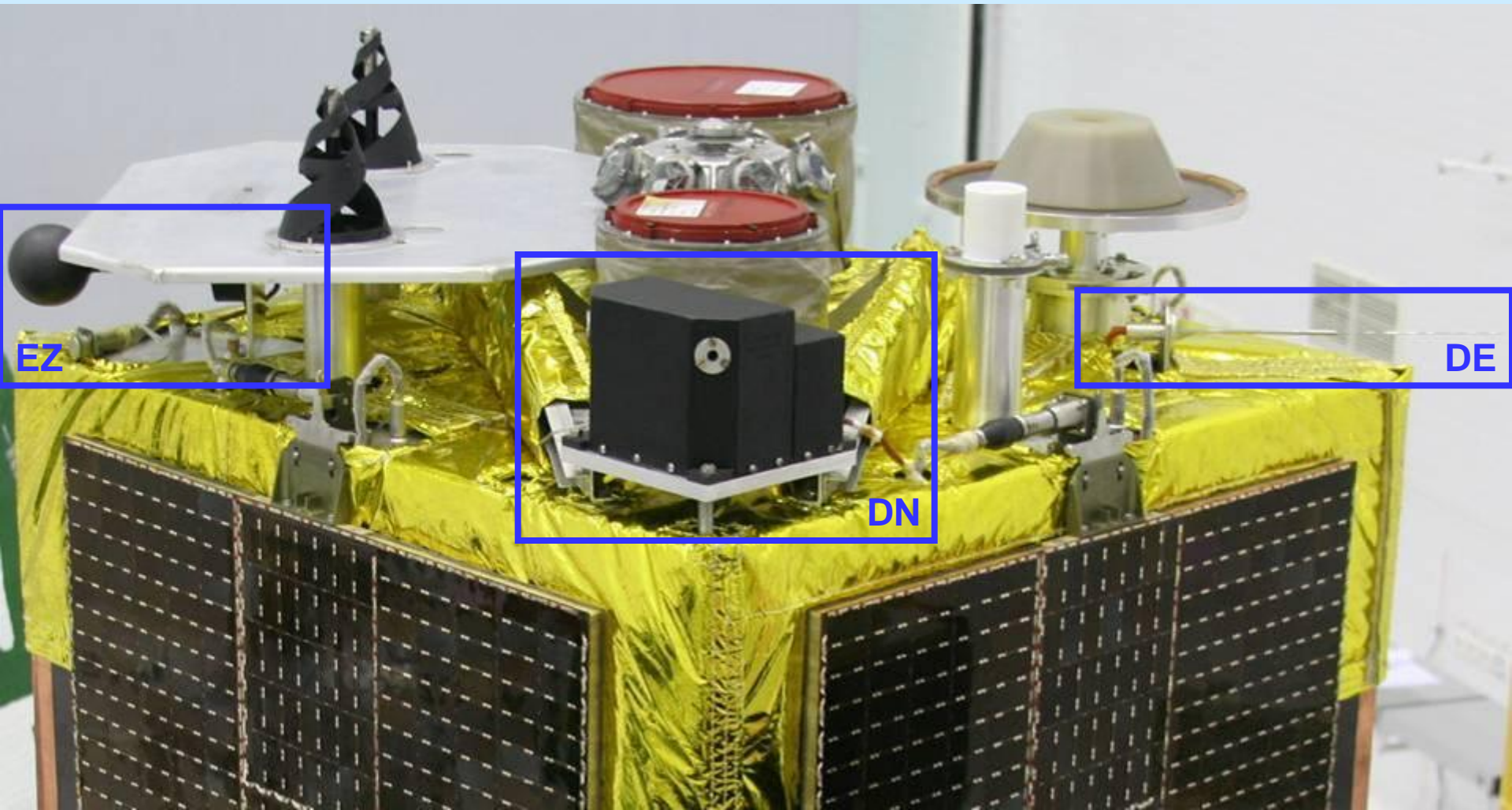
Sich-2/Potential

The main goals are to develop new ways of space environment diagnostics, to test new instruments in space, and to study SWx effects on spacecraft.

Instrument	Measured value	Specifications
Particle density analyzer DN-DE	Pressure: $10^{-8} \div 10^{-2}$ Pa Neutral part. density: $10^4 \div 10^{10}$ cm ⁻³ Charged part. density: $10^3 \div 10^{11}$ cm ⁻³ Electron temperature: $0.1 \div 1500$ eV	Dimensions: DN: 134×130×100 mm DE: \varnothing 35×289 mm Power: < 2 W Weight: 2.23 kg
Electric probe LEMI-502 (EZ)	Electric potential: DC \div 100 kHz Noise at 2 kHz: 1 μ V/Hz ^{1/2} Dynamic range: 120 dB	Power: \leq 0.15 W Weight: 0.16 kg Dim.: \varnothing 76×183 mm Temp. range: ± 80 C
Flux-gate magnetometer LEMI-016 (2 independent magnetometers)	Magnetic field: DC \div 12 Hz (3-axis, 16-bit) Measurement range: ± 65000 nT Max diff. of mag. and mech. axes: ± 5 arcmin Maximum zero drift: ≤ 50 nT Transformation coefficient error: < 0.1% Temperature drift: < 1.5 nT/C	Power: < 0.25 W Weight: 1.2 kg Dim.: 138×80.5×92.5 mm Temp. range: -40..+80 C Max shock load: 300 g
Electronics unit (including SSNI)	Storage: 16 GB	Dim.: 98x212x188 mm Power: < 8 W Weight: 3 ± 0.15 kg



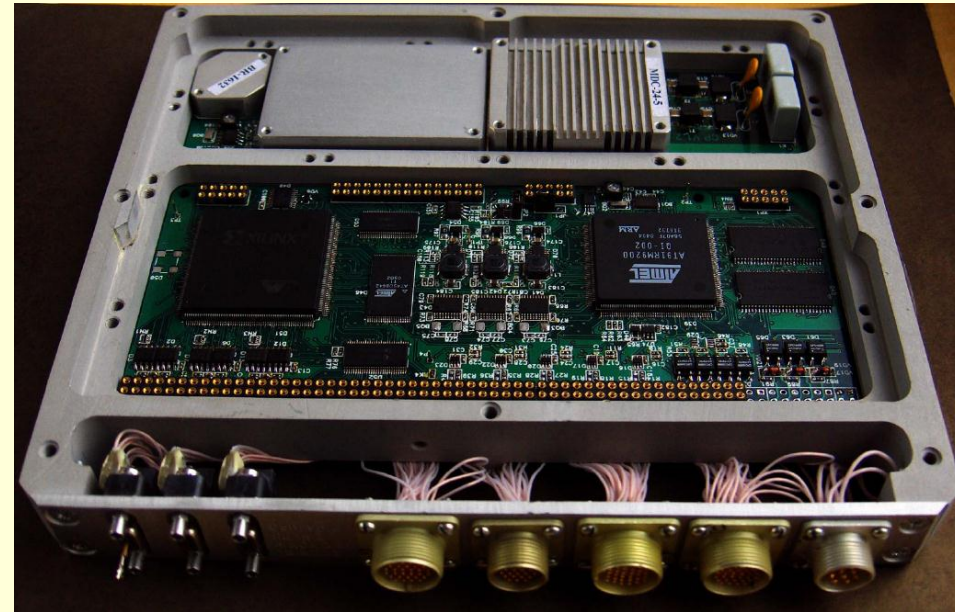
Sich-2/Potential (instrument location)



Sich-2/Potential (onboard computer)

Onboard computer (SSNI)

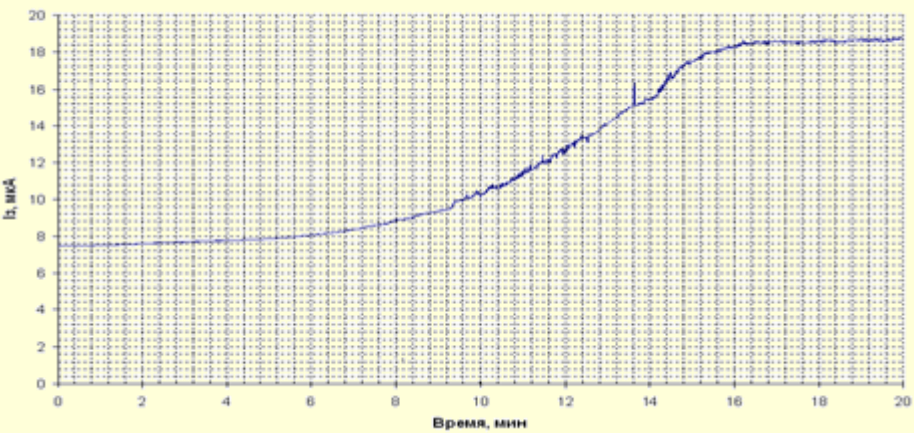
- ARM-9200T architecture with 32-bit CPU (200 MIPS)
- 3 unified input ports, 50 Mbps per port, up to 32 devices per port, bit control
- 4 spacecraft interface ports (sync and async modes)
- 4 GB storage
- Max power: < 4 W
- CPU: 21.5x160x186 mm, < 0.95 kg



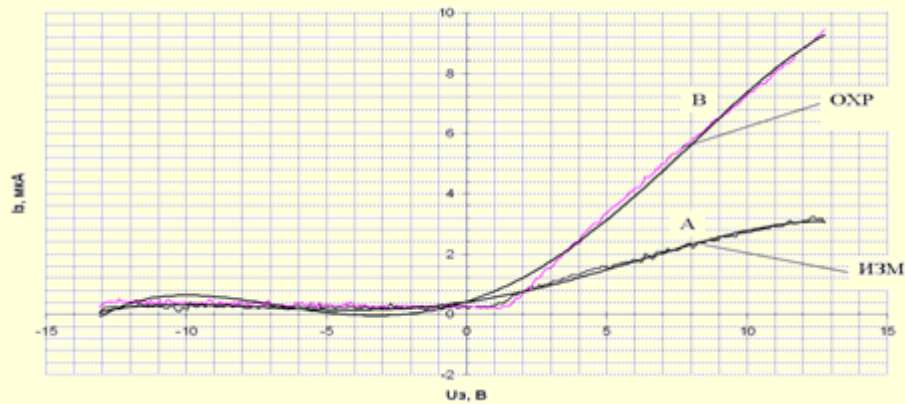
- MB: 175x126 mm, < 0.5 kg
- interface chip (installed on the devices): 9x24x46 mm, 0.022 kg per device

Sich-2/Potential (raw data)

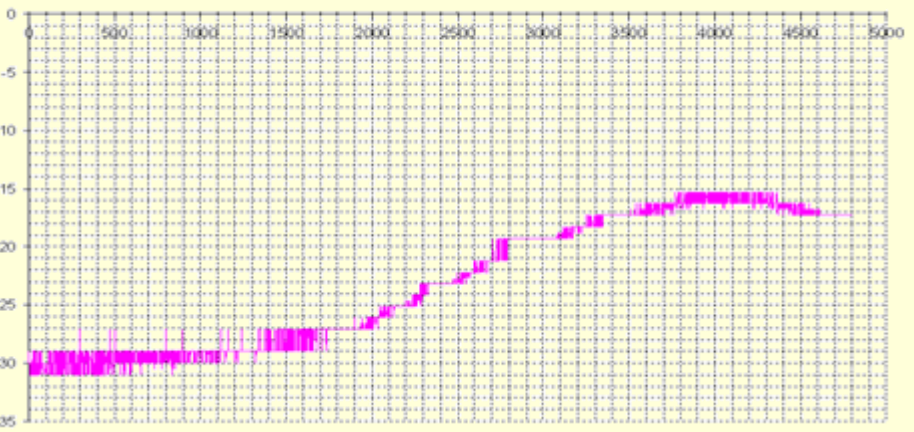
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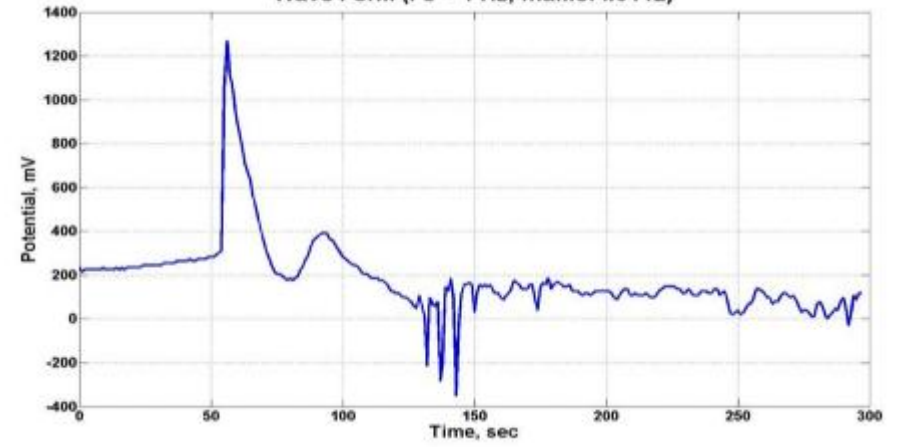
ВАХ ЭКП пересое измерение
Sich-2_26_09_11\20110904\pdv\ekp\0\ek0121-125.csv



Sich-2_26_09_11\20110901\pdv\pkp\0\nk0096.csv 3



Wave Form (Fs = 1 Hz; frame: lf0112)



SWx FP7 projects

Advanced Forecast For Ensuring Communications Through Space (AFFECTS), EC-GA № 263506, <http://www.affects-fp7.eu/>

- **PI:** Universität Göttingen (Volker Bothmer)
- **Goal:** Development of the European space weather alert and forecasting system
- **Timeline:** March 2011 – February 2014
- **Ukrainian partners:** SRI NASU & NSAU



Problem-oriented processing and database creation for ionosphere exploration (POPDAT), EC-GA № 263240, <http://popdat.org/>

- **PI:** Technische Universität Berlin (Klaus Brieß)
- **Goal:** Creation of the ionospheric wave processes database
- **Timeline:** June 2011 – June 2013
- **Ukrainian partners:** SRI NASU & NSAU with L'viv Centre



SWx meetings in Ukraine in 2011

- Remote radiosensing of the ionosphere (ION-2011), 12-15 Apr 2011, Institute of the ionosphere, Kharkiv, <http://iion.org.ua/> (Russian language only)
- 18th Young Scientists' Conference on Astronomy and Space Physics, 2-7 May 2011, Kyiv National University, <http://ysc.kiev.ua/> (English language only)
- Astronomy and Space Physics in Taras Shevchenko National University of Kyiv, 24-27 May 2011, Kyiv National University, http://www.observ.univ.kiev.ua/eng/index.php?mod=pages&page=vseh_2010
- 11th Ukrainian Conference on Space Research, 29 Aug – 2 Sept, 2011, National Space Centre, Yevpatoria, <http://www.nkau.gov.ua/SpaceConf2011/>
- First Joint UK-Ukraine Meeting on Solar Physics and Space Science, 29 Aug – 2 Sept 2011, Alushta, http://swat.group.shef.ac.uk/Conferences/Ukraine_UK_2011/
- Conference “Physics of the Sun and solar-terrestrial relations”, 5-10 Sept 2011, Crimean Astrophysical Observatory, Nauchny, <http://solar.crao.crimea.ua/>
- 6th Scientific Conference in Honor of Bohdan Babiy “Selected Issues of Astronomy and Astrophysics”, 4-6 Oct 2011, L'viv National University, <http://astro.franko.lviv.ua/~conf6/>

SWx meetings in Ukraine in 2012

- Remote radio sounding of the ionosphere (ION-2012), April 2011 (TBC), Institute of the ionosphere, Kharkiv, <http://ion.org.ua/> (Russian language only)
- 19th Young Scientists' Conference on Astronomy and Space Physics, 23-28 April 2012, Kyiv National University, <http://ysc.kiev.ua/>
- External and internal sources of ULF waves in the terrestrial magnetosphere, 15-17 May 2012, Space Research Institute, Kyiv (by invitation only)
- Astronomy and Space Physics in Taras Shevchenko National University of Kyiv, 22-25 May 2012 (TBC), Kyiv National University
- 12th Ukrainian Conference on Space Research, 3-7 September 2012, National Space Centre, Yevpatoria
- Physics of the Sun and solar-terrestrial relations, 10-15 September 2012 (TBC), Crimean Astrophysical Observatory, Nauchny, <http://solar.crao.crimea.ua/>

Thank you for attention!



Space Research Institute of NASU & NSAU <http://www.ikd.kiev.ua/>

- Space Plasma Department <http://plasma.ikd.kiev.ua/>
- Laboratory for Satellite Near Space Exploration <http://nearspace.ikd.kiev.ua/>
- L'viv Center <http://www.isr.lviv.ua/>



Main Astronomical Observatory <http://mao.kiev.ua/>



Kyiv National University <http://univ.kiev.ua/>

- Astronomical Observatory <http://www.observ.univ.kiev.ua/>
- Chairs of Astronomy and Space Physics <http://space.univ.kiev.ua/>



Radioastronomical Institute <http://ri.kharkov.ua/>



Kharkiv National University <http://univer.kharkov.ua/>

- Space Research Sector <http://src.univer.kharkov.ua/>
- Faculty of Radiophysics <http://www-radiophys.univer.kharkov.ua/>



Institute of the Ionosphere <http://www.iion.org.ua/>



Crimean Astrophysical Observatory <http://www.crao.crimea.ua/>

- Solar Physics Laboratory <http://solar.crao.crimea.ua/>



Institute of Technical Mechanics NASU & NSAU <http://www.itm.dp.ua/>