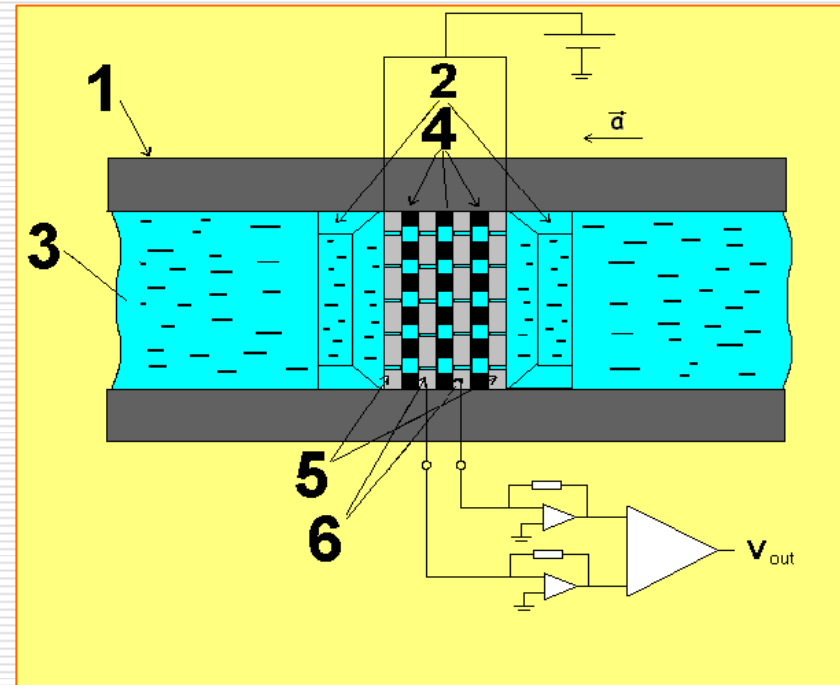


New way to sense motion

Molecular-electronic seismometers developed in
R-sensors, LLC

Schematic of Basic MET Cell

- 1 – transducer sealed housing
- 2 – electrodes
- 3 – electrolyte solution
- 4 – dielectric spacers
- 5 – anodes
- 6 – cathodes



Most significant features

- High sensitivity can be achieved at small inertial mass;
- No moving delicate parts to be broken or wear out;
- Compact size, ruggedness, wide frequency range, low-noise;
- Low-cost.

BROADBAND SEISMOMETERS MODELS CME4211 и CME4311

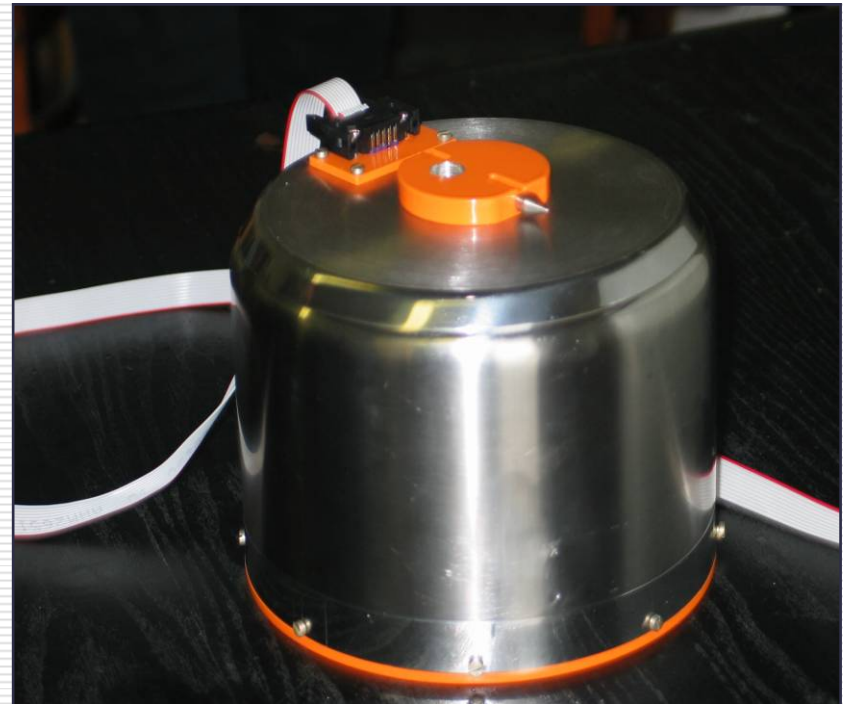
- Frequency range:
 - 30 sec – 20 Hz - CME4211
 - 60 sec – 50 Hz - CME4311
- Well suited for field experiments;
- Combination of the low-noise, compact size, low-power consumption;
- Economical;



Broadband seismometer for ocean-bottom application

4211-OBS and 4311-OBS

- Models 4211 и 4311 в in lightweight case;
- Power consumption - 6 mA @ 6-15 Volts;
- Weight – 3 kg;
- Compact size:
 - Diameter -160 mm
 - Height - 140 mm;



Seismometer CME4211, installed for OBS application



我国海域石油资源量约225亿吨，占全国资源总量的60%。随着世界各个地区深水油气勘探迅速发展，成为油气资源勘探时首先考虑的制约关系，海底地震仪（OBS）

• 自主研发海底地震仪组成

- 耐压舱球
- 声学释放器
- 采集控制器
- 地震计和检波器
- 常平装置
- 脱钩机构
- 沉耦架

CME4211 and CME4311, other examples of applications

- ❑ Regular versions are used in field for oil and gas exploration (Russian service companies Gradient);
- ❑ Borehole version are used in regional seismic networks (Kuril islands and Shikotan) and reseourvuor monitoring (Worldsensing, Tunisia and Spain)



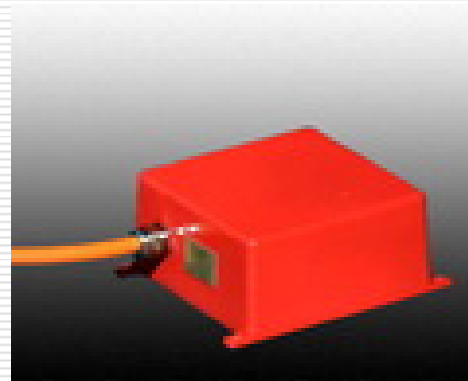
CME6011 Broadband force-balanced seismometer

- Well suited for stationary and field installations;
- Self-noise below USGS low-noise model in 1-15 sec frequency range;
- Great linearity, response flatness, temperature and time stability;
- Build-in calibrator



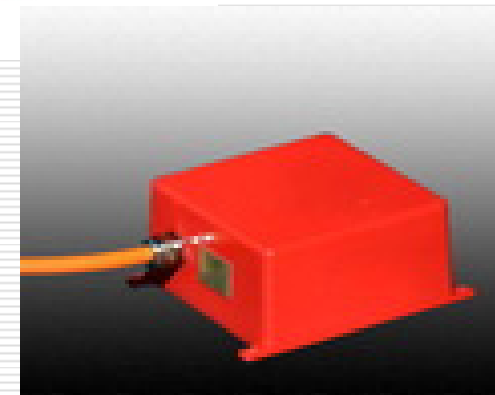
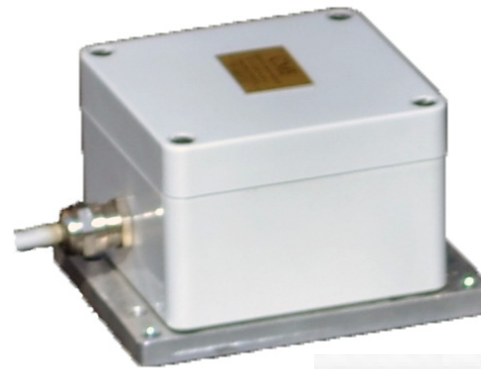
High-gain compact seismic sensors MTSS series (velocimeters) for geophysics, security systems.

- High-gain 300 V/m/sec;
- Wide frequency range
- 1-300 Hz and 0.1-120 Hz;
- Ultra-compact size, for such frequency range and sensitivity;



High-gain compact accelerometers for earthquake damage assessment, structural monitoring, etc.

- Wide dynamic range > 126 dB
- Operation at strong motion
- 1g – MTSS-1043A
- 2g – MTSS-1033A
- Low-cost
- Ultra-compact size, for such size and sensitivity;



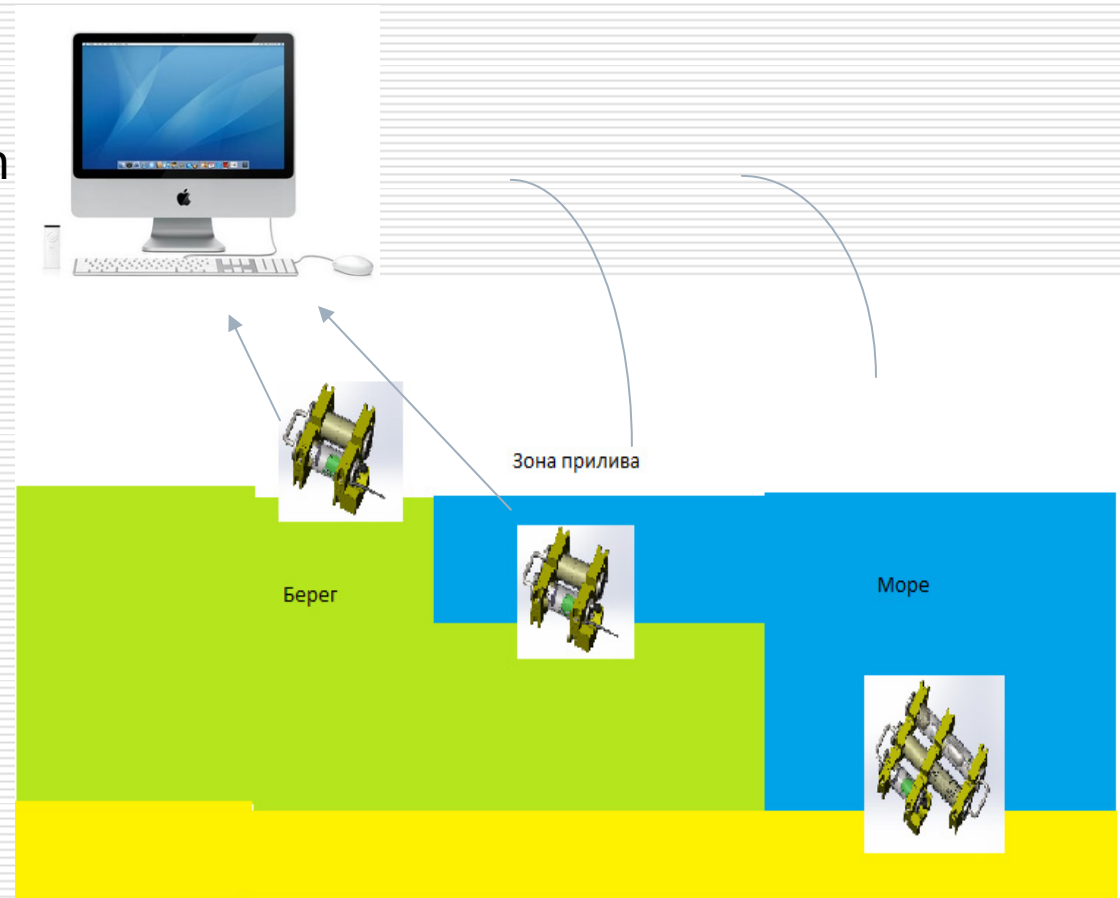
MET angular motion seismic sensors for structural monitoring, geophysics, etc.

- direct non-differential rotational readout;
- very low noise:
 $5 \cdot 10^{-7}$ rad/sec²/√Hz
- one- and three-component versions (METR-01 and METR-03);



Development of seismic system based on MET sensors – an ongoing project

Seismic system for transient zones based on MET sensors (project supported by Russian Ministry of Science and education. Project ID RFMEFI57814X0013)



Next steps...

Thanks and Contact Information

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