Assembly of optical fiber sensors for rotational seismology - data coherence and comparability issues in field application

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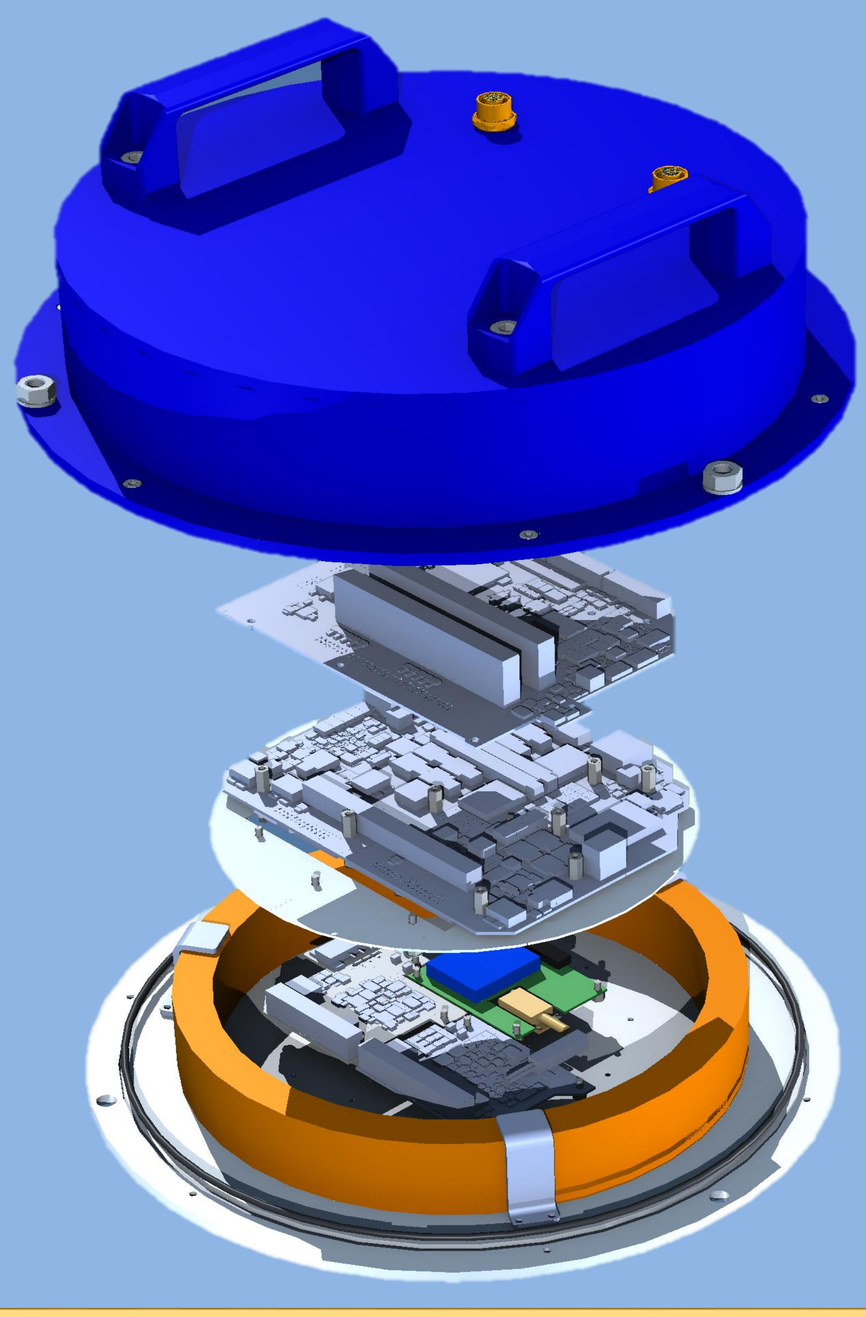
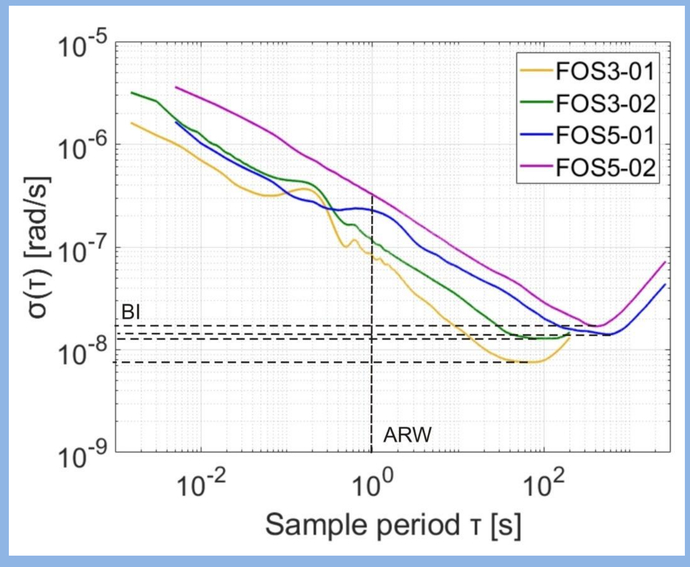
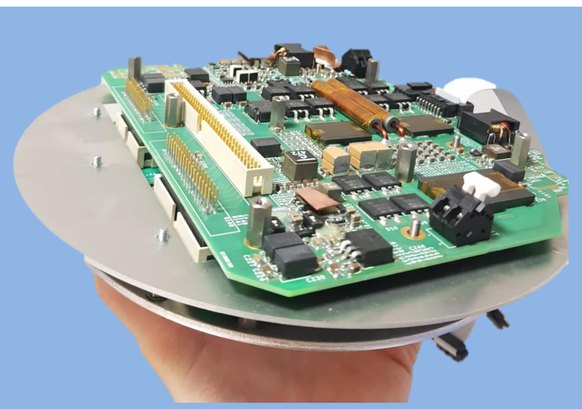
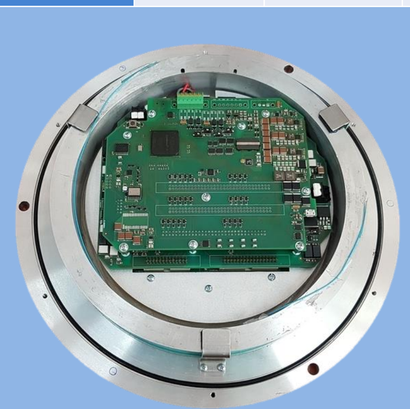
Fiber-Optic System for Rotational Events & phenomena Monitoring (FOSREM) is an interferometric optical fiber sensor designed to continuously observe rotational effects. It uses closed-loop configuration which is based on the compensatory phase measurement method as well as specific electronic system.



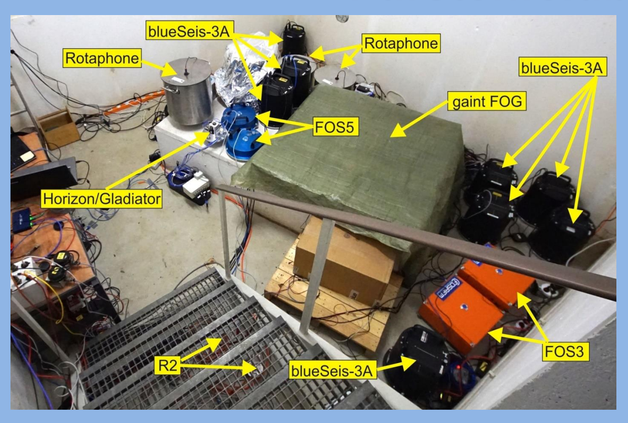


Field view	FOSREM	ARW [rad/√s]	BI [rad/s]
	FOS3-01	$8.70 \cdot 10^{-8}$	$1.13 \cdot 10^{-8}$
	FOS3-02	$1.30 \cdot 10^{-7}$	$1.96 \cdot 10^{-8}$
	FOS5-01	$2.16 \cdot 10^{-7}$	$2.28 \cdot 10^{-8}$
	FOS5-02	$3.24 \cdot 10^{-7}$	$2.55 \cdot 10^{-8}$

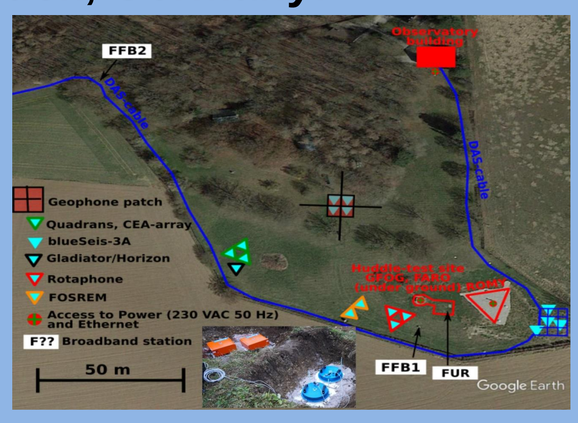




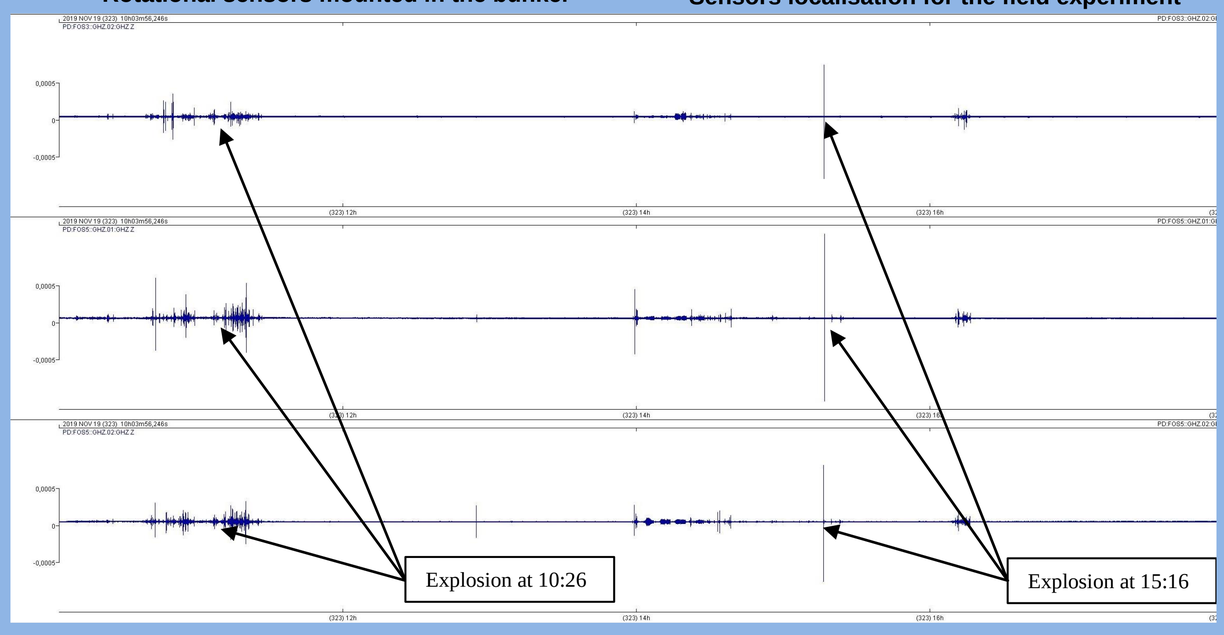
Experiment in Geophysical Observatory Fürstenfeldbruck, Germany:



Rotational sensors mounted in the bunker



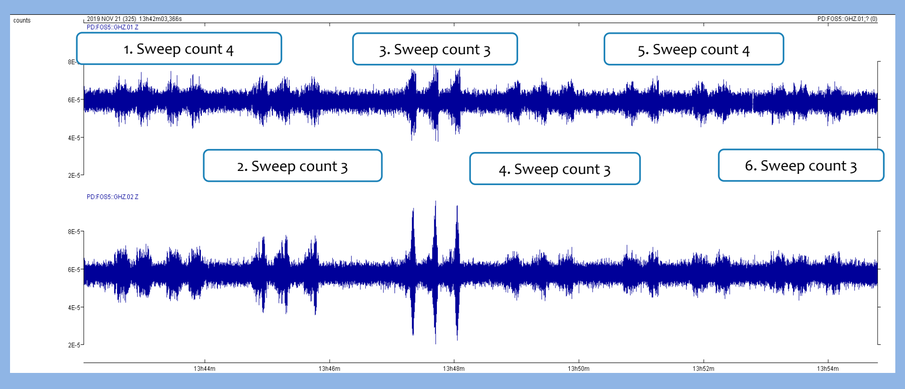
Sensors localisation for the field experiment

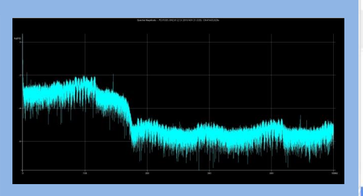


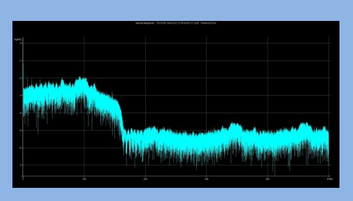
The main advantages of FOSREM - FOS5 type:

- sensitivity: $2 \cdot 10^{-8}$ rad/s/Hz$^{1/2}$;
- wide frequency bandpass: from DC to 1000 Hz;
- maximum detected rotation rate: 10 rad/s;
- compact hermetically sealed construction: diameter - 312 mm, height - 85 mm;
- weight: less than 10 kg;
- stable work at temperature range: -10°C – +40°C;
- power consumption: less than 25 W;
- web-based management Interface;
- wide application field.

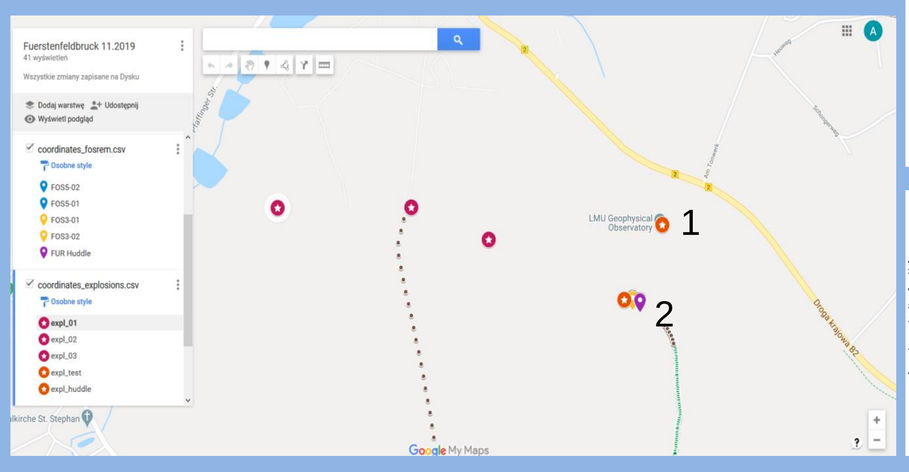
1. SeismoTruck 13:44 – 13:54 (UTC), 21.11.2019
2. Change every 1-2 min; number of changes: 6
3. Distance from FOS: 139 m – 96 m
4. Distance between changes: 10 m
5. Number of excitations in order: 4, 3, 3, 3, 4, 3
6. Frequency: 7 – 120 Hz, duration 15 s

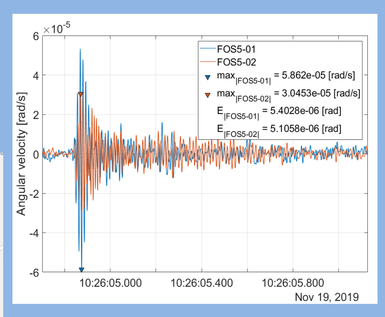


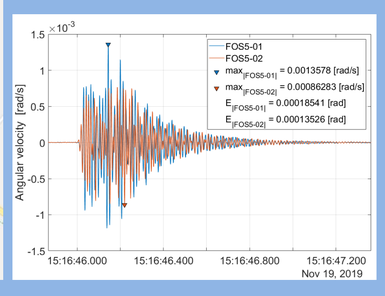




19.11.2019
1. expl_huddle= 500g; distance from FOS 200m; 15:16
2. expl_test 150g; distance from FOS 33 m; 10:26







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