SYSTEM AND METHOD FOR MONITORING MECHANICALLY COUPLED STRUCTURES

Description

The invention concerns a system for monitoring a mechanically coupled structure and a corresponding method.

Sensors are known, which - for example based on the Sagnac effect - determine rotations absolutely and are therefore usable for recording the dynamical behaviour of large mechanically coupled structures under the influence of external forces independent of local reference frames. However, due to unavoidable drift in these sensors the frequency range is limited from below.

Therefore, embodiments~~it is a goal~~ of the invention ~~to~~ provide a system and a method for monitoring mechanically coupled structures, which make monitoring of chronological sequences of the behaviour of mechanically coupled structures possible.

~~To achieve this goal the invention provides a system with the features of claim 1 and a method with the features of claim 6.~~

~~Preferred embodiments of the system and the method are provided by the dependent claims, respectively.~~In one aspect, there is provided a system for monitoring a mechanically coupled structure with a first sensor configured to determine at predetermined times its orientation relative to Earth's rotation axis as a first measurement, wherein the first sensor is connectable with a first part of the mechanically coupled structure, at least one second sensor, which has a known first orientation to the first sensor at startup of the system and which is configured to determine a rotation rate as a second measurement, at least one third sensor, which has a known first orientation to the first sensor at startup of the system and which is configured to determine an acceleration as a third measurement, wherein the at least one second sensor and the at least one third sensor is connectable with a second part of the mechanically coupled structure, a central unit, and a communication network over which the central unit is connected with the first sensor, the second sensor, and the third sensor, wherein the first sensor is configured to transmit the first measurement to the central unit, the second sensor is configured to transmit the second measurement to the central unit, the third sensor is configured to transmit the third measurement to the central unit, and the

central unit is configured to monitor the mechanically coupled structure by means of the first, second, and third measurements.

In another aspect, there is provided a method for monitoring of mechanically coupled structures comprising the following steps: determining at predetermined times the orientation of a first sensor relative to the Earth's rotation axis by means of the sensor as a first measurement, wherein the first sensor is connected with a first part of the mechanically coupled structure, transmitting the first measurement to a central unit over a communication network, determining a rotation rate of at least one second sensor, which has a known first orientation to the first sensor at startup of the system as a second measurement, determining of the acceleration of at least one third sensor, which has a known first orientation to the first sensor at startup of the system as a third measurement, wherein the at least one second sensor and the at least one third sensor are connected with a second part of the mechanically coupled structure, transmitting of the second and the third measurement to the central unit over the communication network, generating a monitoring value from the first, the second, and the third measurement.

In the following the invention will be discussed with respect to embodiments and on reference to the figures. The figures illustrate:

FIG. 1 a schematic illustration of a system during monitoring of a mechanically coupled structure according to an embodiment;

FIG. 2 a schematic illustration for determining the orientation of the sensor to Earth's rotation axis;

FIG. 3 a schematic illustration of a process flow of a method according to a further embodiment;