IN THE CLAIMS:

All of the pending claims are presented below. This listing of claims will replace all prior versions and listings of claims in the application. Please enter these claims as amended.

Listing of the Claims:

1. (Currently Amended) A sensor system for a downhole pumping system, comprising:

a sensor subsystem for detecting movement of at least one component of the downhole pumping system, the sensor subsystem comprising:

an axial motion sensor subsystem comprising a magnetometer, the magnetometer to be coupled to the at least one component of the downhole pumping system and to measure axial movement of the at least one component of the downhole pumping system based on variations in a magnet field detected by the magnetometer generated by movement of the at least one component of the downhole pumping system;

a rotation sensor subsystem comprising a gyroscope, the gyroscope to be coupled to the at least one component of the downhole pumping system and to detect rotational movement of the at least one component of the downhole pumping system by detecting rotational velocity values with the gyroscope generated by rotation of the at least one component of the downhole pumping system; and

a vibration sensor subsystem for monitoring vibration of the at least one component of the downhole pumping system in three axes; and

a processor subsystem to receive data from the axial motion sensor subsystem and the rotation sensor subsystem, the processor subsystem to:

~~measure~~detect axial movement of the at least one component of the downhole pumping system with the magnetometer of the axial motion sensor subsystem, the detecting axial movement comprising:

sensing a direction change in the at least one component of the downhole pumping system to determine when a stroke of the at least one component

of the downhole pumping system has been completed and to determine that a new stroke is beginning; and

after the direction change in the at least one component of the downhole pumping system has been detected, begin to determine rotation ~~determine rotational velocity~~of the at least one component of the downhole pumping system with the rotation sensor subsystem by sampling rotational ~~velocity~~values generated by the rotation of the at least one component of the downhole pumping system, ~~withonlythe gyroscope~~the determining the rotational values of the at least one component of the downhole pumping system comprising:

continuing sampling the rotational values through a second direction change of the at least one component of the downhole pumping system; and

ceasing sampling the rotational values at a third direction change of the at least one component of the downhole pumping system.

2. (Original) The sensor system of claim 1, wherein the sensor subsystem is configured to detect movement of the at least one component of the downhole pumping system comprising at least one rod of the downhole pumping system extending from a surface location into a wellbore.

3. (Currently Amended) The sensor system of claim 2, wherein the processor subsystem is configured to verify the axial movement and the direction change of the at least one rod before determining the rotation.

4. (Currently Amended) The sensor system of claim 2, wherein the processor subsystem is configured to determine~~a change indirection~~ the direction change of the at least one rod to indicate that a previous stoke has been completed and that a new stroke is beginning.

5. (Currently Amended) The sensor system of claim 4, wherein the processor subsystem is configured to begin sampling the rotational values comprising rotational velocity after determining the direction change of ~~the change in direction~~the at least one rod.

6. (Currently Amended) The sensor system of ~~claim 5~~claim 1, wherein the processor subsystem is configured receive the rotational values from only a gyroscope~~to continue sampling the rotational velocity untilanother change in directionthe at least one rod is detected~~.

7. (Currently Amended) The sensor system of ~~claim 5~~claim 1, wherein the processor subsystem is configured to compare the sampled rotational values with previously sampled rotational values detected by the rotation sensor subsystem during a previous stroke of the downhole pumping system to determine if rotation of the at least one component of the downhole pumping system has occurred~~continue sampling the rotational velocity along substantially an entire stroke of the at least one rod, the sampling beginning at a first change of direction of the at least one rod, continuing through a second change of direction of the at least one rod, and ceasing at a third change of direction of the at least one rod~~.

8. (Original) The sensor system of claim 1, wherein the sensor subsystem is configured to detect movement of the at least one component of the downhole pumping system comprising a tubing rotator of the downhole pumping system.

9. (Original) The sensor system of claim 8, wherein the sensor subsystem is configured to detect rotation of the tubing rotator while detecting axial movement of a polished of the downhole pumping system.

10. (Currently Amended) The sensor system of claim 1, wherein the processor subsystem is configured to determine the ~~rotational velocity~~rotational values of the at least one component of the downhole pumping system by summing both positive and negative samples of the rotational ~~velocity~~values sensed by the rotation sensor subsystem.

11. (Currently Amended) The sensor system of claim 10, wherein the processor subsystem is configured to compare the determined ~~rotational velocity~~rotational values of the at least one component of the downhole pumping system with an expected amount of ~~rotational~~

~~velocity~~rotational values to determine a failure in the rotation of the at least one component of the downhole pumping system.

12. (Previously Presented) The sensor system of claim 1, further comprising a vibration sensor subsystem for monitoring vibration of the at least one component of the downhole pumping system in three axes over a vibrational baseline.

13. (Currently Amended) A sensor system for a downhole pumping system, comprising:

a sensor subsystem for detecting movement of at least one component of the downhole pumping system, the sensor subsystem comprising:

an axial motion sensor subsystem comprising an axial motion sensor, the axial motion sensor to be coupled to the at least one component of the downhole pumping system and to measure axial movement of the at least one component of the downhole pumping system based on variations detected by the axial motion sensor generated by movement of the at least one component of the downhole pumping system; and

a rotation sensor subsystem comprising a rotational sensor, the rotational sensor to be coupled to the at least one component of the downhole pumping system and to detect rotational movement of the at least one component of the downhole pumping system by sampling rotational ~~velocity~~values with the rotational sensor generated by rotation of the at least one component of the downhole pumping system; and

~~a vibration sensor subsystem for monitoring vibration of theat least one component of the downhole pumping system in three axes; and~~

a processor subsystem to receive data from the axial motion sensor subsystem and the rotation sensor subsystem, the processor subsystem to:

~~derive a vibrational baseline of the at least one component of the downhole pumping system from the vibration sensor subsystem in three axes during normal operation;~~

verify the axial movement of the at least one component of the downhole pumping system with the axial motion sensor subsystem; [[and]]

when the axial movement has been verified, ~~determinerotational velocityof the at least one component of the downhole pumping system with~~detecting the rotational ~~velocity~~values~~detected by~~ with the rotation sensor subsystem during a current stroke of the downhole pumping system; and

comparing the rotational values with previously sensed rotational values detected by the rotation sensor subsystem during a previous stroke of the downhole pumping system to determine if rotation of the at least one component of the downhole pumping system has occurred.

14. (Original) The sensor system of claim 13, wherein the axial motion sensor subsystem comprises a magnetometer and the rotation sensor subsystem comprises a gyroscope.

15. (Currently Amended) The sensor system of claim 14, wherein the sensor subsystem is configured to detect movement of the at least one component of the downhole pumping system comprising at least one rod of the downhole pumping system extending from a surface location into a wellbore, and wherein the processor subsystem is configured to continue sampling the rotational ~~velocity~~values of the at least one rod over a stroke of the at least one rod.

16. (Currently Amended) A sensor system for a downhole pumping system, comprising:

an axial motion sensor subsystem comprising a magnetometer to measure axial movement of at least one component of the downhole pumping system and to determine a change in axial direction of the at least one component of the downhole pumping system;

a sensor subsystem for detecting movement of a tubing rotator of the downhole pumping system, the sensor subsystem comprising a rotation sensor subsystem comprising a rotational sensor, the rotational sensor to be coupled to the tubing rotator of the downhole pumping system and to detect rotational movement of the tubing rotator of the downhole pumping

system by sampling rotational ~~velocity~~values with the rotational sensor generated by rotation of the tubing rotator of the downhole pumping system; and

a processor subsystem to receive data from the rotation sensor subsystem, the processor subsystem to determine~~rotational velocity~~ rotation of the tubing rotator of the downhole pumping system with the rotational ~~velocity~~values detected by the rotation sensor subsystem, the processor subsystem configured to:

detect the axial movement of the at least one component of the downhole pumping system with the axial motion sensor subsystem;

when the axial movement of the at least one component is detected, begin detecting the rotational movement of the tubing rotator of the downhole pumping system with the rotational sensor;

continue detecting the rotational movement of the tubing rotator of the downhole pumping system through a second direction change of the at least one component of the downhole pumping system; and

cease detecting the rotational movement of the tubing rotator of the downhole pumping system after a third direction change of the at least one component of the downhole pumping system.

17. (Original) The sensor system of claim 16, wherein the rotation sensor subsystem comprises at least one of a gyroscope or an accelerometer.

18. (Original) The sensor system of claim 16, wherein the rotation sensor subsystem is configured to monitor the rotation of the tubing rotator along a path that extends in a direction substantially perpendicular to a surface upon which the downhole pumping system is positioned.

19. (Currently Amended) A method of detecting motion of at least one component of a downhole pumping system, the method comprising:

determining a first change in axial direction of at least one component of the downhole pumping system based on magnetic variations detected by an axial motion sensor coupled to the at

least one component of the downhole pumping system generated by translation of the at least one component of the downhole pumping system;

when detecting no change in the axial direction, ceasing any sensing of rotation movement;

when verifying the first change in the axial direction;

begin detecting rotational movement of the at least one component of the downhole pumping system with a rotational sensor generated by rotation of the at least one component of the downhole pumping system;

continuing detecting the rotational movement of the at least one component of the downhole pumping system through a second direction change of the at least one component of the downhole pumping system; and

ceasing detecting the rotational movement of the at least one component of the downhole pumping system after a third direction change of the at least one component of the downhole pumping system~~and~~

~~verifyingaxial movement of the at least one component of the downhole pumping system with the axial motion sensorbefore thedetectingof therotational movement of the at least one component of the downhole pumping system withtherotational sensor~~.

20. (Original) The method of claim 19, further comprising comparing a rotational velocity detected with the rotational sensor with a threshold value to determine a performance characteristic of the at least one component of the downhole pumping system.