CLAIMS

1. A method for monitoring sleep with a powered ophthalmic lens in the form of a contact lens, the method comprising:

activating the powered ophthalmic lens;

initiating an accumulator on the lens to track a passage of time;

determining at a first lid sampling rate whether lid closure has occurred using an eyelid position system;

when lid closure is detected,

sampling at least once at least one of an accelerometer and a transducer provided in the lens, and

determining whether a threshold is exceeded, when the threshold is exceeded

retrieving a reading from the accumulator;

storing the accumulator reading and a reading of the at least one of the accelerometer and the transducer; and

determining whether the reading of the at least one of the accelerometer and the transducer is below the threshold, when the reading is below the threshold, storing an indication of a REM end and returning to sampling lid closure.

2. The method according to claim 1, further comprising:

measuring a light level with at least one photosensor present on the lens;

storing the light level and current reading from the accumulator; and

determining when a change in light level occurs and storing the current reading from the accumulator with the light level reading.

3. The method according to claim 2, further comprising:

comparing the accumulator to a duration threshold; and

when the accumulator is in excess of the duration threshold, determining if the current light level approximates the initial light level reading, when initial light level is reached, terminating method.

4. The method according to claim 1, wherein sampling of the at least one of the accelerometer and the transducer occurs at a first motion sampling rate until the reading exceeds the threshold, then sampling at a second motion sampling rate.

5. The method according to claim 1, wherein when lid closure is detected, then sampling lid closure at a second lid sampling rate.

6. The method according to claim 1, further comprising:

monitoring a power supply on the lens for an available energy level;

when the power supply has the available energy level below a low energy threshold, performing at least one of

reducing the sampling rate for at least one of the accelerometer and the transducer,

reducing the sampling rate of at least one sensor,

terminating further sampling of at least one of the accelerometer and the transducer,

terminating further monitoring of the power supply,

storing a time stamp representing low energy based on the current value in the accumulator,

removing power from at least one of the accelerometer and the transducer,

sampling the lid closure at a second lid sampling rate that is slower than the first sampling rate, and

powering a memory where the readings are stored.

7. The method according to claim 1, further comprising:

monitoring available memory for storing readings;

when the available memory is below a low memory threshold, performing at least one of

storing a time stamp representing low memory based on the current value in the accumulator,

reducing the sampling rate for at least one of the accelerometer and the transducer,

terminating further sampling of at least one of the accelerometer and the transducer,

storing future readings from at least one of the accelerometer and the transducer over the earliest stored readings in the memory, and

deleting the stored sensor readings associated with the lowest accumulator reading and shifting the remaining stored sensor and accumulator readings in the memory.

8. The method according to claim 1, wherein storing the readings includes transmitting the readings to an external device for storage.

9. The method according to claim 8, wherein the external device stores the readings with a time stamp based on the current time on the external device.

10. The method according to claim 8, further comprising:

sampling light levels with the external device and storing the light level with a time stamp in memory.

11. The method according to claim 8, further comprising receiving with the external device user input for initiation of a sleep study and a termination of the sleep study.

12. A method for monitoring sleep with a powered ophthalmic lens in the form of a contact lens, the method comprising:

activating the powered ophthalmic lens;

initiating an accumulator on the lens to track a passage of time;

sampling at least once at least one of an accelerometer and a transducer provided in the lens; and

determining whether a first threshold is exceeded, when the first threshold is exceeded

retrieving a reading from the accumulator,

storing the accumulator reading and a reading of the at least one of the accelerometer and the transducer, and

determining whether the reading of the at least one of the accelerator and the transducer is below a second threshold, when the reading is below the second threshold, storing an indication of a REM end.

13. The method according to claim 12, wherein sampling of the at least one of the accelerometer and the transducer occurs at a first motion sampling rate until the reading exceeds the threshold, then sampling at a second motion sampling rate.

14. The method according to claim 12, further comprising:

monitoring a power supply on the lens for an available energy level;

when the power supply has the available energy level below a low energy threshold, performing at least one of

reducing the sampling rate for at least one of the accelerometer and the transducer,

reducing the sampling rate of at least one sensor,

terminating further sampling of at least one of the accelerometer and the transducer,

terminating further monitoring of the power supply,

storing a time stamp representing low energy based on the current value in the accumulator,

removing power from at least one of the accelerometer and the transducer,

sampling the lid closure at a second lid sampling rate that is slower than a first sampling rate, and

powering a memory where the readings are stored.

15. The method according to claim 12, further comprising:

monitoring available memory for storing readings;

when the available memory is below a low memory threshold, performing at least one of

storing a time stamp representing low memory based on the current value in the accumulator,

reducing the sampling rate for at least one of the accelerometer and the transducer,

terminating further sampling of at least one of the accelerometer and the transducer,

storing future readings from at least one of the accelerometer and the transducer over the earliest stored readings in the memory, and

deleting the stored sensor readings associated with the lowest accumulator reading and shifting the remaining stored sensor and accumulator readings in the memory.

16. The method according to claim 12, wherein any storing reading includes transmitting the reading to an external device for storage.