CLAIMS

1. A powered ophthalmic lens, the powered ophthalmic lens comprising:

a contact lens; and

an eyelid position sensor system incorporated into the contact lens, the eyelid position sensor system including a sensor array having a plurality of individual sensors vertically spaced from each other to detect eyelid position,

a system controller configured to sample each individual sensor in the sensor array to detect eyelid position and provide an output control signal;

at least one alert mechanism configured to receive the output control signal and capable of at least one of providing an alert and storing data in response to a determination by the system controller that the eyelid has been closed for a period of time indicative of at least one of onset of sleep and drowsiness;

wherein the alert mechanism comprises associated memory for storing an initiation of sleep in response to the determination of onset of sleep by the system controller and a termination of sleep in response to a determination of a wearer waking up by the system controller, the alert mechanism configured to store a time stamp from the clock with the initiation of sleep and the termination of sleep;

at least one electronic communication component connected to the memory and the clock, and the at least one electronic communication component configured to retrieve data from the memory and a time stamp from the clock in response to an external inquiry for the stored data; and

a pupil position system having at least one accelerometer for tracking eye movement, the pupil position system in communication with the system controller such that the system controller samples the at least one accelerometer to detect pupil position; and

wherein the system controller uses both pupil position and eyelid position to determine at least one of the onset of sleep and drowsiness.

2. The powered ophthalmic lens according to claim 1, wherein the system controller operates in one of at least two states based on a state input received by the system controller, where the at least two states include an awake operation state and an asleep operation state and the at least two states control the operation of the

at least one alert mechanism as to whether the alert is provided based on the detection of onset of sleep by the system controller.

3. The powered ophthalmic lens according to Claim 1, wherein

the plurality of individual sensors comprise photosensors for detecting light incident on the eye; and

the eyelid position sensor system further comprises

a multiplexer configured to receive multiple inputs from the photosensors and output a single signal,

an analog-to-digital converter configured to convert the analog signal from the amplifier to a sampled, digital signal for further signal processing, and

a digital signal processor configured to receive an output from the analog-to-digital converter and perform digital signal processing, including one or more of filtering, processing and detecting sampled data to permit incident light detection for downstream use.

4. The powered ophthalmic lens according to Claim 3, wherein the digital signal processor comprises associated memory storing two sets of blink templates and blink masks for use by the digital signal processor based on operational state of the lens as determined in response to wearer instructions.

5. The powered ophthalmic lens according to Claim 1, further comprising a power supply.

6. The powered ophthalmic lens according to Claim 1, wherein the plurality of individual sensors comprise capacitive touch sensors for detecting contact or proximity and outputting a signal indicative thereof; and

the sensor system further comprises sensor conditioners that output a signal proportional to capacitance for downstream use.

7. The powered ophthalmic lens according to Claim 6, wherein the eyelid position sensor system further comprises a multiplexer configured to receive multiple inputs from the sensor conductors and output a single signal to the system controller.

8. The powered ophthalmic lens according to Claim 1, wherein the eyelid position sensor system further comprises a communication channel for coordinating action between pairs of powered contact lenses.