CLAIMS

1. A device (10) for monitoring the health status of a limited life critical system (2), comprising:

- at least one measurement sensor (S1-S4) adapted to measure a magnitude adapted to affect the health status of the critical system (2) by outputting a signal carrying information relative to such magnitude;

- at least one processing unit (13) operatively connected to the sensor (S1-S4) and adapted to receive and sample said signal to provide digital data relative to such magnitude;

- at least one memory (15) adapted to store said digital data or digital data obtained therefrom through said processing unit (13);

- a power supply system(18) of the measurement sensor (S1-S4) and the processing unit (13);

- a passive RFID transponder (16) adapted to receive a request from an external query RFID device (4,8) and to provide as a reply said digital data to the query device (4,8) by accessing the memory.

2. The monitoring device (10) according to claim 1, wherein the processing unit (13) is programmed to switch between two energy consumption statuses, wherein one of said statuses is a status having a relatively limited consumption compared to the other one, the processing

unit (13) being such as to normally and mainly remain in said status of relatively limited consumption to switch to the other status at preset time intervals in order to sample said signal.

3. The monitoring device (10) according to claim 2, comprising a passive movement sensor (S5) operatively connected to the processing unit (13), wherein the processing unit (13) is such as to switch from the relatively limited consumption status to the other status, when the passive movement sensor (S5) detects a movement having a width exceeding a preset threshold.

4. The monitoring device (10) according to claim 3, wherein said at least one measurement sensor (S1-S4) comprises a vibration and/or mechanical shock sensor that is adapted to output an electric signal, and wherein following said switching, the processing unit (13) is such as to sample said electric signal provided by the vibration and/or shock sensor.

5. The monitoring device (10) according to any one of the previous claims, wherein the measurement sensor (S1-S4) comprises a temperature sensor, wherein the digital data comprise data related to the storage temperature of the critical system (2), and wherein the processing unit (13) is programmed to calculate the equivalent storage time at a reference temperature by calculating an

acceleration factor according to the Arrhenius law.

6. The monitoring device (10) according to claim 5, wherein in order to calculate said equivalent storage time the processing unit (13) is programmed for:

- sampling said signal to obtain a digital sample and storing it in a vector of samples having a predetermined length according to a FIFO storage technique;

- upon each sampling, carrying out the scalar product between said vector of samples and a vector of real numbers, which represent exponential increment values.

7. The monitoring device (10) according to any one of the previous claims, wherein the processing unit (13) is such as to store in said memory (15) at least one vector of data that represents a histogram, and wherein the processing unit (13), by comparing said digital data to thresholds, is such as to store the digital data in specific elements of said vector in order to make said histogram usable by said external query RFID device (4,8).

8. The monitoring device (10) according to any one of the previous claims, wherein said RFID transponder (16) comprises a PIFA - Planar Inverted F Antenna (19).

9. A monitoring system (1) comprising at least one monitoring device (10) according to any one of the previous claims, and at least one query RFID device (4,8)

adapted to operatively interact with said monitoring device (10).

10. A container (3) for a critical system (2) comprising a containment body adapted to adapted to house a critical system (2) therein, and characterized in that it comprises at least one monitoring device (10) according to any one of the previous claims 1 to 8, which is mechanically coupled to said containment body.

CLAIMS

1. A device (10) for monitoring the health status of a limited life critical system (2), comprising:

- at least one measurement sensor (S1-S4) adapted to measure a magnitude adapted to affect the health status of the critical system (2) by outputting a signal carrying information relative to such magnitude;

- at least one processing unit (13) operatively connected to the sensor (S1-S4) and adapted to receive and sample said signal to provide digital data relative to such magnitude;

- at least one memory (15) adapted to store said digital data or digital data obtained therefrom through said processing unit (13);

- a power supply system (18) of the measurement sensor (S1-S4) and the processing unit (13);

- a passive RFID transponder (16) adapted to receive a request from an external query RFID device (4,8) and to provide as a reply said digital data to the query device (4,8) by accessing the memory.

2. The device (10) according to claim 1, wherein the processing unit (13) is programmed to switch between two energy consumption statuses, wherein one of said statuses is a status having a relatively limited consumption compared to the other one, the processing unit (13) being

such as to normally and mainly remain in said status of relatively limited consumption to switch to the other status at preset time intervals in order to sample said signal.

3. The device (10) according to claim 2, comprising a passive movement sensor (S5) operatively connected to the processing unit (13), wherein the processing unit (13) is such as to switch from the relatively limited consumption status to the other status, when the passive movement sensor (S5) detects a movement having a width exceeding a preset threshold.

4. The device (10) according to claim 3, wherein said at least one measurement sensor (S1-S4) comprises a vibration and/or mechanical shock sensor that is adapted to output an electric signal, and wherein following said switching, the processing unit (13) is such as to sample said electric signal provided by the vibration and/or shock sensor.

5. The device (10) according to any one of the previous claims, wherein the measurement sensor (S1-S4) comprises a temperature sensor, wherein the digital data comprise data related to the storage temperature of the critical system (2), and wherein the processing unit (13) is programmed to calculate the equivalent storage time at a reference temperature by calculating an acceleration

factor according to the Arrhenius law.

6. The device (10) according to claim 5, wherein in order to calculate said equivalent storage time the processing unit (13) is programmed for:

- sampling said signal to obtain a digital sample and storing it in a vector of samples having a predetermined length according to a FIFO storage technique;

- upon each sampling, carrying out the scalar product between said vector of samples and a vector of real numbers, which represent exponential increment values.

7. The device (10) according to any one of the previous claims, wherein the processing unit (13) is such as to store in said memory (15) at least one vector of data that represents a histogram, and wherein the processing unit (13), by comparing said digital data to thresholds, is such as to store the digital data in specific elements of said vector in order to make said histogram usable by said external query RFID device (4,8).

8. The device (10) according to any one of the previous claims, wherein said RFID transponder (16) comprises a PIFA - Planar Inverted F Antenna (19).

9. A monitoring system (1) comprising at least one device (10) according to any one of the previous claims, and at least one query RFID device (4,8) adapted to

operatively interact with said device (10).

10. A container (3) for a critical system (2) comprising a containment body adapted to adapted to house a critical system (2) therein, and characterized in that it comprises at least one device (10) according to any one of the previous claims 1 to 8, which is mechanically coupled to said containment body.