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**SURGICAL CAP TO CONTROL
PATIENT BODY TEMPERATURE****BACKGROUND OF THE INVENTION**5 **1. Field of the Invention**

[0001] The present invention relates generally to a device and a method that maintains a patient's body temperature during surgical procedures and, more specifically, to a surgical, insulative cap that both aids in maintaining the patient's core body temperature at an eutermic range and further incorporates a graphic display
10 panel for providing a remote caregiver informational interface.

2. Description of the Related Art

[0002] The vast majority of patients that undergo anesthetic experience some level of hypothermia. The decrease in temperature is variable, but it worsens in the
15 procedures that involve larger and lengthier surgical exposures. The state of relative hypothermia can significantly and adversely affect a patient, especially during the perioperative and the postoperative periods. Complications related to hypothermia include myocardia ischemia, hypertension, tachycardia, and the infections that lead to unanticipated mortality and morbidity. Because most of a patient's heat capacity is lost
20 through an uncovered head, the medical industry is combating the problem by developing a means to keep the patient eutermic.

[0003] The present invention teaches a surgical, insulative cap that is designed

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both to contour a patient's head and ears and to maintain its position during surgery in combination with an interface for displaying the output of biometric sensors that can provide continuous, accurate standard vital body sign parameters such as body temperature, but can also include sensors for other biometric data such as body temperature heart rhythm, heart rate, breathing activity, SpO2, etc. sufficient to detect malignant hyperthermia or hypothermia as well as other deleterious perioperative, and postoperative conditions.

SUMMARY OF THE INVENTION

[0004] It is an object of the present invention to provide a flexible and a disposable surgical cap that is worn by patients during surgical procedures. It is an object of the present invention to reduce the risks to patients, especially to the elderly patients at higher risks, for developing hypertension, tachycardia and the other conditions related to surgical hypothermia. It is an object that the present cap is comprised of an insulative material that is both stretchable and flexible to provide a means for the cap to follow the contour of a head.

[0005] It is an object that the present surgical cap is constructed to minimize exposures to fibrous materials and, as such, to remove any habitat for bacterial growth.

[0006] It is envisioned that the present surgical cap includes an insulative inner portion and a shell fabricated from the materials sold under the trademarks THERMALITE®, THINSULATE® or OUTLAST®. More specifically, the cap includes a ceramic

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fiber material, a commercially synthetic material having fibers that contain a plurality of microencapsulated and paraffinic hydrocarbons (hereinafter a “phase change material”) and a synthetic microfiber having a composition approximating 65% olefin and 35% polyester. The cap extends over a greater portion of a patient’s forehead, over the patient’s ears and behind the head to reach as far as the top of the lumbar spine. .

According to one aspect of the invention, monitoring sensors may be integrated directly into the cap in contact with the patient’s head in order to facilitate acquisition and display of standard vital body sign parameters. According to yet another aspect of the invention, the cap can be in informational communication with various other monitoring sensors placed about the patient for acquisition of standard body sign parameters. In either aspect, any number of standard body sign parameters may be acquired, such as ECG, heart rate, breathing, oxygen saturation (SpO₂), temperature, or the like. Further, advanced measurements may additionally be integrated merely with the inclusion of appropriate biometric sensors and analyzers.

[0007] It is envisioned that the present surgical cap includes a caregiver interface in the form of a display screen positioned at the front of the cap in alignment with the patient’s forehead. The present invention provides for utilization in an environment beyond the operating room. The location and operation of such an interface display screen allows doctors, nurses, EMT’s or others to easily access the information output of selected vital body sign sensors in a manner that both travels with the patient as well as eliminates the need for a caregiver to divert attention from patient care activities.

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[0008] It is an object of the present invention to provide a surgical, insulative cap that both aids in maintaining the patient's core body temperature at an eutermic range and further incorporates an information display for communication with biometric sensor capacity.

5 **[0009]** It is a final object of the present invention to provide all of the advantages that the foregoing objects entail. The present invention departs from the current designs to overcome their respective disadvantages. The present invention will maintain its position during and after the repeated times an anesthesiologist manipulates the head's position to access monitor apparatuses.

10 The present invention continues to provide access to the central venous region. The present invention will provide a display for the proper position for viewing information from sensors for acquiring body sign parameters including: body temperature; electrocardiogram (ECG); respiratory rate (RR) and End Tidal Carbon Dioxide (ETCO₂); heart rate (HR); oxygen saturation (SpO₂); photoplethysmography (PPG);
15 blood glucose (BG); carbon monoxide level (SpCO); blood pressure (BP); and hydration levels (HL).

[0011] Additionally, it is envisioned that the use of physical tracking of location or position, such as through GPS or other means, may be incorporated for healthcare, military, industrial and consumer markets.

20 **[0012]** The present invention may similarly be used for nonsurgical patients with temperature regulatory issues, such as immunocompromised individuals, patients

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undergoing dialysis, and cancer patients.

[0013] Further features of the invention will become apparent in the course of the following description.

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BRIEF DESCRIPTION OF THE DRAWINGS

[0014] The advantages and the features of the present invention will become better understood with reference to the following more detailed description and the claims taken in conjunction with the accompanying drawings, in which like elements are identified with like symbols, and in which:

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[0015] FIG. 1 is a perspective view of a Surgical Cap to Control Patient Body Temperature according to a preferred embodiment of the present invention;

[0016] FIG. 2 is a side elevational view thereof;

[0017] FIG. 3 is a front elevational view thereof;

[0018] FIG. 4 is a rear elevational view thereof;

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[0019] FIG. 5 is a reverse perspective showing the inner portion thereof;

[0020] FIG. 6 is a partial cross sectional view taken along lines VI-VI of FIG. 4;

[0021] FIG. 7 is a perspective view of a surgical cap to control patient body temperature according to a preferred embodiment of the present invention, wherein the surgical cap is shown in cooperation with a wearer's head; and,

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[0022] FIG. 8 is a perspective view of a surgical cap to control patient body temperature according to an alternate embodiment of the present invention;

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[0023] FIG. 9 is a front perspective view of a Surgical Cap to Control Patient Body Temperature according to a first alternate embodiment of the present invention incorporating a securement strap;

[0024] FIG. 10 shows the display screen 20 the present invention for use as a graphical user interface for showing core body vitals of a patient in operative communication with various monitors and lifesaving devices such as a defibrillator;

[0025] FIG. 11 shows the display screen 20 the present invention for use as a graphical user interface for showing core body vitals of a patient in operative communication with a smart hospital bed; and

[0026] FIG. 12 shows the display screen 20 the present invention for use as a graphical user interface for showing core body vitals of a patient in operative communication with an emergency medical transport vehicle.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0027] The best mode for carrying out the invention is presented in terms of its preferred embodiment, herein depicted within the Figures 1-7.

1. Detailed Description of the Figures

[0022] Referring now to FIG. 1-5, a covering unit, generally noted as 10, is shown for covering a patient's head for maintaining the head temperature and core body temperature within eutermic range during surgery. The covering unit 10 covers a substantial portion of the head 70, as will be described in greater detail below and

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forms a multi-part shell component having an inner surface 12 adapted for closely fitting the contours of a patient's head so as to prevent open air space between the head and an inner surface. The shell component further has an outer surface 14, and forming an opening 16 circumscribed by a gripping lower edge 18. This gripping lower edge 18
5 forms a gripping means for gripping to a patient's head in a manner such as to impede said the head covering unit from coming off of the patient's head during surgery. The shell component preferably will provide insulating properties, and may include an insulating filling. However, in greater detail as shown in FIG. 6, the material of the shell component is anticipated as being thicker than 1 mm and less than 2mm thick and
10 adapted for positioning over both lateral side portions of the head. This shell is of a thickness suitable for maintaining the patient's head temperature within eutermic range.

[0023] As additionally anticipated and shown best in conjunction with FIG. 5-6, an additional insulating component 19 lining a portion of the inner surface 12. The
15 insulating component 19 lining the top center panel is provided having a greater thickness to cover areas adapted to cover the posterior, the anterior and the top portions of said head. The thickness may be greater than 2 mm. Further, the lateral portions of the insulating component 19a lining the first side panel and the second side panel further may have a lesser thickness at both lateral side portions of the head. This
20 thickness may be less than 2mm.

[0024] Also illustrated in FIG. 1-7, the cap 10 will preferably cover below the mid

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point of the external auditory meatus bilaterally in addition to the rear portion of the head and upper neck region. The material covering the head has been designed to be in contact with the head in all covered areas so as to prevent a signification amount of air space between the head and the inner material covering the head. To accomplish this, the shell component is made from a pattern cut that is asymmetric from a section of the covering unit adapted for covering the front of the head and a section of the covering unit adapted for covering the rear of the head covering unit, such that the pattern cut has a concave pattern so as to emulate the shape of the front and rear of the head to prohibit the head covering unit from coming off of the head during surgery.

[0025] It is preferred that the shell component comprise insulative properties. The shell component may further include an insulative filling.

[0026] It is anticipated that the material of the shell component, as shown in FIG. 6, approximates a thickness no less than 1-mm and preferably between 1-mm and 2-mm or greater. The shell's thickness is not limited to the approximations disclosed herein, but may alternatively comprise any thickness that both maintains euthermic range and adapts to a position over both lateral portions of the patient's head.

[0027] It is additionally anticipated that an additional insulative component **19** lines a portion of the inner surface **12**, as best shown in FIGS. 5 and 6. The insulative component **19** comprises material having a thickness greater than 2-mm at the areas adapted to cover the posterior, the anterior and the top portions of the head. The insulative component **19** comprises material having a thickness less than 2-mm at the

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areas adapted to cover both of the lateral portions. The surgical cover **10** insulates a greater portion of the patient's head along approximately the central third, the anterior and the posterior portions. As also illustrated in FIGS. 1-7, the surgical cap **10** preferably covers below the midpoint of the external auditory meatus bilaterally in addition to the rear portion of the head and the upper neck region. The inner material that covers the head is designed to be in direct contact with the head to prevent the adverse effects a surgical cap having air gaps has on patient hypothermia. The direct contact is accomplished by means of a shell component made from a pattern cut asymmetrically from a section of the covering unit adapted to cover the front of the head and from a section of the covering unit adapted to cover the rear of the head. The pattern cut is concave to emulate the shape of the front and the rear of a head; it prohibits the surgical cap **10** from falling off during surgery. The pattern forms a gap less than 3/4 inch, preferably less than 1/2 inch and most preferably less than 1/4 inch.

[0028] It is additionally contemplated that the surgical cap **10** include material that comprises a temperature regulating microfiber. The enclosed cap may further incorporate a chin strap attached to the lower right and the lower left aspects of the surgical cover **10**.

[0029] It is envisioned that the cap **10** is manufactured in various sizes, e.g., the standard sizes that include extra-small, small, medium, large, extra-large and the like. For a more efficient fit, the surgical cap **10** may comprise the various standard sizes for different age ranges. Additionally, an adjustment or a take-up mechanism

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may be used to ensure a close-fit over the patient's head without pressing on the patient's head. The surgical cap **10** laterally grips below the patient's external auditory meatus. Finally, it is envisioned that the material used in the head covering unit does not emit sparks nor is it static conductive. It may even be made of a fire retardant material.

[0030] FIGS. 1-3 further illustrate that an embodiment of the disclosed invention can be made from a pattern cut asymmetrically from a section of the surgical cap **10** adapted to cover the front of the head and a section of the surgical cap **10** adapted to cover the rear of the head. Such a pattern is concave to emulate the shape of the front and the rear of the head and to prohibit the head covering unit from falling off during surgery. This embodiment includes a rear panel **20**, a front panel **22**, a top panel **24**, and a medial and a lateral side panel **26** covering the mid point of the external auditory meatus bilaterally. The seams between the sides contain the external aspects to prevent the surgical cap **10** from moving when it is laid on the posterior side, the medial or lateral side of the body.

[0031] FIGS. 1-3 further illustrated that an example of the disclosed invention can be made from a pattern cut that is asymmetric from a section of the covering unit adapted for covering the front of the head and a section of the covering unit adapted for covering the rear of the head covering unit. Such a pattern cut has a concave pattern so as to emulate the shape of the front and rear of the head to prohibit the head covering unit from coming off of the head during surgery, and includes a rear panel **20**,

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a front panel **22**, a top panel **24**, a medial and lateral side panel **26** covering the mid point of the external auditory meatus bilaterally. The seams between the sides containing external aspects so as to contain the head from movement when laying on the posterior side, or the medial or lateral side of the body.

5 **[0032]** Referring now to FIG. 8, a perspective view of a Surgical Cap for Controlling Patient Body Temperature according to an alternate embodiment of the present invention that includes an additional chinstrap **80** attached to the covering unit **10** across the opening **16** and at the lower edge **18**. While the chinstrap **80** is intended to provide additional protection for the prevention of maintaining said head covering on
10 the patient's head during surgery.

Referring now to the Figures, a medical sensor and covering unit combination, generally noted as **10**, is shown for covering a patient's head for maintaining the head temperature and core body temperature within eutermic range during surgery. The covering unit **10** covers a substantial portion of a patient's head, as will be described in
15 greater detail below, and forms a multi-part shell component having an inner surface **12** adapted for closely fitting the contours of a patient's head so as to prevent open air space between the head and an inner surface. The shell component further has an outer surface **14**, and forming an opening **16** circumscribed by a gripping lower edge **18**. This gripping lower edge **18** forms a gripping means for gripping to a patient's head
20 in a manner such as to impede said the head covering unit from coming off of the patient's head during surgery.

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[0033] According to one aspect of the present invention, a functional electronics package in the form of a sensor patch may be incorporated within the cap **10**.

Referring in conjunction with FIG. 9 through FIG. 12, such an aspect may utilized a removable patch module **50** that incorporates monitoring sensors **52** accessing an inner surface in a manner taught by the Related Applications, incorporated by reference as if

5 fully rewritten herein. According to a further aspect of the present invention informational communication with remote sensors of an otherwise conventional or remote location affixed to a patient's body that can communicate wirelessly to provide vital signs information. It is envisioned that the present surgical cap includes a

10 caregiver interface in the form of a display screen **20** positioned at the front of the cap in alignment with the patient's forehead. The location and operation of such an interface display screen allows doctors, nurses, EMT's or others to easily access the information output of selected vital body sign sensors in a manner that both travels with the patient as well as eliminates the need for a caregiver to divert attention from patient care

15 activities.

[0034] It should be apparent to a person having ordinary skill in the relevant art, in light of the present teachings, that alternate sensor configuration or placement may be provided, and that such modifications are and should be broadly considered within the range of equivalents of the present invention. By way of one example, and not as a

20 limitation, monitoring sensors may be integrated directly into the inner surface **12** of the cap **10** in contact with the patient's head in order to facilitate acquisition of standard

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vital body sign parameters. By way of another example, and not as a limitation, monitoring sensors may be distributed about and attached to various other parts of the patient's body and be in communication wirelessly with the display **20** on the patient's head in order to facilitate acquisition of standard vital body sign parameters.

5 **[0035]** In any sub-configuration, the cap **10** is intended maintain its position during and after the repeated times when medical personnel manipulates the patient's position during medical and surgical treatments. The cap **10** will provide the proper position and contact of sensors for acquiring body sign parameters including: body temperature; electrocardiogram (ECG); respiratory rate (RR) and End Tidal Carbon
10 Dioxide (ETCO₂); heart rate (HR); oxygen saturation (SpO₂); photoplethysmography (PPG); blood glucose (BG); carbon monoxide level (SpCO); blood pressure (BP); and hydration levels (HL).

[0036] About the outer surface **16** and functionally positioned at the forehead region of the wearer's head the display **20** may further be formed a graphical interface
15 for providing direct readout of various body sign through viewing a navigation display.

[0037] While various types of body vital sign sensors are currently in use, and it would be obvious to one skilled in the relevant art, in light of the present disclosure, that the specific type of sensor should not form a limitation on the overall functions and features of the present invention. Additionally, it is envisioned that the use of physical
20 tracking of location or position, such as through GPS or other means, may be incorporated for healthcare, military, industrial and consumer markets.

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[0038] The shell component **14** preferably will provide insulating properties, and may include an insulating filling. However, the material of the shell component is anticipated as being thicker than 1 mm and less than 2mm thick and adapted for positioning over both lateral side portions of the head. This shell is of a thickness
5 suitable for maintaining the patient's head temperature within eutermic range.

[0039] As additionally anticipated, an additional insulating component **19** lining a portion of the inner surface **12**. Also illustrated throughout the Figures, the cap **10** will preferably cover below the midpoint of the external auditory meatus bilaterally in addition to the rear portion of the head and upper neck region. The material covering
10 the head has been designed to be in contact with the head in all covered areas so as to prevent a significant amount of air space between the head and the inner material covering the head. To accomplish this, the shell component is made from a pattern cut that is asymmetric from a section of the covering unit adapted for covering the front of the head and a section of the covering unit adapted for covering the rear of the head
15 covering unit, such that the pattern cut has a concave pattern so as to emulate the shape of the front and rear of the head to prohibit the head covering unit from coming off of the head during surgery. Additionally, a number of separate insulating panels, namely a pair of side panels **22** flanking a central panel **24**. In such a construction each of the panels **22**, **24** may be adjustably fitted about a wearer's head by an adjustable
20 stretch joint **26** positioned between the panels **22**, **24** and along their intersections.

[0040] The surgical cover **10** insulates a greater portion of the patient's head

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along approximately the central third, the anterior and the posterior portions. As also illustrated, the surgical cap **10** preferably covers below the midpoint of the external auditory meatus bilaterally in addition to the rear portion of the head and the upper neck region. The inner material that covers the head is designed to be in direct contact with the head to prevent the adverse effects a surgical cap having air gaps has on patient hypothermia. The direct contact is accomplished by means of a shell component made from a pattern cut asymmetrically from a section of the covering unit adapted to cover the front of the head and from a section of the covering unit adapted to cover the rear of the head. The pattern cut is concave to emulate the shape of the front and the rear of a head; it prohibits the surgical cap **10** from falling off during surgery. The pattern forms a gap less than 3/4 inch, preferably less than 1/2 inch and most preferably less than 1/4 inch.

[0041] It is additionally contemplated that the surgical cap **10** include material that comprises a temperature regulating microfiber. The enclosed cap may further incorporate a chin strap attached to the lower right and the lower left aspects of the surgical cover **10**.

[0042] It is envisioned that the cap **10** is manufactured in various sizes, e.g., the standard sizes that include extra-small, small, medium, large, extra-large and the like. For a more efficient fit, the surgical cap **10** may comprise the various standard sizes for different age ranges. Additionally, an adjustment or a take-up mechanism may be used to ensure a close-fit over the patient's head without pressing on the patient's head. The

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surgical cap **10** laterally grips below the patient's external auditory meatus. Finally, it is envisioned that the material used in the head covering unit does not emit sparks nor is it static conductive. It may even be made of a fire retardant material. It is envisioned that the head covering unit may include attached pouches suitable for the placement of therapeutic or service elements necessary for the functions of the cap, including pouches of heating or cooling materials; hemostatic materials to control bleeding from head wounds; batteries, and diagnostic and analytic units supporting the functions of the vital sign monitors.

[0043] FIG. 2 further illustrated that an example of the disclosed invention can be made from a pattern cut that includes a chinstrap **30** that may be provided attached to or extending from each side panel **22** across the opening **16** and at the lower edge **18**. The chinstrap **30** is intended to provide additional protection for the prevention of maintaining said head covering on the patient's head during surgery.

2. Operation of the Preferred Embodiment

[0044] In operation, the present invention the covering unit **10** is anticipated for use in maintaining the head temperature and core body temperature within eutermic range during or after surgery. The patient's head **70** is covered at the forehead, ears and a base having a back portion along a line where the head and neck meet. The covering unit **10** is closely fitted to the head **70** and maintains a close proximity throughout surgery. The head covering **10** provides further additional insulation at least

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a portion of a patient's head during surgery. The cap **10** is made such as to grippingly engage below the wearer's external auditory meatus bilaterally and conform closely to the patient's head. The display screen **20** provides a graphical user interface for showing core body vitals of a patient connected to defibrillators (FIG. 3), smart hospital
5 beds (FIG. 4), smart ambulances (FIG. 5) or similar other medical equipment. The display screen **20** may show, but not be limited too, various vital sign parameters including: body temperature; electrocardiogram (ECG); respiratory rate (RR) and End Tidal Carbon Dioxide (ETCO₂); heart rate (HR); oxygen saturation (SpO₂); photoplethysmography (PPG); blood glucose (BG); carbon monoxide level (SpCO);
10 blood pressure (BP); and hydration levels (HL). An additional inclusion of a GPS tracking or physical location positioning sensors for may be further incorporated and adapted for healthcare, military, industrial and consumer markets.

[0045] The foregoing descriptions of the specific embodiments of the present invention have been presented for the purposes of illustration and description only.

15 They are not intended to be exhaustive nor are they intended to limit the invention to the precise forms disclosed and, obviously, many modifications and variations are possible in light of the above teaching. The embodiments were chosen and described in order to best explain the principles of the invention and its practical application, to thereby enable others skilled in the art to best utilize the invention and its various
20 embodiments with various modifications as are suited to the particular use contemplated. It is intended that the scope of the invention be defined by the Claims

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appended hereto and their equivalents. Therefore, the scope of the invention is to be limited only by the following claims.

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CLAIMS

Having thus described the invention, what is claimed as new and desired and to be secured by Letters Patent is as follows:

5 1. A method to maintain the euthermic state of a patient during surgical procedures, said method comprises the steps:

providing a closely fitted surgical cap adapted to extend in close proximity to the head over much of the patient's forehead, over the patient's ears, across the rear to the base of the patient's head, and along a line where the head and the neck meet, wherein
10 said surgical cap lies against said patient's head and is in contact with said forehead, said ears and said base of said patient's head, said surgical cap is further adapted to additionally insulate at least a portion of said patient's head covered by said surgical cap;

covering a substantial portion of said patient's head prior to surgery with said
15 surgical cap; and

maintaining said head covering closely fitted to said patient's head during surgery;

wherein said patients head temperature and core body temperature are thereby maintained within a defined temperature range.

20 2. The method according to claim 1, wherein said surgical cap is made such as to

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bilaterally grip below the wearer's external auditory meatus and to conform closely to said patient's head.

3. The method according to claim 1 further comprises the step of insulating a
5 greater portion on the anterior of said patient's head with insulation as compared to the rest of said head.

4. The method according to Claim 1 further comprises the step of maintaining said head covering closely fitted to said patient's head during both the perioperative and the
10 postoperative period.

5. The method according to Claim 1, wherein the portions of said patient's head that is insulated are the portions along approximately the central third, the anterior and the posterior of said head.

15 6. The method of Claim 3, wherein said insulative component covers bilaterally below the midpoint of the external auditory meatus.

7. The method of Claim 6, wherein said insulative component is made of a
20 synthetic microfiber having a composition of approximately 65% olefin and 35% polyester.

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8. The method of Claim 1, wherein said specified temperature range is within minus two degrees from the euthermic temperature.

9. The covering unit in Claim 1, wherein said user interface display is operative communication with at least one vital signs sensor.

10. The covering unit in Claims 9, wherein said insulative component is selected from the group comprising a ceramic fiber material, a phase change material and a synthetic microfiber.

11. The covering unit of Claim 10, wherein said insulative component covers a rear portion of said covering unit such as to cover said head and the upper neck region of said user.

12. The covering unit of Claim 11, wherein said shell component is made from a flexible material that can expand to fit different sized heads.

13. The covering unit of Claim 12, wherein said shell component is made of an anti-static material.

14. The covering unit of Claim 13, wherein said covering unit is made from an

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asymmetric pattern cut from a section of said covering unit adapted to cover the front of said head and a section of said covering unit adapted to cover said rear of said head such that said pattern is concave so as to emulate the shape of the front and the rear of said head and to prohibit said covering unit from falling off.

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15. The covering unit in Claim 14, wherein said insulative component is selected from the group comprising a ceramic fiber material, a phase change material and a synthetic microfiber.

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16. A covering unit to assist in maintaining a user's optimal body temperature, said covering unit comprises:

an insulative element that closely fits a portion of said user's head and ears;

a shell component having an inner surface, an outer surface and a lower edge, said inner surface is attached to said insulative element;

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a first side panel;

a second side panel;

a top center panel that forms a front, a center and a rear connected to said first side panel and said second side panel;

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an information display formed within or attached to said shell component and located at a position that corresponds generally along the centerline of a wearer's head from front to back; and

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means to grip formed of a medial and a lateral side panel adapted to cover in close proximity a mid point of the external auditory meatus bilaterally, said means contains the head from shifting and moving when said covering unit is laid on the posterior, the medial or the lateral side of the body.

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17. The covering unit in Claim 16, wherein
said user interface display is in operative communication with at least one vital signs sensor; and

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said display is positioned about the front upper crown or forehead area of the user's head.

18. The covering unit of Claim 17, wherein said insulative element comprises material having a thickness greater than 2-mm on the areas adapted to cover the posterior, the anterior and the top portions of said head.

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19. The covering unit of Claim 17 further comprises a material having a thickness less than 2-mm at the areas adapted to cover both lateral side portions of the head.

20. A method to maintain the eutermic state, said method comprises the steps:

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providing a closely fitted covering unit adapted to extend in close proximity to the head over much of the user's forehead, over the user's ears, across the rear to the

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base of the user's head, and along a line where the head and the neck meet, wherein said covering unit is further adapted to form or support a vital signs display mechanism formed within or attached to said shell component and located at a position that corresponds generally along the centerline of a wearer's head from front to back, wherein said covering unit further lies against said user's head and is in contact with said forehead, said ears and said base of said user's head, said covering unit is further adapted to additionally insulate at least a portion of said user's head covered by said covering unit;

placing of said vital signs display mechanisms at a location to provide optimum visibility to rescue personnel;

covering a substantial portion of said user's head prior in conjunctions with the donning of a life vest; and

maintaining said head covering closely fitted to said user's head during a rescue event.

21. The method according to claim 20, wherein said covering unit is made such as to bilaterally grip below the wearer's external auditory meatus and to conform closely to said user's head.

22. The method according to claim 21 further comprises the step of insulating a greater portion on the anterior of said user's head with insulation as compared to the

rest of said head.

23. The method according to Claim 22, wherein the portions of said user's head that is insulated are the portions along approximately the central third, the anterior and the posterior of said head.