What is claimed is:

1. A system for measuring vital signs from a patient, comprising:

(a) a first sensor configured to generate a first time-dependent waveform indicative of one or more contractile properties of the patient's heart;

(b) a second sensor configured to generate a second time-dependent waveform indicative of one or more contractile properties of the patient's heart;

(c) at least three motion-detecting sensors positioned on the forearm, upper arm, and a body location other than the forearm or upper arm of the patient, each of said motion-detecting sensors generating at least one time-dependent motion waveform indicative of motion of the location on the patient's body to which the motion-detecting sensor is affixed;

(d) a processing component configured to be worn on the patient's body and comprising a microprocessor, said processing component configured to receive the first time-dependent waveform, the second time-dependent waveform, and the at least one time-dependent motion waveform generated by each motion-detecting sensor and determine therefrom: (i) a pulse transit time calculated using a time difference between a time-dependent feature in each of the first and second time-dependent waveforms, (ii) a blood pressure value calculated using said time difference, and (iii) at least one motion parameter selected from the patient's posture, activity level, and degree of motion calculated using at least one motion waveform generated by each of said motion-detecting sensors; and

(e) a wireless communication system configured to be worn on the patient's body and operably connect to the processing component, the wireless system configured to wirelessly transmit the blood pressure value and at least one motion parameter determined by the processing component to a remote receiver.

2. A system according to claim 1, wherein:

said first sensor is an optical sensor comprising: a source of electromagnetic radiation configured to irradiate tissue of the patient with radiation emitted therefrom, and

a detector configured to detect one or more properties of the electromagnetic radiation after it irradiates said tissue, wherein the first time-dependent waveform is an optical waveform indicative of volumetric changes in the irradiated tissue caused by ventricular contraction of the patient's heart; and,

said second sensor is an electrical sensor comprising: at least two electrodes configured to detect electrical signals from the patient's body, and an electrical circuit operably connected to the electrodes and configured to process the detected electrical signals to generate the second time-dependent waveform, wherein said second time-dependent waveform is an electrical waveform indicative of ventricular depolarization of the patient's heart.

3. A system according to claim 2, wherein the optical waveform represents a time-dependent change in optical absorption of an underlying vessel resulting from the ejection of blood from the left ventricle.

4. A system according to claim 3, wherein the pulse transit time is a time difference between a peak of a QRS complex of an ECG waveform and an inflection point in said optical waveform.

5. A system according to claim 1, wherein:

said first sensor is an optical sensor comprising: a source of electromagnetic radiation configured to irradiate tissue of the patient with radiation emitted therefrom at a first location on an extremity, and a detector configured to detect one or more properties of the electromagnetic radiation after it irradiates said tissue, wherein the first time-dependent waveform is an optical waveform indicative of volumetric changes in the irradiated tissue at said first location caused by ventricular contraction of the patient's heart; and

said second sensor is an optical sensor comprising: a source of electromagnetic radiation configured to irradiate tissue of the patient with radiation emitted therefrom at a second position, and a detector configured to detect one or more properties of the electromagnetic radiation after it irradiates said tissue, wherein the second time-dependent waveform is an optical waveform indicative of volumetric changes in the

irradiated tissue at said second location caused by ventricular contraction of the patient's heart.

6. A system according to claim 1, wherein the remote receiver is configured to generate an alarm condition based on the blood pressure value, wherein the alarm condition is optionally modified based on the at least one motion parameter.

7. A system according to claim 6, wherein an alarm condition indicating a need for medical intervention is modified by a motion parameter indicating said patient is ambulatory.

8. A system according to claim 1, wherein each of said three motion-detecting sensors are accelerometers.

9. A system according to claim 1, wherein the motion-detecting sensor positioned on the forearm is positioned on the wrist.

10. A system according to claim 9, wherein the processing component is positioned on the wrist proximate to the motion-detecting sensor.

11. A system according to claim 10, wherein the motion-detecting sensor positioned on the upper arm is electrically connected to the processing component through a cable.

12. A system according to claim 11, wherein the motion-detecting sensor positioned at a body location other than the forearm or upper arm is positioned on the chest and is electrically connected to the processing component through said cable.

13. A system according to claim 12, wherein the motion waveform generated by the motion-detecting sensor positioned on the upper arm is transmitted to the processing component through said cable as a first digital data stream, and the motion waveform generated by the motion-detecting sensor positioned at a body location other than the forearm or upper arm is transmitted to the processing component through said cable as a second digital data stream, wherein the first digital data stream is separately resolvable from the second digital data stream by the processing component.

14. A system according to claim 13, wherein the second time-dependent waveform is an ECG waveform that is transmitted to the processing component through said cable as a

third digital data stream separately resolvable from each of the first and second digital data streams.

15. A system according to claim 14, wherein said cable comprises a terminal portion, said terminal portion comprising: a connector configured for reversible attachment of one or more ECG electrodes; an ECG circuit configured to receive electrical signals from said one or more ECG electrodes and process them to determine one or more ECG waveforms therefrom; and an analog-to-digital converter configured to convert said one or more ECG waveforms to said third digital data stream.

16. A system according to claim 15, wherein the terminal portion comprises the motion-detecting sensor positioned at a body location other than the forearm or upper arm of the patient.

17. A method of measuring blood pressure from a patient, comprising:

attaching a system according to one of claims 1-16 to a patient;

determining a pulse transit time, blood pressure value, and at least one motion parameter using said processing component; and,

transmitting said blood pressure value, and at least one motion parameter to said remote receiver using said wireless communication system,

wherein said method optionally comprises generating an alarm condition based on the blood pressure value and the at least one motion parameter.

18. A system for measuring vital signs from a patient, comprising:

(a) a sensor configured to detect a first time-dependent physiological waveform indicative of one or more contractile properties of the patient's heart;

(b) a cable system comprising:

an electrical sensor comprising: at least two electrodes configured to detect electrical signals from the patient's body and operably connect to an electrical circuit configured to process the detected electrical signals, the electrical sensor generating a time-dependent

electrical waveform indicative of one or more contractile properties of the patient's heart, and,

at least two motion-detecting sensors, each of said motion-detecting sensors generating at least one time-dependent motion waveform indicative of motion of the location on the patient's body to which the motion-detecting sensor is affixed; and,

(c) a processing component configured to be worn on the patient's body and comprising a microprocessor and one or more electrical connectors for operably connecting the microprocessor to the sensor and the cable system, said processing component configured to receive the time-dependent electrical waveform, the time-dependent physiological waveform, and the at least one time-dependent motion waveform generated by each motion-detecting sensor and determine therefrom: (i) at least one vital sign calculated using at least one of the time-dependent physiological waveform and the time-dependent electrical waveform, and (ii) at least one motion parameter selected from the patient's posture, activity level, arm height, and degree of motion calculated using at least one time-dependent motion waveform generated by each of said motion-detecting sensors.

19. The system of claim 18, wherein the cable system comprises a transmission line that is operably connected to: (i) the electrical sensor to receive the time-dependent electrical waveform; and (ii) at least one motion-detecting sensor to receive a time-dependent motion waveform.

20. The system of claim 19, wherein the cable system comprises a transmission line operably connected to: (i) the electrical sensor and configured to receive the time-dependent electrical waveform; and (ii) the at least two motion-detecting sensors and configured to receive at least one time-dependent motion waveform generated by each of the motion-detecting sensors.

21. The system of claim 18, wherein the cable system further comprises a terminal portion comprising the electrical circuit.

22. The system of claim 21, wherein the terminal portion further comprises at least one motion-detecting sensor.

23. The system of claim 22, wherein the motion-detecting sensor is electrically connected to the processing component through the cable system.

24. The system of claim 18, wherein the cable system further comprises at least one analog-to-digital converter configured to digitize the time-dependent electrical waveform and the at least one time-dependent motion waveform generated by each of the motion-detecting sensors.

25. The system of claim 24, wherein a time-dependent motion waveform generated by at least one motion-detecting sensor is transmitted to the processing component through said cable system as a first digital data stream, and the time-dependent motion waveform generated by a second motion-detecting sensor is transmitted to the processing component through said cable system as a second digital data stream, wherein the first digital data stream is separately resolvable from the second digital data stream by the processing component.

26. The system of claim 25, wherein the time-dependent electrical waveform is transmitted to the processing component through said cable system as a third digital data stream separately resolvable from each of the first and second digital data streams.

27. The system of claim 22, wherein the terminal portion comprises an electrical circuit configured to operably connect to at least three electrodes, with each electrode configured to detect an electrical signal from the patient's body, and the electrical circuit configured to process the electrical signals detected by each electrode to generate the at least one time-dependent electrical waveform.

28. The system of claim 27, wherein the terminal portion comprises an electrical circuit configured to operably connect to at least five electrodes, with each configured to detect an electrical signal from the patient's body, and the electrical circuit configured to process the electrical signals detected by each electrode to generate at least three separate time-dependent electrical waveforms.

29. The system of claim 28, wherein the terminal portion comprises an electrical circuit configured to operably connect to at least twelve electrodes, with each configured to detect an electrical signal from the patient's body, and the electrical circuit configured to

process the electrical signals detected by each electrode to generate at least five separate time-dependent electrical waveforms.

30. The system of claim 22, wherein the cable system comprises a first connector comprising a first set of electrical conductors, and the terminal portion comprises a second connector comprising a second set of electrical conductors, and wherein the first connector is configured to operably attach and detach from the second connector.

31. The system of claim 22, wherein the terminal portion further comprises a separate connector corresponding to each of the at least two electrodes and operably connected to the electrical circuit.

32. The system of claim 18, wherein the electrodes are operably connected to the cable system and configured to attach to separate locations on the patient's chest, and a first motion-detecting sensor is operably connected to the cable system and configured to attach to a location selected from the patient's chest and upper arm.

33. The system of claim 32, wherein a second motion-detecting sensor is operably connected to the cable system and configured to attach to a location selected from the patient's lower arm, wrist, hand, and fingers.

34. The system of claim 18, wherein the sensor comprises an optical sensor comprising a source of electromagnetic radiation configured to irradiate tissue of the patient with radiation emitted therefrom, and a detector configured to detect one or more properties of the electromagnetic radiation after it irradiates said tissue, the optical sensor generating a time-dependent optical waveform indicative of volumetric changes in the irradiated tissue.

35. The system of claim 34, wherein the processing component is further configured to detect a time difference between a feature of the time-dependent optical waveform and a feature of the time-dependent electrical waveform.

36. The system of claim 35, wherein the vital sign calculated by the processing component is blood pressure calculated from the time difference.

37. A method of measuring blood pressure from a patient, comprising:

attaching a system according to one of claims 18-36 to a patient; and

determining a pulse transit time, blood pressure value, and at least one motion parameter using said processing component.

38. A system for measuring a blood pressure from a patient, comprising:

(a) a first sensor configured to generate a first time-dependent waveform indicative of one or more contractile properties of the patient's heart;

(b) an electrical sensor comprising: at least two electrodes configured to detect electrical signals from the patient's body, and an electrical circuit operably connected to the electrodes and configured to process the detected electrical signals, the electrical sensor generating a time-dependent electrical waveform indicative of one or more contractile properties of the patient's heart;

(c) at least two motion-detecting sensors positioned on separate locations on the patient's body, each of said motion-detecting sensors generating at least one time-dependent motion waveform indicative of motion of the location on the patient's body to which the motion-detecting sensor is affixed; and,

(d) a processing component configured to be worn on the patient's body and comprising a microprocessor, said processing component configured to receive the first time-dependent waveform, the time-dependent electrical waveform, and the at least one time-dependent motion waveform generated by each motion-detecting sensor, and to determine: (i) a first arm position from one or more of the time-dependent motion waveforms acquired in a first arm position; (ii) a first time difference between a feature present in each of a first time-dependent waveform and a first time-dependent electrical waveform acquired in the first arm position; (iii) a second arm position from one or more of the time-dependent motion waveforms acquired in a second arm position; (iv) a second time difference between a feature present in each of a second time-dependent waveform and a second time-dependent electrical waveform acquired in the second arm position; (v) a first blood pressure value calculated at the first arm position; (vi) a second blood pressure value calculated at the second arm position; (vii) a blood pressure factor calculated using the first blood pressure value and the first time difference or a property

derived therefrom, together with the second blood pressure value and the second time difference or a property derived therefrom.

39. The system of claim 38, wherein the processing component further comprises a display component.

40. The system of claim 39, wherein the display component renders a graphic interface configured to instruct the patient to move an arm to the first arm position and then to the second arm position.

41. The system of claim 38, wherein the processing component further comprises an audio component.

42. The system of claim 41, wherein the audio component renders audible instructions that instruct the patient to move an arm to the first arm position and then to the second arm position.

43. The system of claim 38, wherein the processing component is further configured to: (i) detect when the patient's arm is in the first position by processing at least one time-dependent motion waveform generated by each motion-detecting sensor; and (ii) determine the first time difference and the first blood pressure value when the patient's arm is in the first position.

44. The system of claim 43, wherein the processing component is further configured to: (i) detect when the patient's arm is in the second position by processing at least one time-dependent motion waveform generated by each motion-detecting sensor; and (ii) determine the second time difference and the second blood pressure value when the patient's arm is in the second position.

45. The system of claim 44, wherein the processing component is further configured to determine a third time difference between a feature present in each of the time-dependent waveform measured by the first sensor and a time-dependent electrical waveform after it determines the first and second time differences.

46. The system of claim 45, further comprising a pneumatic system comprising an inflatable cuff, a pump, and a pressure sensor, the inflatable cuff configured to attach to the patient's arm and be inflated by the pump, and the pressure sensor configured to

measure a time-dependent pressure waveform representing a pressure within the inflatable cuff.

47. The system of claim 46, wherein the pressure sensor is configured to measure a time-dependent pressure waveform representing a pressure within the inflatable cuff while the pump inflates the inflatable cuff.

48. The system of claim 46, further comprising a processor configured to process the time-dependent pressure waveform to calculate at least one cuff-based blood pressure value.

49. The system of claim 48, wherein the processing component is further configured to determine a blood pressure value by processing the third time difference, the blood pressure factor, and the cuff-based blood pressure value.

50. The system of claim 45, wherein the processing component is further configured to determine a blood pressure value by processing the third time difference and the blood pressure factor.

51. The system of claim 38, wherein a first motion-detecting sensor is positioned at a location on the patient's body selected from a lower arm, wrist, hand, and finger.

52. The system of claim 51, wherein a second motion-detecting sensor is positioned at a location on the patient's body selected from an upper arm, shoulder, and chest.

53. The system of claim 38, wherein the first sensor comprises an optical sensor comprising a source of electromagnetic radiation configured to irradiate tissue of the patient with radiation emitted therefrom, and a detector configured to detect one or more properties of the electromagnetic radiation after it irradiates said tissue, the optical sensor generating a time-dependent optical waveform indicative of volumetric changes in the irradiated tissue.

54. The system of claim 53, wherein the processing component is further configured to detect a time difference between a feature of the time-dependent optical waveform and a feature of the time-dependent electrical waveform.

55. A method of measuring blood pressure from a patient, comprising:

attaching a system according to one of claims 38-54 to a patient; and

determining a blood pressure value and at least one motion parameter using said processing component.

56. A method for monitoring a patient, comprising the following steps:

(a) detecting a first time-dependent physiological waveform indicative of one or more contractile properties of the patient's heart with a first sensor comprising a first detector configured to be worn on the patient's body;

(b) detecting a second time-dependent physiological waveform indicative of one or more contractile properties of the patient's heart with a second sensor comprising a second detector configured to be worn on the patient's body;

(c) detecting sets of time-dependent motion waveforms with at least two motion-detecting sensors positioned on different locations on the patient's body, wherein each motion-detecting sensor detects a set of motion waveforms indicative of motion of the location on the patient's body to which the motion-detecting sensor is affixed;

(d) processing the first and second time-dependent physiological waveforms to determine at least one vital sign from the patient;

(e) analyzing at least a portion of each set of time-dependent motion waveforms, or a mathematical derivative thereof, to determine a motion parameter;

(f) processing the motion parameter to determine a probability that the patient is undergoing a specific activity state; and

(g) estimating the patient's activity state based on the probability.

57. The method of claim 56, wherein step (e) further comprises calculating a mathematical transform of at least one motion waveform to determine a frequency-dependent motion waveform.

58. The method of claim 57, wherein step (e) further comprises calculating a power spectrum of at least one motion waveform.

59. The method of claim 58, wherein step (e) further comprises calculating an amplitude of at least one frequency component of the power spectrum, or a mathematical derivative thereof, to determine the motion parameter.

60. The method of claim 56, wherein step (e) further comprises analyzing a time-dependent variation of least one motion waveform.

61. The method of claim 60, wherein step (e) further comprises calculating a standard deviation of at least one motion waveform to determine the motion parameter.

62. The method of claim 60, wherein step (e) further comprises calculating a mathematical derivative of at least one motion waveform to determine the motion parameter.

63. The method of claim 60, wherein step (e) further comprises comparing at least a portion of the motion waveform to a mathematical function.

64. The method of claim 59, wherein step (e) further comprises determining a logit variable z, or a mathematical derivative thereof, wherein z is defined as:

$$z = b_0 + b_1 x_1 + b_2 x_2 + \cdots + b_m x_m$$

wherein b_0, b_1, b_2, and b_m are predetermined constants related to motion, and at least one of x_0, x_1, x_2, and x_m is a motion parameter determined from an amplitude of at least one frequency component of the power spectrum.

65. The method of claim 64, wherein step (f) further comprises processing the logit variable z, or a mathematical derivative thereof, with a mathematical function to determine the probability that the patient is undergoing a specific activity state.

66. The method of claim 65, wherein step (f) further comprises processing the logit variable z, or a mathematical derivative thereof, with a probability function P, or a mathematical derivative thereof, wherein P is defined as:

$$P = \frac{1}{1 - exp(-z)}$$

and wherein P indicates a probability of an activity state.

67. The method of claim 77, wherein step (g) further comprises comparing P, or a mathematical derivative thereof, to a predetermined threshold value to estimate the patient's activity state.

68. The method of claim 60, wherein step (e) further comprises determining a logit variable z, or a mathematical derivative thereof, wherein z is defined as:

$$z = b_0 + b_1 x_1 + b_2 x_2 + \cdots + b_m x_m$$

wherein b_0, b_1, b_2, and b_m are predetermined constants related to motion, and at least one of x_0, x_1, x_2, and x_m is a motion parameter determined from a time-dependent variation of least one motion waveform.

69. The method of claim 68, wherein step (f) further comprises processing the logit variable z, or a mathematical derivative thereof, with a mathematical function to determine the probability that the patient is undergoing a specific activity state.

70. The method of claim 69, wherein step (f) further comprises processing the logit variable z, or a mathematical derivative thereof, with a probability function P, or a mathematical derivative thereof, wherein P is defined as:

$$P = \frac{1}{1 - exp(-z)}$$

and wherein P indicates a probability of an activity state.

71. The method of claim 70, wherein step (g) further comprises comparing P, or a mathematical derivative thereof, to a predetermined threshold value to estimate the patient's activity state.

72. The method of claim 71, wherein step (g) further comprises estimating an activity state selected from the group consisting of resting, moving, sitting, standing, walking, running, falling, lying down, and convulsing.

73. The method of claim 71, wherein step (d) further comprises determining at least one vital sign by calculating a time difference between a feature in the first time-dependent physiological waveform and a feature in the second time-dependent physiological waveform.

74. The method of claim 73, wherein step (d) further comprises calculating a blood pressure from the time difference.

75. The method of claim 68, wherein the first time-dependent physiological waveform is an electrical waveform, and step (a) further comprises detecting the electrical waveform with at least two electrodes attached to the patient and operably connected to an electrical circuit.

76. The method of claim 75, wherein the second time-dependent physiological waveform is an optical waveform, and step (b) further comprises detecting the optical waveform with an optical sensor comprising a light source and a photodiode.

77. The method of claim 76, wherein each of the first and second time-dependent physiological waveforms are selected from a group consisting of an optical waveform, an electrical waveform, an acoustic waveform, and a pressure waveform.

78. The method of claim 77, wherein steps (a) and (b) each further comprise detecting a time-dependent physiological waveform with a sensor selected from a group consisting of: (i) an optical sensor comprising a light source and a photodiode; (ii) an electrical sensor comprising at least two electrodes operably connected to an electrical circuit; (iii) an acoustic sensor comprising a microphone; and (iv) a pressure sensor comprising a transducer.

79. A system for measuring vital signs from a patient, comprising:

(a) a first sensor configured to generate a first time-dependent waveform indicative of one or more contractile properties of the patient's heart;

(b) a second sensor configured to generate a second time-dependent waveform indicative of one or more contractile properties of the patient's heart;

(c) at least two motion-detecting sensors positioned on a location selected from a forearm, upper arm, and a body location other than the forearm or upper arm of the patient, each of said motion-detecting sensors generating at least one time-dependent motion waveform indicative of motion of the location on the patient's body to which the motion-detecting sensor is affixed; and,

(d) a processing component configured to be worn on the patient's body and comprising a microprocessor, said processing component configured to receive the first time-dependent waveform, the second time-dependent waveform, and the at least one time-dependent motion waveform generated by each motion-detecting sensor and determine therefrom: (i) one or more vital signs calculated using the first and second time-dependent waveforms; (ii) at least one motion parameter selected from the patient's posture, activity level, arm height, and degree of motion and calculated using at least one motion waveform generated by each of said motion-detecting sensors; and (iii) at least one alarm condition calculated using one or more of the vital signs and at least one motion parameter, wherein an alarm condition indicated by a variance in one or more of the vital signs is regulated according to one or more motion parameters.

80. A system according to claim 79, wherein:

said first time-dependent sensor is an optical sensor comprising: a source of electromagnetic radiation configured to irradiate tissue of the patient with radiation emitted therefrom, and a detector configured to detect one or more properties of the electromagnetic radiation after it irradiates said tissue, wherein the first time-dependent waveform is an optical waveform indicative of volumetric changes in the irradiated tissue caused by ventricular contraction of the patient's heart; and

said second time-dependent sensor is an electrical sensor comprising: at least two electrodes configured to detect electrical signals from the patient's body, and an electrical circuit operably connected to the electrodes and configured to process the detected electrical signals, wherein said second time-dependent waveform is an electrical waveform indicative of ventricular depolarization of the patient's heart.

81. A system according to claim 80, wherein the optical waveform is generated by a pressure waveform resulting from ejection of blood from the left ventricle.

82. A system according to claim 81, wherein the pulse transit time is a time difference between an electrocardiogram QRS complex and a corresponding inflection point in said optical waveform.

83. A system according to claim 79, wherein:

said first time-dependent sensor is an optical sensor comprising: a source of electromagnetic radiation configured to irradiate tissue of the patient with radiation emitted therefrom at a first location on an extremity, and a detector configured to detect one or more properties of the electromagnetic radiation after it irradiates said tissue, wherein the first time-dependent waveform is an optical waveform indicative of volumetric changes in the irradiated tissue at said first location caused by ventricular contraction of the patient's heart; and

said second time-dependent sensor is an optical sensor comprising: a source of electromagnetic radiation configured to irradiate tissue of the patient with radiation emitted therefrom at a second position on said extremity, and a detector configured to detect one or more properties of the electromagnetic radiation after it irradiates said tissue, wherein the second time-dependent waveform is an optical waveform indicative of volumetric changes in the irradiated tissue at said second location caused by ventricular contraction of the patient's heart.

84. A system according to claim 79, wherein an alarm condition indicating a need for medical intervention is modified by a motion parameter indicating said patient is ambulatory.

85. A system according to claim 79, wherein each of said three motion-detecting sensors are accelerometers.

86. A system according to claim 79, wherein the motion-detecting sensor positioned on the forearm is positioned on the wrist.

87. A system according to claim 86, wherein the processing component is positioned on the wrist proximate to the motion-detecting sensor.

88. A system according to claim 87, wherein the motion-detecting sensor positioned on the upper arm is electrically connected to the processing component through a cable.

89. A system according to claim 88, wherein the motion detecting sensor positioned at a body location other than the forearm or upper arm is positioned on the chest and is electrically connected to the processing component through said cable.

90. A system according to claim 89, wherein the motion waveform generated by the motion-detecting sensor positioned on the upper arm is transmitted to the processing component through said cable as a first digital data stream and the motion waveform generated by the motion-detecting sensor positioned at a body location other than the forearm or upper arm is transmitted to the processing component through said cable as a second digital data stream, wherein the first digital data stream is separately resolvable from the second digital data stream by the processing component.

91. A system according to claim 90, wherein the electrical waveform is transmitted to the processing component through said cable as a third digital data stream separately resolvable from each of the first and second digital data streams.

92. A system according to claim 91, wherein said cable terminates at a connector in electrical communication therewith, said connector configured for reversible attachment of one or more electrodes, wherein said connector comprises an electrical circuit configured to receive electrical signals from said one or more electrodes and to determine one or more electrical waveforms therefrom, and an analog-to-digital converter configured to convert said one or more electrical waveforms into said third digital data stream.

93. A system according to claim 92, wherein the connector is positioned proximal to the sensor positioned at a body location other than the forearm or upper arm.

94. A method of measuring vital signs from a patient, comprising:

attaching a system according to one of claims 79-93 to a patient;

determining a pulse transit time, blood pressure value, and at least one motion parameter using said processing component; and

transmitting said blood pressure value, and at least one motion parameter to said remote receiver using a wireless communication system,

wherein said method optionally comprises generating an alarm condition based on the blood pressure value and the at least one motion parameter.

95. A method for monitoring vital signs and posture of a patient, the method comprising the following steps:

(a) detecting a first time-dependent physiological waveform indicative of one or more contractile properties of the patient's heart with a first sensor comprising a first detector configured to be worn on the patient's body;

(b) detecting a second time-dependent physiological waveform indicative of one or more contractile properties of the patient's heart with a second sensor comprising a second detector configured to be worn on the patient's body;

(c) detecting a set of time-dependent motion waveforms with at least one motion-detecting sensor positioned on the patient's torso, wherein the one motion-detecting sensor detects a set of motion waveforms indicative of motion of the patient's torso;

(d) processing the first and second time-dependent physiological waveforms to determine at least one vital sign from the patient;

(e) analyzing at least a portion of the set of time-dependent motion waveforms, or a mathematical derivative thereof, to determine a vector corresponding to motion of the patient's torso;

(f) comparing the vector to a coordinate space representative of how the motion-detecting sensor is oriented on the patient to determine a posture parameter; and

(g) comparing the posture parameter to a threshold value to estimate the patient's posture.

96. The method of claim 95, wherein step (e) further comprises analyzing three time-dependent motion waveforms, each corresponding to a unique axis, to determine the vector.

97. The method of claim 96, wherein step (f) further comprises comparing the vector to a coordinate space defined by three positional vectors, each indicating an orientation of the motion-detecting sensor on the patient.

98. The method of claim 97, wherein a first positional vector corresponds to a vertical axis in the coordinate space, a second positional vector corresponds to a horizontal axis in the coordinate space, and the third positional vector corresponds to a normal axis extending normal to the patient's chest.

99. The method of claim 97, wherein the posture parameter is an angle.

100. The method of claim 99, wherein step (f) further comprises comparing the vector to the coordinate space to determine the angle between the vector and at least one of the three positional vectors.

101. The method of claim 100, wherein step (f) further comprises comparing the vector to the coordinate space to determine the angle between the vector and a vector corresponding to a vertical axis, or a property of the angle between the vector and the vector corresponding to the vertical axis.

102. The method of claim 101, wherein step (g) further comprises comparing the angle to a threshold value that is substantially equivalent to 45 degrees, and wherein the patient's posture is estimated to be upright if the angle is less than the threshold value.

103. The method of claim 101, wherein step (g) further comprises comparing the angle to a threshold value that is substantially equivalent to 45 degrees, and wherein the patient's posture is estimated to be lying down if the angle is greater than the threshold value.

104. The method of claim 103, wherein step (f) further comprises comparing the vector to the coordinate space to determine the angle between the vector and a vector corresponding to a normal axis extending normal to the patient's chest, or a property of the angle between the vector and the vector corresponding to a normal axis extending normal to the patient's chest.

105. The method of claim 104, wherein step (g) further comprises comparing the angle to a threshold value that is substantially equivalent to 35 degrees, and wherein the patient's posture is estimated to be supine if the angle is less than the threshold value.

106. The method of claim 104, wherein step (g) further comprises comparing the angle to a threshold value that is substantially equivalent to 135 degrees, and wherein the patient's posture is estimated to be prone if the angle is greater than the threshold value.

107. The method of claim 103, wherein step (f) further comprises comparing the vector to the coordinate space to determine the angle between the vector and a vector corresponding to a horizontal axis, or a property of the angle between the vector and the vector corresponding to the horizontal axis.

108. The method of claim 107, wherein step (g) further comprises comparing the angle to a threshold value that is substantially equivalent to 90 degrees, and wherein the patient's posture is estimated to be lying on a first side if the angle is less than the threshold value.

109. The method of claim 107, wherein step (g) further comprises comparing the angle to a threshold value that is substantially equivalent to 90 degrees, and wherein the patient's posture is estimated to be lying on a side opposite the first side if the angle is greater than the threshold value.

110. The method of claim 95, wherein step (c) further comprises detecting a set of time-dependent motion waveforms with at least one motion-detecting sensor positioned on the patient's chest.

111. The method of claim 95, where the at least one motion-detecting sensor is an accelerometer.

112. The method of claim 95, wherein step (d) further comprises processing the first and second time-dependent physiological waveforms to calculate a time difference between a feature in the first time-dependent physiological waveform and a feature in the second time-dependent physiological waveform.

113. The method of claim 112, wherein step (d) further comprises calculating a blood pressure from the time difference.

114. The method of claim 112, wherein the first time-dependent physiological waveform is an electrical waveform, and step (a) further comprises detecting the electrical waveform with at least two electrodes attached to the patient and operably connected to an electrical circuit.

115. The method of claim 114, wherein the second time-dependent physiological waveform is an optical waveform, and step (b) further comprises detecting the optical waveform with an optical sensor comprising a light source and a photodiode.

116. The method of claim 112, wherein each of the first and second time-dependent physiological waveforms are selected from a group consisting of an optical waveform, an electrical waveform, an acoustic waveform, and a pressure waveform.

117. The method of claim 116, wherein and steps (a) and (b) each further comprise detecting a time-dependent physiological waveform with a sensor selected from a group consisting of: (i) an optical sensor comprising a light source and a photodiode; (ii) an electrical sensor comprising at least two electrodes operably connected to an electrical circuit; (iii) an acoustic sensor comprising a microphone; and (iv) a pressure sensor comprising a transducer.

What is claimed is:

1. A method for monitoring vital signs and posture of a patient, the method comprising the following steps:

(a) detecting a first time-dependent physiological waveform indicative of one or more contractile properties of the patient's heart with a first sensor comprising a first detector configured to be worn on the patient's body;

(b) detecting a second time-dependent physiological waveform indicative of one or more contractile properties of the patient's heart with a second sensor comprising a second detector configured to be worn on the patient's body;

(c) detecting a set of time-dependent motion waveforms with at least one motion-detecting sensor positioned on the patient's torso, wherein the one motion-detecting sensor detects a set of motion waveforms indicative of motion of the patient's torso;

(d) processing the first and second time-dependent physiological waveforms to determine at least one vital sign from the patient;

(e) analyzing at least a portion of the set of time-dependent motion waveforms, or a mathematical derivative thereof, to determine a vector corresponding to motion of the patient's torso;

(f) comparing the vector to a coordinate space representative of how the motion-detecting sensor is oriented on the patient to determine a posture parameter; and

(g) comparing the posture parameter to a threshold value to estimate the patient's posture.

2. The method of claim 1, wherein step (e) further comprises analyzing three time-dependent motion waveforms, each corresponding to a unique axis, to determine the vector.

3. The method of claim 2, wherein step (f) further comprises comparing the vector to a coordinate space defined by three positional vectors, each indicating an orientation of the motion-detecting sensor on the patient.

4. The method of claim 3, wherein a first positional vector corresponds to a vertical axis in the coordinate space, a second positional vector corresponds to a horizontal axis in the coordinate space, and the third positional vector corresponds to a normal axis

extending normal to the patient's chest.

5. The method of claim 3, wherein the posture parameter is an angle.

6. The method of claim 5, wherein step (f) further comprises comparing the vector to the coordinate space to determine the angle between the vector and at least one of the three positional vectors.

7. The method of claim 6, wherein step (f) further comprises comparing the vector to the coordinate space to determine the angle between the vector and a vector corresponding to a vertical axis, or a property of the angle between the vector and the vector corresponding to the vertical axis.

8. The method of claim 7, wherein step (g) further comprises comparing the angle to a threshold value that is substantially equivalent to 45 degrees, and wherein the patient's posture is estimated to be upright if the angle is less than the threshold value.

9. The method of claim 7, wherein step (g) further comprises comparing the angle to a threshold value that is substantially equivalent to 45 degrees, and wherein the patient's posture is estimated to be lying down if the angle is greater than the threshold value.

10. The method of claim 9, wherein step (f) further comprises comparing the vector to the coordinate space to determine the angle between the vector and a vector corresponding to a normal axis extending normal to the patient's chest, or a property of the angle between the vector and the vector corresponding to a normal axis extending normal to the patient's chest.

11. The method of claim 10, wherein step (g) further comprises comparing the angle to a threshold value that is substantially equivalent to 35 degrees, and wherein the patient's posture is estimated to be supine if the angle is less than the threshold value.

12. The method of claim 10, wherein step (g) further comprises comparing the angle to a threshold value that is substantially equivalent to 135 degrees, and wherein the patient's posture is estimated to be prone if the angle is greater than the threshold value.

13. The method of claim 9, wherein step (f) further comprises comparing the vector to the coordinate space to determine the angle between the vector and a vector corresponding to a horizontal axis, or a property of the angle between the vector and the vector corresponding to the horizontal axis.

14. The method of claim 13, wherein step (g) further comprises comparing the angle to a threshold value that is substantially equivalent to 90 degrees, and wherein the patient's posture is estimated to be lying on a first side if the angle is less than the threshold value.

15. The method of claim 13, wherein step (g) further comprises comparing the angle to a threshold value that is substantially equivalent to 90 degrees, and wherein the patient's posture is estimated to be lying on a side opposite the first side if the angle is greater than the threshold value.

16. The method of claim 1, wherein step (c) further comprises detecting a set of time-dependent motion waveforms with at least one motion-detecting sensor positioned on the patient's chest.

17. The method of claim 1, where the at least one motion-detecting sensor is an accelerometer.

18. The method of claim 1, wherein step (d) further comprises processing the first and second time-dependent physiological waveforms to calculate a time difference between a feature in the first time-dependent physiological waveform and a feature in the second time-dependent physiological waveform.

19. The method of claim 18, wherein step (d) further comprises calculating a blood pressure from the time difference.

20. The method of claim 18, wherein the first time-dependent physiological waveform is an electrical waveform, and step (a) further comprises detecting the electrical waveform with at least two electrodes attached to the patient and operably connected to

an electrical circuit.

21. The method of claim 20, wherein the second time-dependent physiological waveform is an optical waveform, and step (b) further comprises detecting the optical waveform with an optical sensor comprising a light source and a photodiode.

22. The method of claim 18, wherein each of the first and second time-dependent physiological waveforms are selected from a group consisting of an optical waveform, an electrical waveform, an acoustic waveform, and a pressure waveform.

23. The method of claim 22, wherein and steps (a) and (b) each further comprise detecting a time-dependent physiological waveform with a sensor selected from a group consisting of:

(i) an optical sensor comprising a light source and a photodiode;

(ii) an electrical sensor comprising at least two electrodes for operably connecting to an electrical circuit;

(iii) an acoustic sensor comprising a microphone; and

(iv) a pressure sensor comprising a transducer.

24. A system for measuring vital signs from a patient, comprising:

(a) a first sensor configured to generate a first time-dependent waveform indicative of one or more contractile properties of the patient's heart;

(b) a second sensor configured to generate a second time-dependent waveform indicative of one or more contractile properties of the patient's heart;

(c) at least three motion-detecting sensors for positioning on the forearm, upper arm, and a body location other than the forearm or upper arm of the patient, each of said motion-detecting sensors for generating at least one time-dependent motion waveform indicative of motion of the location on the patient's body to which the motion-detecting sensor is affixed;

(d) a processing component configured to be worn on the patient's body and comprising a microprocessor, said processing component configured to receive the first time-dependent waveform, the second time-dependent waveform, and the at least one time-dependent motion waveform generated by each motion-detecting sensor and to determine therefrom:

(i) a pulse transit time calculated using a time difference between a time-dependent feature in each of the first and second time-dependent waveforms;

(ii) a blood pressure value calculated using said time difference; and

(iii) at least one motion parameter selected from the patient's posture, activity level, and degree of motion calculated using at least one motion waveform generated by each of said motion-detecting sensors; and

(e) a wireless communication system configured to be worn on the patient's body and for operably connecting to the processing component, the wireless system configured to wirelessly transmit the blood pressure value and at least one motion parameter determined by the processing component to a remote receiver.

25. A system for measuring vital signs from a patient, comprising:

(a) a sensor configured to detect a first time-dependent physiological waveform indicative of one or more contractile properties of the patient's heart;

(b) a cable system comprising: an electrical sensor comprising: at least two electrodes configured to detect electrical signals from the patient's body and for operably connecting to an electrical circuit configured to process the detected electrical signals, the electrical sensor being for generating a time-dependent electrical waveform indicative of one or more contractile properties of the patient's heart, and, at least two motion-detecting sensors, each of said motion-detecting sensors being for generating at least one time-dependent motion waveform indicative of motion of the location on the patient's body to which the motion-detecting sensor is affixed; and,

(c) a processing component configured to be worn on the patient's body and comprising a microprocessor and one or more electrical connectors for operably connecting the microprocessor to the sensor and the cable system, said processing component configured to receive the time-dependent electrical waveform, the time-dependent physiological waveform, and the at least one time-dependent motion waveform generated by each motion-detecting sensor and determine therefrom:

(i) at least one vital sign calculated using at least one of the time-dependent physiological waveform and the time-dependent electrical waveform, and

(ii) at least one motion parameter selected from the patient's posture, activity level, arm height, and degree of motion calculated using at least one time-dependent motion waveform generated by each of said motion-detecting sensors.

26. A method for monitoring a patient, comprising the following steps:

(a) detecting a first time-dependent physiological waveform indicative of one or more contractile properties of the patient's heart with a first sensor comprising a first detector configured to be worn on the patient's body;

(b) detecting a second time-dependent physiological waveform indicative of one or more contractile properties of the patient's heart with a second sensor comprising a second detector configured to be worn on the patient's body;

(c) detecting sets of time-dependent motion waveforms with at least two motion-detecting sensors positioned on different locations on the patient's body, wherein each motion-detecting sensor detects a set of motion waveforms indicative of motion of the location on the patient's body to which the motion-detecting sensor is affixed;

(d) processing the first and second time-dependent physiological waveforms to determine at least one vital sign from the patient;

(e) analyzing at least a portion of each set of time-dependent motion waveforms, or a mathematical derivative thereof, to determine a motion parameter;

(f) processing the motion parameter to determine a probability that the patient is undergoing a specific activity state; and

(g) estimating the patient's activity state based on the probability.

27. A system for measuring vital signs from a patient, comprising:

(a) a first sensor configured to generate a first time-dependent waveform indicative of one or more contractile properties of the patient's heart;

(b) a second sensor configured to generate a second time-dependent waveform indicative of one or more contractile properties of the patient's heart;

(c) at least two motion-detecting sensors for positioning on a location selected from a forearm, upper arm, and a body location other than the forearm or upper arm of the patient, each of said motion-detecting sensors being for generating at least one time-dependent motion waveform indicative of motion of the location on the patient's body to which the motion-detecting sensor is affixed; and,

(d) a processing component configured to be worn on the patient's body and comprising a microprocessor, said processing component configured to receive the first time-dependent waveform, the second time-dependent waveform, and the at least one

time-dependent motion waveform generated by each motion-detecting sensor and determine therefrom:

(i) one or more vital signs calculated using the first and second time-dependent waveforms;

(ii) at least one motion parameter selected from the patient's posture, activity level, arm height, and degree of motion and calculated using at least one motion waveform generated by each of said motion-detecting sensors; and

(iii) at least one alarm condition calculated using one or more of the vital signs and at least one motion parameter, for an alarm condition indicated by a variance in one or more of the vital signs to be regulated according to one or more motion parameters.