

ALLNAMES:(A&K ROBOTICS INC)

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Machine translation

1. [20200315421](#) WET FLOOR DETECTION AND NOTIFICATION

US - 08.10.2020

Int.Class [A47L 11/29](#) Appl.No 16821610 Applicant A&K Robotics Inc. Inventor Anson Yan Shun KUNG

Methods, systems and apparatus for providing a notification of a wet floor are provided. A scrubbing robot for scrubbing a floor and having one or more liquid carrying components has a sensor coupled to it positioned for collecting data about an area of the floor proximate to the scrubbing robot and along a path over which the robot has travelled. An application is stored on the computer for determining that liquid is on the floor by analysing the data for a presence of a second set of parameters corresponding to or crossing (from above to below or from below to above) a set of threshold parameters that is indicative of the presence of liquid on the floor. A notification module coupled to the scrubbing robot issues at least one of a human detectable and a computer detectable notification in response to the application determining that liquid is on the floor.

2. [20190179307](#) AUTOSCRUBBER CONVERTIBLE BETWEEN MANUAL AND AUTONOMOUS OPERATION

US - 13.06.2019

Int.Class [G05D 1/00](#) Appl.No 16152984 Applicant A&K Robotics Inc. Inventor Matthew Henry Anderson

Autoscrubbers are capable of being operated in a manual [e.g. walk-behind] mode and an autonomous [operator free] mode and capable of switching between such operational modes. Apparatus and methods for steering such autoscrubbers use steering torque mechanisms to apply steering torques independently to left and right drive wheels. Steering systems for autonomous operation may be retrofit onto existing walk-behind autoscrubbers to implement this functionality. The autonomous control capability may not detract appreciably from an operator's ability to use the autoscrubber in a manual [walk-behind] mode.

3. [2990669](#) METHODS AND SYSTEMS FOR DISPATCHING ASSISTANCE TO ROBOTS

CA - 03.07.2018

Int.Class [G06Q 10/06](#) Appl.No 2990669 Applicant A&K ROBOTICS INC. Inventor

Methods, systems, and techniques are disclosed for selecting and dispatching a worker to assist a robot. The system may include a computer comprising a processor and a computer readable memory. The computer readable memory may include lists of worker criteria items for a plurality of workers and a list of assistance criteria items for a robot. The system may include a triggering application executable by the processor for identifying triggering data corresponding to a triggering item within sensor data from the robot. A ranking application may also be stored on the computer and may be executed in response to an identification of triggering data corresponding to the triggering item. The ranking application may be operable to cross-reference the worker criteria items on each of the first lists with the assistance criteria items on the second list and to generate a ranking of the plurality of workers based on the cross-referencing.

4. [20180189748](#) METHODS AND SYSTEMS FOR DISPATCHING ASSISTANCE TO ROBOTS

US - 05.07.2018

Int.Class [G06Q 10/00](#) Appl.No 15859886 Applicant A&K Robotics Inc. Inventor Matthew Henry Anderson

Methods, systems, and techniques are disclosed for selecting and dispatching a worker to assist a robot. The system may include a computer comprising a processor and a computer readable memory. The computer readable memory may include lists of worker criteria items for a plurality of workers and a list of assistance criteria items for a robot. The system may include a triggering application executable by the processor for identifying triggering data corresponding to a triggering item within sensor data from the robot. A ranking application may also be stored on the computer and may be executed in response to an identification of triggering data corresponding to the triggering item. The ranking application may be operable to cross-reference the worker criteria items on each of the first lists with the assistance criteria items on the second list and to generate a ranking of the plurality of workers based on the cross-referencing.

5. [20210011474](#) AUTOSCRUBBER CONVERTIBLE BETWEEN MANUAL AND AUTONOMOUS OPERATION

US - 14.01.2021

Int.Class [G05D 1/00](#) Appl.No 17035006 Applicant A&K Robotics Inc. Inventor Matthew Henry Anderson

Autoscrubbers are capable of being operated in a manual [e.g. walk-behind] mode and an autonomous [operator free] mode and capable of switching between such operational modes. Apparatus and methods for steering such autoscrubbers use steering torque mechanisms to apply steering torques independently to left and right drive wheels. Steering systems for autonomous operation may be retrofit onto existing walk-behind autoscrubbers to

implement this functionality. The autonomous control capability may not detract appreciably from an operator's ability to use the autoscrubber in a manual [walk-behind] mode.

6. **3076056** WET FLOOR DETECTION AND NOTIFICATION

CA - 28.03.2019

Int.Class A47L 11/40 Appl.No 3076056 Applicant A&K ROBOTICS INC. Inventor

Methods, systems and apparatus for providing a notification of a wet floor are provided. A scrubbing robot for scrubbing a floor and having one or more liquid carrying components has a sensor coupled to it positioned for collecting data about an area of the floor proximate to the scrubbing robot and along a path over which the robot has travelled. An application is stored on the computer for determining that liquid is on the floor by analysing the data for a presence of a second set of parameters corresponding to or crossing [from above to below or from below to above] a set of threshold parameters that is indicative of the presence of liquid on the floor. A notification module coupled to the scrubbing robot issues at least one of a human detectable and a computer detectable notification in response to the application determining that liquid is on the floor.

7. **3684239** WET FLOOR DETECTION AND NOTIFICATION

EP - 29.07.2020

Int.Class A47L 11/40 Appl.No 18859121 Applicant A&K ROBOTICS INC Inventor KUNG ANSON YAN SHUN

Methods, systems and apparatus for providing a notification of a wet floor are provided. A scrubbing robot for scrubbing a floor and having one or more liquid carrying components has a sensor coupled to it positioned for collecting data about an area of the floor proximate to the scrubbing robot and along a path over which the robot has travelled. An application is stored on the computer for determining that liquid is on the floor by analysing the data for a presence of a second set of parameters corresponding to or crossing [from above to below or from below to above] a set of threshold parameters that is indicative of the presence of liquid on the floor. A notification module coupled to the scrubbing robot issues at least one of a human detectable and a computer detectable notification in response to the application determining that liquid is on the floor.

8. **WO/2019/056124** WET FLOOR DETECTION AND NOTIFICATION

WO - 28.03.2019

Int.Class A47L 11/40 Appl.No PCT/CA2018/051195 Applicant A&K ROBOTICS INC. Inventor KUNG, Anson Yan Shun

Methods, systems and apparatus for providing a notification of a wet floor are provided. A scrubbing robot for scrubbing a floor and having one or more liquid carrying components has a sensor coupled to it positioned for collecting data about an area of the floor proximate to the scrubbing robot and along a path over which the robot has travelled. An application is stored on the computer for determining that liquid is on the floor by analysing the data for a presence of a second set of parameters corresponding to or crossing [from above to below or from below to above] a set of threshold parameters that is indicative of the presence of liquid on the floor. A notification module coupled to the scrubbing robot issues at least one of a human detectable and a computer detectable notification in response to the application determining that liquid is on the floor.

9. **20180161980** METHODS AND SYSTEMS FOR BILLING ROBOT USE

US - 14.06.2018

Int.Class G06Q 40/00 Appl.No 15836742 Applicant A&K Robotics Inc. Inventor Matthew Henry Anderson

Methods and systems for billing the use of a robot, including methods and systems for reducing a robot's functionality based on a user's account information. In some embodiments, the system comprises a computer readable memory comprising a database with a user's account information, a processor operably coupled to the computer readable memory and to a robot, a checking application stored on the computer readable memory and executable by the processor for determining if the user's account is active based on the account data and a functionality reducing application stored on the computer readable memory executable by the processor for reducing the robot's functionality to a reduced state if the checking application determines the user's account is not active and limiting the robot's functionality to the reduced state until the checking application determines that the user's account is active.

10. **2988291** METHODS AND SYSTEMS FOR BILLING ROBOT USE

CA - 08.06.2018

Int.Class G06Q 30/04 Appl.No 2988291 Applicant A&K ROBOTICS INC. Inventor

Methods and systems for billing the use of a robot, including methods and systems for reducing a robot's functionality based on a user's account information. In some embodiments, the system comprises a computer readable memory comprising a database with a user's account information, a processor operably coupled to the computer readable memory and to a robot, a checking application stored on the computer readable memory and executable by the processor for determining if the user's account is active based on the account data and a functionality reducing application stored on the computer readable memory executable by the processor for reducing the robot's functionality to a reduced state if the checking application determines the user's account is not active and limiting the robot's functionality to the reduced state until the checking application determines that the user's account is active.

11. **WO/2017/173553** AUTOSCRUBBER CONVERTIBLE BETWEEN MANUAL AND AUTONOMOUS OPERATION

WO - 12.10.2017

Int.Class A47L 11/28 Appl.No PCT/CA2017/050430 Applicant A&K ROBOTICS INC. Inventor ANDERSON, Matthew Henry

Autoscrubbers are capable of being operated in a manual [e.g. walk-behind] mode and an autonomous [operator free] mode and capable of switching between such operational modes. Apparatus and methods for steering such autoscrubbers use steering torque mechanisms to apply steering torques independently to left and right drive wheels. Steering systems for autonomous operation may be retrofit onto existing walk-behind autoscrubbers to



implement this functionality. The autonomous control capability may not detract appreciably from an operator's ability to use the autoscrubber in a manual [walk-behind] mode.

12. **3020184** AUTOSCRUBBER CONVERTIBLE BETWEEN MANUAL AND AUTONOMOUS OPERATION

CA - 12.10.2017

Int.Class A47L 11/28 Appl.No 3020184 Applicant A&K ROBOTICS INC. Inventor

Autoscrubbers are capable of being operated in a manual [e.g. walk-behind] mode and an autonomous [operator free] mode and capable of switching between such operational modes. Apparatus and methods for steering such autoscrubbers use steering torque mechanisms to apply steering torques independently to left and right drive wheels. Steering systems for autonomous operation may be retrofit onto existing walk-behind autoscrubbers to implement this functionality. The autonomous control capability may not detract appreciably from an operator's ability to use the autoscrubber in a manual [walk-behind] mode.

13. **3439522** AUTOSCRUBBER CONVERTIBLE BETWEEN MANUAL AND AUTONOMOUS OPERATION

EP - 13.02.2019

Int.Class A47L 11/28 Appl.No 17778526 Applicant A&K ROBOTICS INC Inventor ANDERSON MATTHEW HENRY

Autoscrubbers are capable of being operated in a manual [e.g. walk-behind] mode and an autonomous [operator free] mode and capable of switching between such operational modes. Apparatus and methods for steering such autoscrubbers use steering torque mechanisms to apply steering torques independently to left and right drive wheels. Steering systems for autonomous operation may be retrofit onto existing walk-behind autoscrubbers to implement this functionality. The autonomous control capability may not detract appreciably from an operator's ability to use the autoscrubber in a manual [walk-behind] mode.

14. **WO/1993/013915** METHOD FOR EFFICIENTLY TRANSFERRING A WORKPIECE FROM A FIRST STATION TO A SECOND STATION

WO - 22.07.1993

Int.Class B21D 43/05 Appl.No PCT/US1992/010310 Applicant FANUC ROBOTICS NORTH AMERICA, INC. Inventor AKEEL, Hadi, A.

A method and system are provided for efficiently transferring a workpiece [P] from a first work station including a first sheet [106] metal press to a second sheet metal press [108] by providing a pendulum-type robot [112], including an arm assembly [112] mounted on a support structure [100] to swing about a first axis [116] located above and between the first and second presses [106, 108]. The arm assembly [112] not only swings about a first axis [116] but also rotates about a second axis [126] orthogonal to the first axis [116] and a third axis [136] which is orthogonal to the second axis [126]. During swinging movement of the arm assembly [112] about the first axis [116] rotation of the arm assembly about the second and third axes [126, 136] allows a center of gravity of the workpiece [P] to follow a substantially straight line path between the first and second presses [106, 108]. The arm assembly includes first and second fourbar linkages which are pivotally connected together to rotate about the second axis.

15. **20210374659** REAL TIME EVENT TRACKING AND DIGITIZATION FOR WAREHOUSE INVENTORY MANAGEMENT

US - 02.12.2021

Int.Class G06Q 10/08 Appl.No 17331853 Applicant Vimaan Robotics, Inc. Inventor Srinivasan K. Ganapathi

Tracking and digitization method and system for warehouse inventory management is provided to greatly increase the visibility of the events at a warehouse, provide a comprehensive cataloging of every single event, compare that event against the expected event, and report any discrepancies immediately so that they can be fixed prior to causing costly mistakes. Further, it reduces the need for costly quality control personnel in the warehouse. Embodiments of this invention greatly enhance the accuracy of inventory, at a vastly reduced cost. In an indoor environment, GPS cannot be used to track the location of the forklifts or vehicles in the warehouse because most warehouses have metal constructions and present a "GPS denied" environment. Hence one must resort to vision, lidar, or inertial, or a combination of such sensors to accurately track location.

16. **WO/2021/242957** REAL TIME EVENT TRACKING AND DIGITIZATION FOR WAREHOUSE INVENTORY MANAGEMENT

WO - 02.12.2021

Int.Class G06F 7/00 Appl.No PCT/US2021/034415 Applicant VIMAAN ROBOTICS, INC. Inventor GANAPATHI, Srinivasan, K.

Tracking and digitization method and system for warehouse inventory management is provided to greatly increase the visibility of the events at a warehouse, provide a comprehensive cataloging of every single event, compare that event against the expected event, and report any discrepancies immediately so that they can be fixed prior to causing costly mistakes. Further, it reduces the need for costly quality control personnel in the warehouse. Embodiments of this invention greatly enhance the accuracy of inventory, at a vastly reduced cost. In an indoor environment, GPS cannot be used to track the location of the forklifts or vehicles in the warehouse because most warehouses have metal constructions and present a "GPS denied" environment. Hence one must resort to vision, lidar, or inertial, or a combination of such sensors to accurately track location.

17. **5423648** METHOD AND SYSTEM FOR QUICKLY AND EFFICIENTLY TRANSFERRING A WORKPIECE FROM A FIRST STATION TO A SECOND STATION

US - 13.06.1995

Int.Class B65H 5/12 Appl.No 07823206 Applicant FANUC Robotics North America, Inc. Inventor Akeel Hadi A.

A method and system are provided for quickly and efficiently transferring a workpiece from a first work station including a first sheet metal press to a second sheet metal press by providing a pendulum-type robot, including an arm assembly mounted on a support structure to swing about a first axis located above and between the first and second presses. The arm assembly not only swings about a first axis but also rotates about a second axis orthogonal to the first axis and a third axis which is orthogonal to the second axis. During swinging movement of the arm assembly about the first axis, rotation of the arm assembly about the second and third axes allows a center of gravity of the workpiece to follow a substantially straight line path between the first and second presses. The arm assembly includes first and second four-bar linkages, which are pivotally connected together to rotate about the second axis. Preferably, a wrist mechanism is provided to permit rotation of the part between the presses. Also preferably, a counterbalance mechanism in the form of a cable balancing device is provided to support the arm assembly against gravity.

18. **1149439** APPARATUS AND METHOD FOR PROTECTING COMPONENTS OF A LIGHT SOURCE

EP - 31.10.2001

Int.Class H01S 3/00 Appl.No 99967491 Applicant CELL ROBOTICS INC Inventor LOHRDING RONALD K

An apparatus and method for protecting at least one component [12] of a light source [11] are provided. The apparatus [20-20d] includes a shield [23, 41, 44, 45] for the component, with this shield having a plurality of locations that are substantially transparent to an emission wave length of the light source [11]. The shield [23, 41, 44, 45] is positioned such that during use of the light source, one of the substantially transparent locations of the shield is disposed between the at least one component [12] of the light source [11] and an object that is to be irradiated. The apparatus also includes a mechanism [32] for advancing the shield [23, 41, 44, 45] upon activation of the light source [11] or an element thereof in order to be able to dispose a different one of the



substantially transparent locations of the shield [23, 41, 44, 45] between the at least one component [12] of the light source [11] and an object that is to be irradiated.

19. [6233269](#) APPARATUS AND METHOD FOR PROTECTING COMPONENTS OF A LIGHT SOURCE

US - 15.05.2001

Int.Class [H01S 3/00](#) Appl.No 09212545 Applicant Cell Robotics, Inc. Inventor Lohrding, Ronald K.

An apparatus and method for protecting at least one component of a light source are provided. The apparatus includes a shield for the component, with this shield having a plurality of locations that are substantially transparent to an emission wave length of the light source. The shield is positioned such that during use of the light source, one of the substantially transparent locations of the shield is disposed between the at least one component of the light source and an object that is to be irradiated. The apparatus also includes a mechanism for advancing the shield upon activation of the light source or an element thereof in order to be able to dispose a different one of the substantially transparent locations of the shield between the at least one component of the light source and an object that is to be irradiated.

20. [2000023761](#) APPARATUS AND METHOD FOR PROTECTING COMPONENTS OF A LIGHT SOURCE

AU - 31.08.2000

Int.Class [H01S 5/022](#) Appl.No 23761/00 Applicant Cell Robotics, Inc. Inventor Conia, Jerome

An apparatus and method for protecting at least one component [12] of a light source [11] are provided. The apparatus [20-20d] includes a shield [23, 41, 44, 45] for the component, with this shield having a plurality of locations that are substantially transparent to an emission wave length of the light source [11]. The shield [23, 41, 44, 45] is positioned such that during use of the light source, one of the substantially transparent locations of the shield is disposed between the at least one component [12] of the light source [11] and an object that is to be irradiated. The apparatus also includes a mechanism [32] for advancing the shield [23, 41, 44, 45] upon activation of the light source [11] or an element thereof in order to be able to dispose a different one of the substantially transparent locations of the shield [23, 41, 44, 45] between the at least one component [12] of the light source [11] and an object that is to be irradiated.

21. [WO/2000/036711](#) APPARATUS AND METHOD FOR PROTECTING COMPONENTS OF A LIGHT SOURCE

WO - 22.06.2000

Int.Class [A61B 18/20](#) Appl.No PCT/US1999/030536 Applicant CELL ROBOTICS, INC. Inventor LOHRDING, Ronald, K.

An apparatus and method for protecting at least one component [12] of a light source [11] are provided. The apparatus [20-20d] includes a shield [23, 41, 44, 45] for the component, with this shield having a plurality of locations that are substantially transparent to an emission wave length of the light source [11]. The shield [23, 41, 44, 45] is positioned such that during use of the light source, one of the substantially transparent locations of the shield is disposed between the at least one component [12] of the light source [11] and an object that is to be irradiated. The apparatus also includes a mechanism [32] for advancing the shield [23, 41, 44, 45] upon activation of the light source [11] or an element thereof in order to be able to dispose a different one of the substantially transparent locations of the shield [23, 41, 44, 45] between the at least one component [12] of the light source [11] and an object that is to be irradiated.

22. [5993439](#) LENS SHIELD FOR LASER SKIN PERFORATION

US - 30.11.1999

Int.Class [A61B 17/36](#) Appl.No 08841005 Applicant Cell Robotics, Inc. Inventor Costello David J.

A lens shield system for shielding a laser source of a system used for collecting capillary blood or fluid from skin, the lens shield comprising a strap apparatus releasably emplaceable around a member of a living being, the member having skin thereon and blood therein, and a lens shield member connected to the strap and disposed for receiving and for transmission therethrough of a laser beam from the laser source directed at the skin. A removable lens shield for shielding a laser source of a collection system used for perforating skin and collecting blood or fluid therein or therebeneath, the collection system in a housing, the lens shield comprising a body sized and configured for removable emplacement in the housing of the collection system between the laser source and the skin, and a window in the body through which the laser beam is transmissible prior to contacting the skin. A method for collecting fluid from a living being has been invented which uses the devices mentioned above. PAL A new laser perforator has been invented for perforating skin with a perforation to permit blood under a surface of the skin to flow out, the perforator in one embodiment having a laser light source for producing an output laser beam, and a mode distribution apparatus for intercepting the output laser beam to control distribution of laser energy of the output laser beam across the perforation of the skin.

23. [WO/2018/191710](#) LEG EXOSKELETON SYSTEM AND METHOD

WO - 18.10.2018

Int.Class [A61H 3/00](#) Appl.No PCT/US2018/027643 Applicant ROAM ROBOTICS INC. Inventor LAMB, Callum Russell

A fluidic exoskeleton system. The system can include one or more fluidic actuator units that have: a joint; a first and second arm coupled to the joint; an inflatable bellows actuator extending between a first and second plate associated with the joint, the inflatable bellows actuator defining a bellows cavity, the inflatable bellows actuator configured to extend along a length of the bellows actuator when inflated by introducing fluid into the bellows cavity; and one or more constraint ribs extending from the joint and surrounding portions of the bellows actuator along the length of the bellows actuator.

24. [WO/2021/046323](#) AUTONOMOUS VEHICLE WAREHOUSE INVENTORY INSPECTION AND MANAGEMENT

WO - 11.03.2021

Int.Class [G06Q 10/08](#) Appl.No PCT/US2020/049364 Applicant VIMAAN ROBOTICS, INC. Inventor GANAPATHI, Srinivasan K.

Autonomous vehicle inventory inspection and management is provided for a GPS-denied indoor warehouse with the objective of achieving fast, yet accurate warehouse inventory assessment. The warehouse stores inventory organized in a distributed and substantially parallel fashion. Passive identification markers are located on the racks for aiding navigation of the autonomous vehicle. Travel paths for the autonomous vehicle are predefined. They are relatively straight paths in between the racks, substantially constant and lateral first distance relative to at least one of two racks along its row, a substantially constant first height relative to a warehouse floor and a substantially constant speed for the autonomous vehicle. These requirements are important to attain the objective of faster, yet accurate inventory inspection and management. During travel, acquisition systems capture information of the inventory, which is synchronized with a digital management system. Inventory is reconstructed providing a digital twin of the warehouse inventory.

25. [WO/2018/144937](#) SYSTEM AND METHOD FOR USER INTENT RECOGNITION

WO - 09.08.2018

Int.Class [A61H 3/00](#) Appl.No PCT/US2018/016729 Applicant ROAM ROBOTICS INC. Inventor SWIFT, Tim

The disclosure includes a method of operating an exoskeleton system. The method includes determining a first state estimate for a current classification program being implemented by the exoskeleton system, determining a second state estimate for a reference classification program; determining that a difference between the first and second state estimate is greater than a classification program replacement threshold; generating an updated classification



program; and replacing the current classification program with the updated classification program based at least in part on the determining that the difference between the first and second state estimates is greater than the classification program replacement threshold.

26. [3980853](#) SAFE OPERATION OF MACHINERY USING POTENTIAL OCCUPANCY ENVELOPES

EP - 13.04.2022

Int.Class [G05B 19/4061](#) Appl.No 20857251 Applicant VEO ROBOTICS INC Inventor KRIVESHKO ILYA A

Various embodiments for enforcing safe operation of machinery performing an activity in a three-dimensional (3D) workspace includes computationally generating a 3D spatial representation of the workspace; computationally mapping 3D regions of the workspace corresponding to space occupied by the machinery and a human; and based thereon, restricting operation of the machinery in accordance with a safety protocol during physical performance of the activity.

27. [WO/2021/041213](#) SAFE OPERATION OF MACHINERY USING POTENTIAL OCCUPANCY ENVELOPES

WO - 04.03.2021

Int.Class [G05B 19/4061](#) Appl.No PCT/US2020/047399 Applicant VEO ROBOTICS, INC. Inventor KRIVESHKO, Ilya A.

Various embodiments for enforcing safe operation of machinery performing an activity in a three-dimensional (3D) workspace includes computationally generating a 3D spatial representation of the workspace; computationally mapping 3D regions of the workspace corresponding to space occupied by the machinery and a human; and based thereon, restricting operation of the machinery in accordance with a safety protocol during physical performance of the activity.

28. [WO/2021/242980](#) USER INTERFACE AND FEEDBACK SYSTEMS AND METHODS FOR A MOBILE ROBOT

WO - 02.12.2021

Int.Class [A61H 3/00](#) Appl.No PCT/US2021/034450 Applicant ROAM ROBOTICS INC. Inventor KEMPER, Kevin Conrad

An exoskeleton system comprising at least one leg actuator unit configured to be coupled to leg of a user, the leg actuator unit including: an upper arm and a lower arm that are rotatably coupled via a joint, the joint positioned at a knee of the user with the upper arm coupled about an upper leg portion of the user above the knee and with the lower arm coupled about a lower leg portion of the user below the knee, a leg-actuator-unit user interface comprising a plurality of input and feedback elements, and an actuator that extends between the upper arm and lower arms.

29. [WO/2021/242991](#) DATA LOGGING AND THIRD-PARTY ADMINISTRATION OF A MOBILE ROBOT

WO - 02.12.2021

Int.Class [A61H 3/00](#) Appl.No PCT/US2021/034468 Applicant ROAM ROBOTICS INC. Inventor STUART, Robert

A method of configuring one or more exoskeleton systems in an exoskeleton network, the method comprising: receiving exoskeleton data from one or more exoskeleton systems that are operably connected to a network; storing the exoskeleton data from the one or more exoskeleton systems; generating a configuration input for configuring at least one of the one or more exoskeleton systems; and sending the generated configuration input to the at least one of the one or more exoskeleton systems via the network to cause the at least one of the one or more exoskeleton systems to be configured based at least in part on the generated configuration input.

30. [WO/2021/173860](#) FLUIDIC ACTUATOR SYSTEMS AND METHODS FOR MOBILE ROBOTS

WO - 02.09.2021

Int.Class [A61H 3/00](#) Appl.No PCT/US2021/019711 Applicant ROAM ROBOTICS INC. Inventor CHAU, James

An exoskeleton system comprising an inflatable actuator configured to be worn by a user. The inflatable actuator includes a fluid-impermeable member that defines a fluid chamber at least in part by a membrane material and a first and second interface that each define sidewalls, the membrane material is coupled to the sidewalls of the first and second interfaces.

31. [WO/2021/243056](#) METHODS FOR IMPROVED USER MOBILITY AND TREATMENT

WO - 02.12.2021

Int.Class [A61H 3/00](#) Appl.No PCT/US2021/034579 Applicant ROAM ROBOTICS INC. Inventor SWARTZ, Ashley

A method of configuring a treatment regimen of one or more exoskeleton systems in an exoskeleton network, the method comprising: receiving exoskeleton data from one or more exoskeleton systems that are operably connected to a network; storing the exoskeleton data from the one or more exoskeleton systems; generating a configuration input for configuring at least one of the one or more exoskeleton systems the configuration input including a replacement for or update to a current medical treatment regimen being implemented by the at least one of the one or more exoskeleton systems; and sending the generated configuration input to the at least one of the one or more exoskeleton systems via the network to cause replacing or updating the current medical treatment regimen being implemented by the at least one of the one or more exoskeleton systems.

32. [WO/2021/242975](#) BATTERY SYSTEMS AND METHODS FOR A MOBILE ROBOT

WO - 02.12.2021

Int.Class [A61H 3/00](#) Appl.No PCT/US2021/034444 Applicant ROAM ROBOTICS INC. Inventor CAMPBELL, Austin

An exoskeleton system comprising: a power system that powers the exoskeleton system, the power system including one or more battery slots, and a modular battery set that includes one or more battery units that are modular such that any of the one or more battery units can be readily and quickly removed and coupled within any of the one or more battery slots to provide power to the exoskeleton system.

33. [WO/2021/242977](#) CONTROL SYSTEM AND METHOD FOR A MOBILE ROBOT

WO - 02.12.2021

Int.Class [A61H 3/00](#) Appl.No PCT/US2021/034447 Applicant ROAM ROBOTICS INC. Inventor STUART, Robert

A method of operating an exoskeleton system comprising: obtaining a set of sensor data from at least sensors associated with one or more actuator units; determining a maneuver state based at least in part on the set of sensor data; determining a configuration of the one or more actuator units based at least in part on the set of sensor data; generating one or more reference targets for the one or more actuator units based at least in part on the determined maneuver state; determining that the one or more actuator units is outside of a generated reference target one or more actuator units; and causing the one or more actuator units to be configured to be within the generated reference target for the one or more actuator units.



34. [WO/2021/119512](#) POWERED DEVICE TO BENEFIT A WEARER DURING SKIING

WO - 17.06.2021

Int.Class [A61H 3/00](#) Appl.No PCT/US2020/064647 Applicant ROAM ROBOTICS INC. Inventor LAMSON, Kyle Allen

One aspect includes an exoskeleton system having at least one actuator unit configured to be coupled to a leg of a user. The actuator unit includes an upper and lower arm that are rotatably coupled via a joint at a knee of the user with the upper and lower arms coupled above and below the knee respectively; and a fluidic actuator that extends between the upper and lower arms. In another aspect, a method includes obtaining a set of sensor data from sensors associated with the actuator unit during an activity and determining to change configuration of the actuator unit to a second configuration state to support the user during the activity; and introducing fluid to the fluidic actuator of the actuator unit to generate the second configuration state by causing the one fluidic actuator to apply force at the actuator unit.

35. [WO/2021/242742](#) DIRECT DRIVE PNEUMATIC TRANSMISSION FOR A MOBILE ROBOT

WO - 02.12.2021

Int.Class [A61H 3/00](#) Appl.No PCT/US2021/034030 Applicant ROAM ROBOTICS INC. Inventor SAMIA, Elias R.

An exoskeleton system comprising a fluidic actuator and a power transmission that includes: a transmission body that defines a transmission chamber configured to hold a fluid, the transmission body having a first and second end, and a piston that translates within the transmission chamber between the first and second ends of the transmission body, with translation of the piston within the transmission chamber changing a volume of the transmission chamber. The exoskeleton system also includes a mechanical power source coupled to the power transmission configured to cause the piston to translate within respective transmission body to change the volume of the transmission cavity; and a first fluid line that couples the power transmission to the fluidic actuator.

36. [WO/2019/046489](#) EXOSKELETON FIT EVALUATION SYSTEM AND METHOD

WO - 07.03.2019

Int.Class [A61H 3/00](#) Appl.No PCT/US2018/048639 Applicant ROAM ROBOTICS INC. Inventor LAMB, Callum

A method of performing a fit test on an actuator unit coupled to a user. The method includes determining a first configuration of the actuator unit while the actuator unit is in an un-actuating state and while the user is in a fit test position; actuating the actuator unit; determining a second configuration of the actuator unit generated in response to the actuating the leg actuator unit; determining a change in configuration of the actuator unit based at least in part on the difference between the first and second configuration; and determining that the change in configuration corresponds to an improper fit of the actuator unit to the user.

37. [WO/2019/046488](#) SEMI-SUPERVISED INTENT RECOGNITION SYSTEM AND METHOD

WO - 07.03.2019

Int.Class [A61H 3/00](#) Appl.No PCT/US2018/048638 Applicant ROAM ROBOTICS INC. Inventor SWIFT, Tim

A computer implemented method of semi-supervised intent recognition for an exoskeleton system. In one aspect, the method includes, in response to a state transition intention input, changing the exoskeleton system from operating in a first mode with sensitivity to detecting state transitions at a first sensitivity level to operating in a second mode with sensitivity to detecting state transitions at a second sensitivity level that is more sensitive than the first sensitivity level; identifying a state transition while operating in the second mode and using the second sensitivity level; and facilitating the identified state transition by actuating the exoskeleton system.

38. [WO/2018/097971](#) AUTONOMOUS PATH TREATMENT SYSTEMS AND METHODS

WO - 31.05.2018

Int.Class [E01H 5/04](#) Appl.No PCT/US2017/060882 Applicant LEFT HAND ROBOTICS, INC. Inventor OTT, Michael John

An autonomous path treatment system and associated path treatment method uses a mobile path recording device having a locator, a processor and firmware to capture a sequence of coordinates and directions of travel of a path as the mobile device is moved along the path and generate a path program file. The system also has an autonomous path treatment robot having: a treatment mechanism for treating the path; a controller having a processor and memory storing firmware that when executed obeys steps of the path program file to control the motor and the treatment mechanism to treat the path; and a server configured to execute a path program to process the captured sequence of coordinates and directions into the path program file containing instructions for controlling the autonomous path treatment robot to treat the path based upon the coordinates.

39. [WO/2021/242974](#) FIT AND SUSPENSION SYSTEMS AND METHODS FOR A MOBILE ROBOT

WO - 02.12.2021

Int.Class [A61H 3/00](#) Appl.No PCT/US2021/034443 Applicant ROAM ROBOTICS INC. Inventor LAMB, Callum

An exoskeleton system comprising a leg actuator unit that is configured to be coupled to a leg of a user. The leg actuator unit includes: an upper arm and a lower arm that are rotatably coupled via a rotatable joint, the rotatable joint configured to be positioned at a knee of the user with the upper arm coupled about an upper-leg portion of the user above the knee and with the lower arm coupled about a lower-leg portion of the user below the knee. The upper arm is configured to be coupled to the upper-leg portion above the knee via a first set of couplers that includes a first upper-leg coupler, the lower arm is configured to be coupled to the lower-leg portion below the knee via a second set of couplers that includes one or more lower-leg couplers associated with a lower-leg brace, and an actuator extends between the upper arm and lower arm, the actuator configurable to move the upper arm and lower arm.

40. [WO/2021/243064](#) MODULAR EXOSKELETON SYSTEMS AND METHODS

WO - 02.12.2021

Int.Class [A61H 3/00](#) Appl.No PCT/US2021/034593 Applicant ROAM ROBOTICS INC. Inventor NUCCI, Giancarlo

A method of operating a modular exoskeleton system, the method comprising: monitoring for one or more actuator units being operably coupled to or removed from the modular exoskeleton system, the modular exoskeleton system comprising at least a first actuator unit configured to be operably coupled and removed from the modular exoskeleton system; determining that the first actuator unit has been operably coupled to the modular exoskeleton system; determining the first actuator unit has been associated with a first body portion of the user; determining a first new operating configuration based at least in part on the determination that the first actuator unit has been operably coupled to the modular exoskeleton system and the determination that the first actuator unit has been associated with the first body portion of the user; and setting the first new operating configuration for the modular exoskeleton system.

41. [108778640](#) SOFT ROBOTIC GRIPPERS FOR CLUTTERED GRASPING ENVIRONMENTS, HIGH ACCELERATION MOVEMENTS, FOOD MANIPULATION, AND AUTOMATED STORAGE AND RETRIEVAL SYSTEMS

CN - 09.11.2018

Int.Class [B25J 15/00](#) Appl.No 201780018217.7 Applicant SOFT ROBOTICS, INC. Inventor LESSING JOSHUA A

Exemplary embodiments relate to soft robotic gripper systems suited to grasping target objects [210] in cluttered environments. Some embodiments provide extension rods [208], hinges [204, 208], and/or rails [604-1, 604-2] that allow a soft robotic actuator [100] to be extended towards or away from a robotic base and/or other actuators. Accordingly, a gripper including the actuator may be reconfigured into a size and/or shape that allows for improved access to the cluttered environment. Further embodiments relate to soft robotic gripper systems for supporting grasped objects during high acceleration movements using vacuum, gripper, and/or bellows devices. Still further embodiments relate to specialized grippers for manipulating food items.

42. 105939647 SYSTEM FOR ROBOTIC-ASSISTED ENDOLUMENAL SURGERY AND RELATED METHODS

CN - 14.09.2016

Int.Class A61B 1/00 **Appl.No** 201480070794.7 **Applicant** AURIS SURGICAL ROBOTICS, INC. **Inventor** ALVAREZ JEFFREY B.

An endolumenal robotic system provides the surgeon with the ability to drive a robotically-driven endoscopic device to a desired anatomical position in a patient without the need for awkward motions and positions, while also enjoying improved image quality from a digital camera mounted on the endoscopic device.

43. 110300889 INSPECTION ROBOT

CN - 01.10.2019

Int.Class G01N 29/22 **Appl.No** 201780087313.7 **Applicant** GECKO ROBOTICS INC. **Inventor** LOOSARARIAN MARK

A system includes an inspection robot having mounted sleds, and a number of sensors each mounted to a sled. A couplant chamber is disposed within at least two of the sleds, each couplant chamber between a transducer of the sensor and an inspection surface. Each couplant chamber includes a cone, the cone having a cone tip portion at an inspection surface end, and a sensor mounting end opposite the cone tip portion. A couplant entry for each couplant chamber is at a vertically upper side of the cone in the intended orientation of the inspection robot on the inspection surface.

