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(54) **A SERVICE SYSTEM OF AN AIR CONDITIONING SYSTEM**

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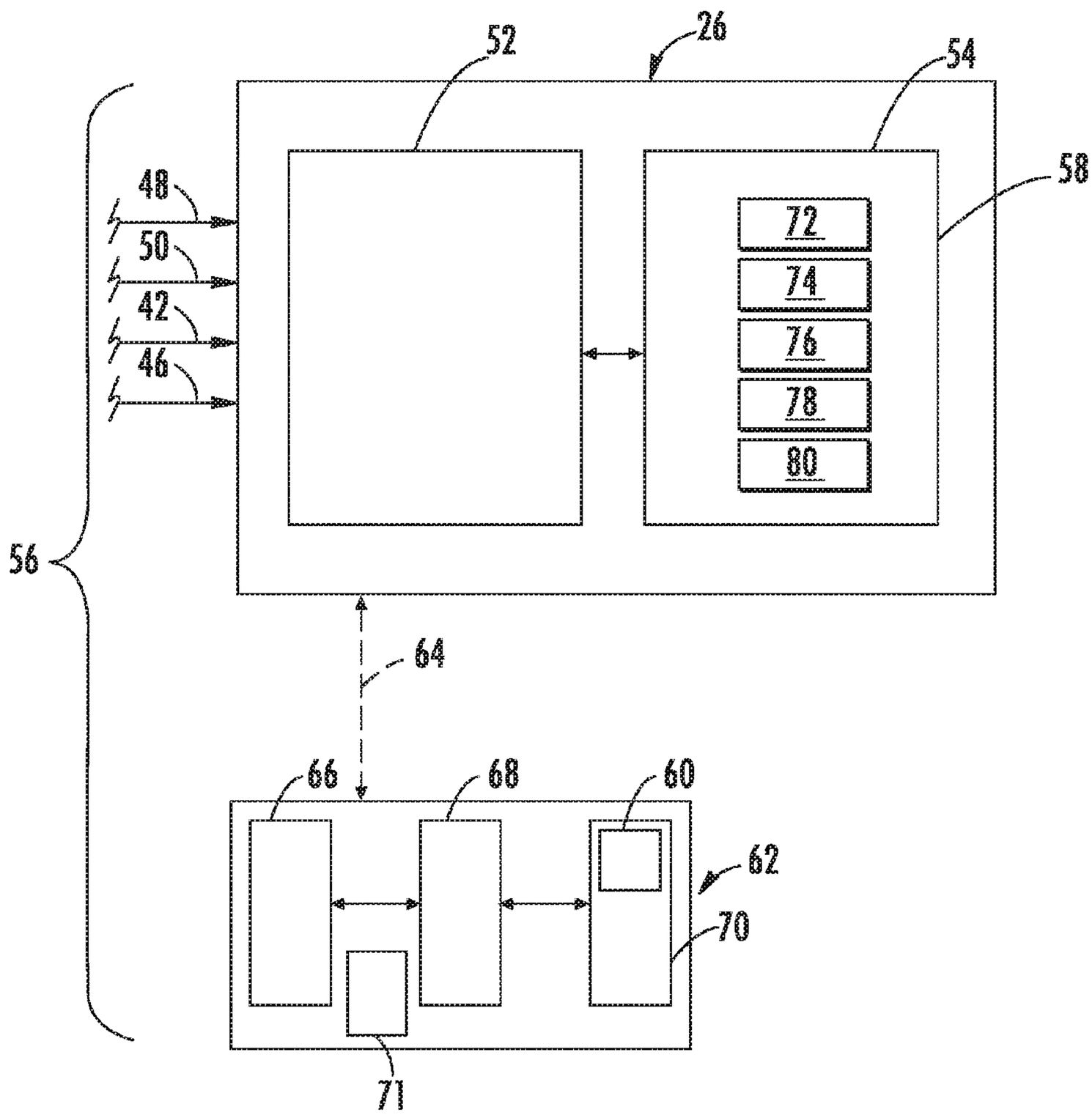
(57) **ABSTRACT**

An air conditioning system includes a service system, a central treatment unit, and a plurality of zoned segments each adapted to condition air in respective zones. The service system includes a controller, specification data, a results module, and an optimization module. The specification data is stored and applied by the controller and includes information pertaining to at least one component of the air conditioning system for each zoned segment. The results module is stored and executed by the controller, and is configured to receive a sensor signal indicative of an operating condition, which is outputted by a sensor of each zoned segment, to determine a need for service. The optimization module is stored and executed by the controller, and is configured to apply the specification data, the need for service from the results module, and allocate a discipline of a plurality of disciplines relative to the service.



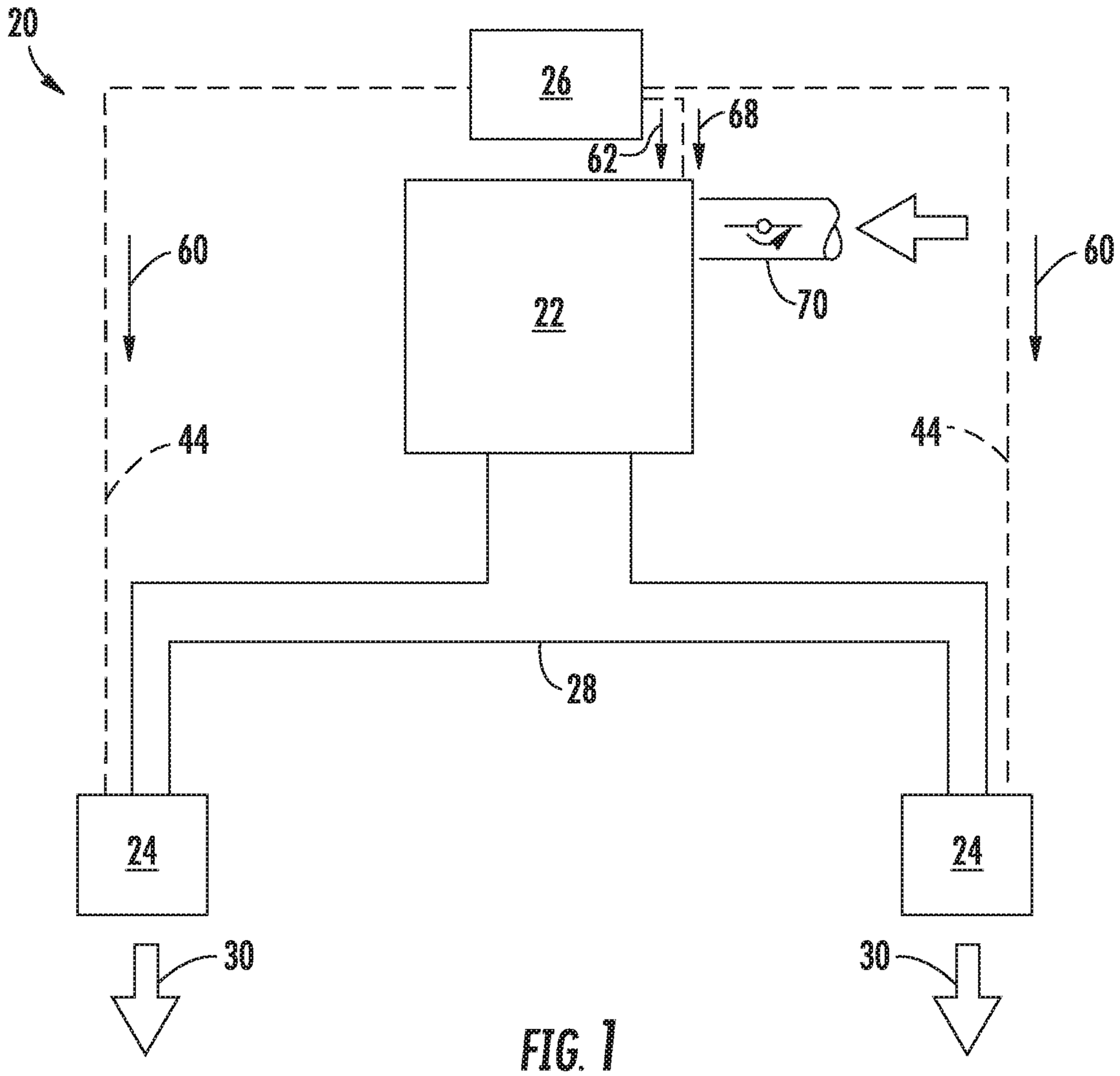


FIG. 1

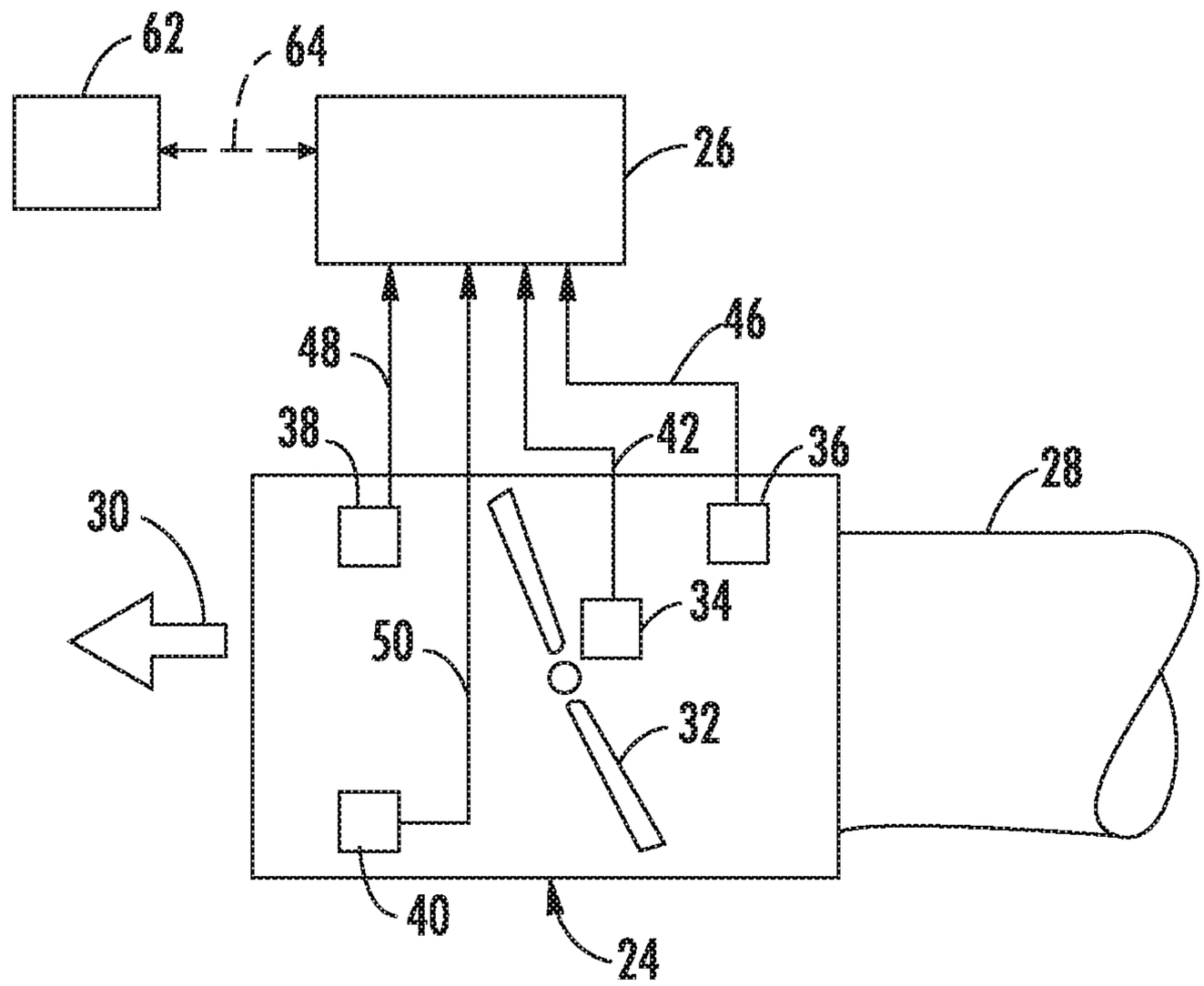


FIG. 2

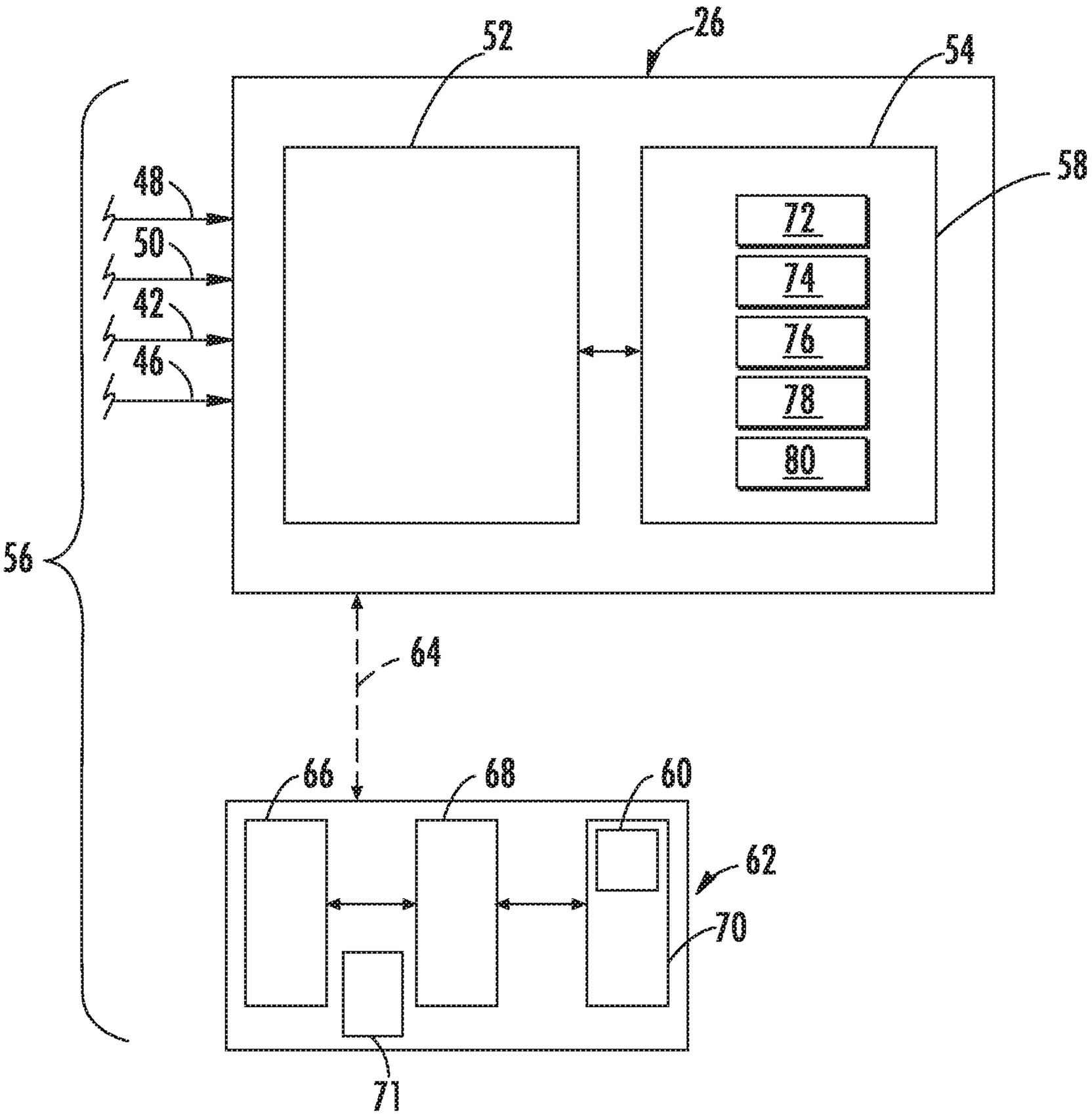


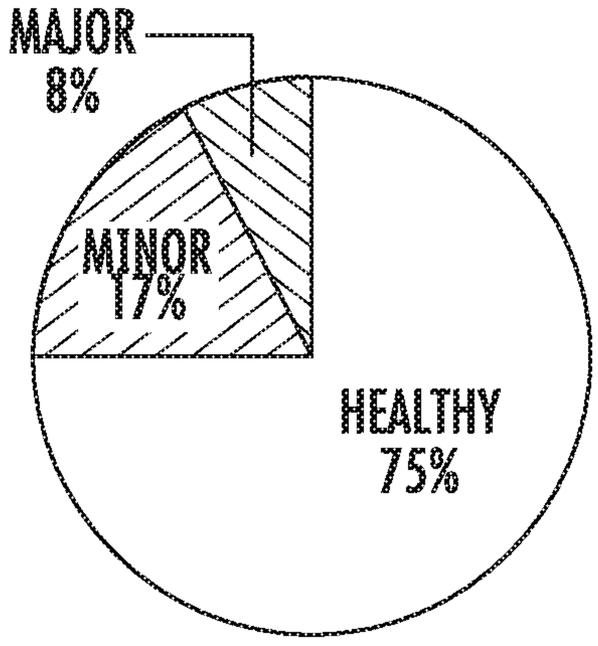
FIG. 3

82

HVAC HEALTH REPORT

PROPERTY	PROPERTY
NUMBER OF VAVs	52
NUMBER OF AHUs	2
FUNCTIONAL TEST	

OVERALL PROPERTY HEALTH



VAVs WITH ISSUES

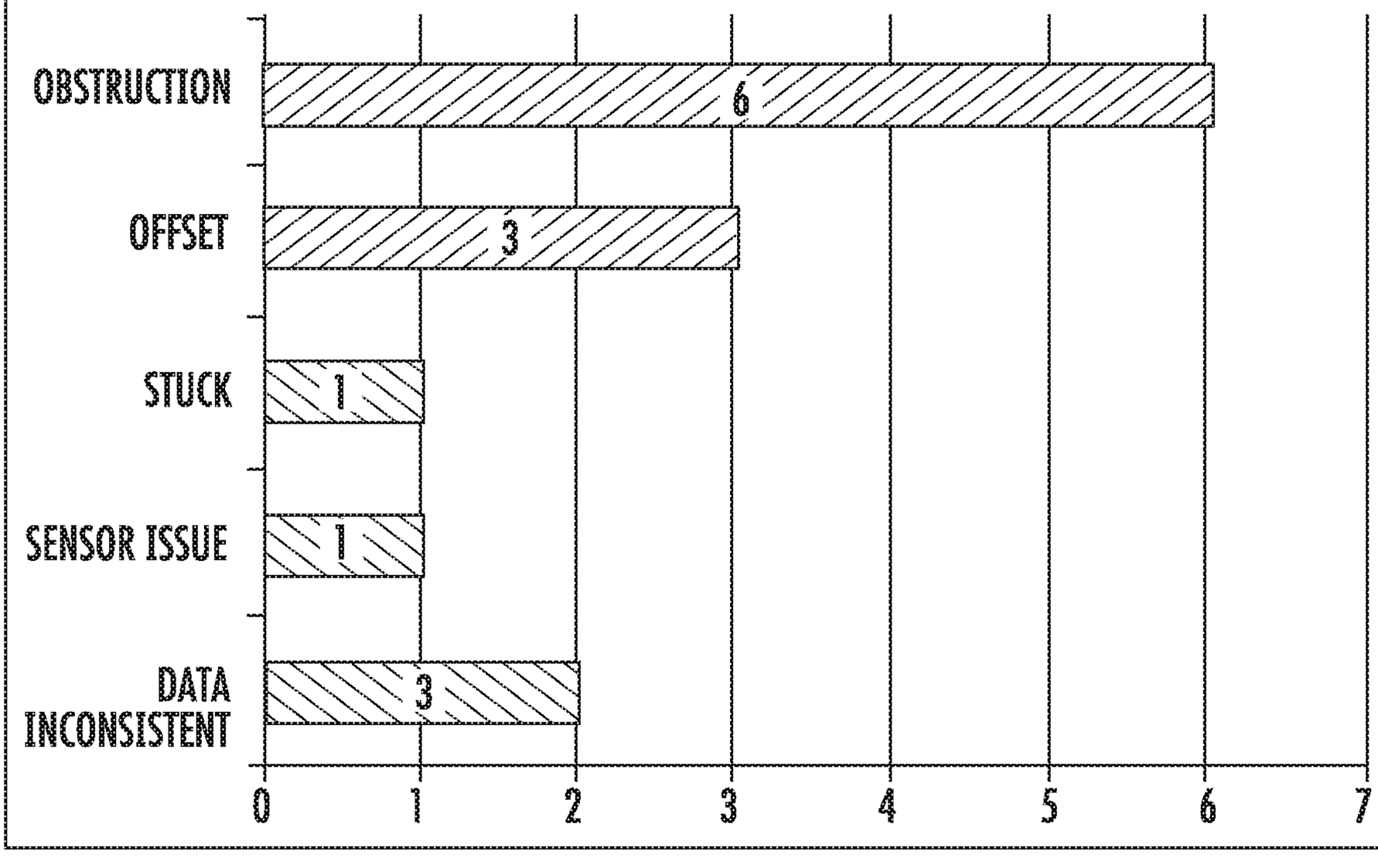


FIG. 4

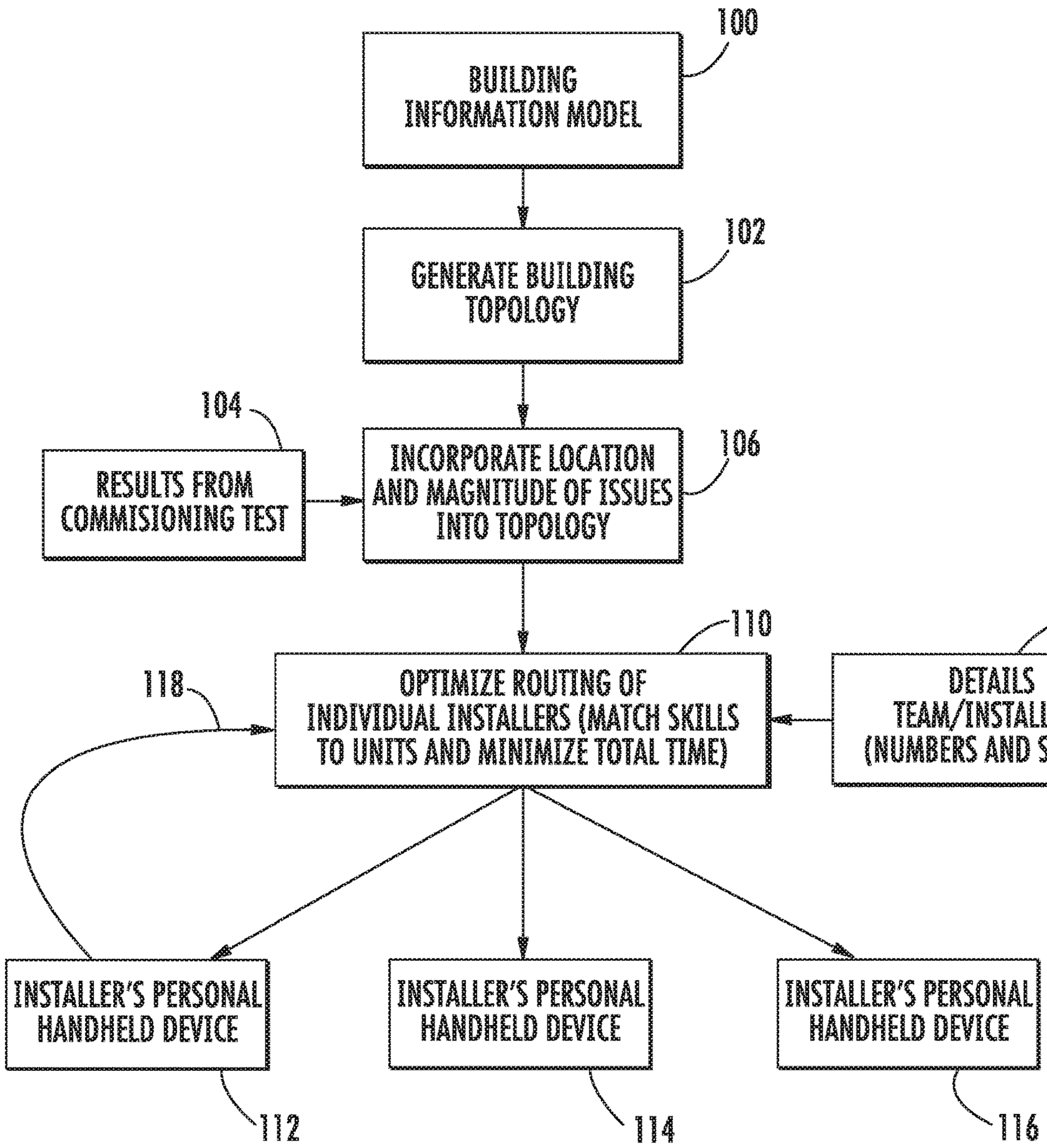

100
BUILDING INFORMATION MODEL
102
GENERATE BUILDING TOPOLOGY
104
RESULTS FROM COMMISIONING TEST
106
INCORPORATE LOCATION AND MAGNITUDE OF ISSUES INTO TOPOLOGY
110
108
118
OPTIMIZE ROUTING OF INDIVIDUAL INSTALLERS (MATCH SKILLS TO UNITS AND MINIMIZE TOTAL TIME)
DETAILS TEAM/INSTALLERS (NUMBERS AND SKILLS)
INSTALLER'S PERSONAL HANDHELD DEVICE
INSTALLER'S PERSONAL HANDHELD DEVICE
INSTALLER'S PERSONAL HANDHELD DEVICE
112
114
116

FIG. 5

A SERVICE SYSTEM OF AN AIR CONDITIONING SYSTEM

BACKGROUND

[0001] The present disclosure relates to an air conditioning system, and more particularly, to service system of the air conditioning system and method of operation.

[0002] Known air conditioning systems, such as a Heating, Ventilation and Air Conditioning (HVAC) system, may include at least one an air handling unit (AHU) each associated with a plurality of zoned segments (e.g., Variable Air Volume (VAV) assemblies) distributed throughout various regions of a building. When commissioning the air conditioning system, each zoned segment must be at least evaluated, adjusted, and balanced to achieve an efficient working system. Establishing an efficient operating air conditioning system and monitoring of continued proper system operation may be time consuming and cumbersome to achieve.

BRIEF DESCRIPTION

[0003] A service system for an air conditioning system including a central treatment unit and a plurality of zoned segments each adapted to condition air in respective zones according to one, non-limiting, embodiment of the present disclosure includes a controller including a processor and an electronic storage medium; specification data stored in the electronic storage medium and applied by the processor, the specification data including information pertaining to at least one component of the air conditioning system for each zoned segment; a results module stored in the electronic storage medium and executed by the processor, the result module configured to receive a sensor signal indicative of an operating condition and outputted from a sensor of each zoned segment, and determine a need for service; and an optimization module stored in the electronic storage medium and executed by the processor, the optimization module configured to apply the specification data, the need for service from the results module, and allocate a discipline of a plurality of disciplines relative to the service.

[0004] Additionally to the foregoing embodiment, the service system includes discipline data stored in the electronic storage medium and applied by the optimization module, wherein the optimization module is configured to assign a field technician to the need for service based on the allocated discipline.

[0005] In the alternative or additionally thereto, in the foregoing embodiment, the service system includes a device module programmed into a user device, and configured to communicate with the optimization module.

[0006] In the alternative or additionally thereto, in the foregoing embodiment, the user device includes a user interface configured to communicate with the field technician.

[0007] In the alternative or additionally thereto, in the foregoing embodiment, the user interface is configured to output service information associated with the need for service relative to a specific zoned segment of the plurality of zoned segments.

[0008] In the alternative or additionally thereto, in the foregoing embodiment, the service information includes data corresponding to a building information model of the specification data.

[0009] In the alternative or additionally thereto, in the foregoing embodiment, the service information includes data corresponding to a building topology of the specification data.

[0010] In the alternative or additionally thereto, in the foregoing embodiment, the service information includes data corresponding to a building topology of the specification data.

[0011] In the alternative or additionally thereto, in the foregoing embodiment, the optimization module is configured to receive a progress feedback report from the field technician via the mobile device.

[0012] In the alternative or additionally thereto, in the foregoing embodiment, the user device is a mobile device.

[0013] In the alternative or additionally thereto, in the foregoing embodiment, the user interface includes a visual screen, and the mobile device includes an augmented reality feature configured to superimpose a hidden component of the at least one component upon the visual screen.

[0014] In the alternative or additionally thereto, in the foregoing embodiment, the mobile device includes goggles and the visual screen is integrated upon at least one lens of the googles.

[0015] In the alternative or additionally thereto, in the foregoing embodiment, the service system is a commissioning service system.

[0016] In the alternative or additionally thereto, in the foregoing embodiment, the operating condition is part of a commissioning test.

[0017] In the alternative or additionally thereto, in the foregoing embodiment, the results module is configured to determine a magnitude of the need for service.

[0018] In the alternative or additionally thereto, in the foregoing embodiment, each one of the plurality of zoned segments include a Variable Air Volume (VAV) assembly, and the central treatment unit is an Air Handling Unit (AHU).

[0019] In the alternative or additionally thereto, in the foregoing embodiment, the sensor includes an air flow sensor of the VAV assembly.

[0020] A method of commissioning an air conditioning system according to another, non-limiting, embodiment includes preprogramming specification data into a controller of the air conditioning system; receiving at least one sensory signal associated with a commissioning test by a results module stored and configured to be executed by the controller; receiving at least a portion of the specification data by the results module; and applying the sensory signal and the specification data by the results module to generate a topology that includes a need for service, a magnitude of the need for service, and a location of the need for service.

[0021] Additionally to the foregoing embodiment, the method includes preprogramming discipline data into the controller; and receiving the discipline data and the topology by an optimization module stored and configured to be executed by the controller to optimize a routing of individual field technicians to respective zoned segments of the air conditioning system requiring a need for service.

[0022] In the alternative or additionally thereto, in the foregoing embodiment, the routing is based at least in-part on allocations of discipline, and the optimization module is configured to communication with a mobile device including an augmented reality feature carried by the field technicians.

[0023] The foregoing features and elements may be combined in various combinations without exclusivity, unless expressly indicated otherwise. These features and elements as well as the operation thereof will become more apparent in light of the following description and the accompanying drawings. However, it should be understood that the following description and drawings are intended to be exemplary in nature and non-limiting.

BRIEF DESCRIPTION OF THE DRAWINGS

[0024] Various features will become apparent to those skilled in the art from the following detailed description of the disclosed non-limiting embodiments. The drawings that accompany the detailed description can be briefly described as follows:

[0025] FIG. **1** is a schematic of an air conditioning system as one exemplary embodiment;

[0026] FIG. **2** is a schematic of a zoned segment of the air conditioning system;

[0027] FIG. **3** is a schematic of a service system of the air conditioning system; and

[0028] FIG. **4** is a depiction of a report generated by a report module of the service system; and

[0029] FIG. **5** is a flow chart of a method of operating the service system.

DETAILED DESCRIPTION

[0030] Referring to FIG. **1**, an air conditioning system **20** may be used in a building having a multitude of areas requiring at least one of various air treatments such as increasing air temperature, decreasing air temperature, controlling humidity levels, and others. The air condition system **20** may include a central treatment unit **22**, a plurality of zoned segments **24**, a controller **26**, and at least one conduit **28**. In one embodiment, the air conditioning system **20** may be a forced air handling system, the central treatment unit **22** may be an Air Handling Unit (AHU), the plurality of zoned segments **24** may be, or may include, a plurality of Variable Air Volume (VAV) assemblies, and the conduit **28** may be at least one duct for the flow distribution of air. The AHU **22** may be adapted to condition the air (i.e., heat, cool, humidity, etc.) and deliver a volume of air into the duct **28**. In one embodiment, the AHU **22** may include a variable speed blower (not shown) configured to generally maintain a predetermined air pressure within the duct **28**. One example of a forced air handling system **20** may be a Heating, Ventilation and Air Conditioning (HVAC) system.

[0031] In another embodiment the air conditioning system **20** may be a hydronic system adapted to controllably heat air in each one of the multitude of areas or zones. In this embodiment, the central treatment unit **22** may be a boiler adapted to heat water, the conduit **28** may be pipe(s) adapted to flow the water, the zoned segment **24** may be, or may include, include a register, a flow and/or pressure control valve, a water pump, a blower to flow air across the register, and other components.

[0032] For simplicity of explanation, the forced air handling system **20** is generally illustrated and described. However, it is understood that any air conditioning system **20** may apply to the present disclosure. Although only two VAV assemblies **24** are illustrated in FIG. **1**, in the application of a forced air handling system **20** applied to a building, the forced air handling system **20** may include over one-thousand VAV assemblies **24**. Each VAV assembly **24** may be adapted to control a pre-specified volume of air received from the duct **28** and flowing (see arrows **30**) into respective areas of the building.

[0033] Referring to FIGS. **1** and **2**, each VAV assembly **24** may include a damper **32**, a position sensor **34**, an upstream pressure sensor **36**, a downstream pressure sensor **38**, and a flow sensor **40**. The damper **32** may generally be in-line with an outlet of the duct **28** as is generally known by one skilled in the art. The position sensor **34** is adapted to measure the position of the damper **32** (i.e., zero to one-hundred percent open), and output a position signal (see arrow **42**) over a pathway **44** to the controller **26**.

[0034] The upstream pressure sensor **36** may be configured to measure the pressure of air immediately upstream of the damper **32** and send an upstream pressure signal (see arrow **46**) to the controller **26** over pathway **44**. The downstream pressure sensor **38** may be configured to measure the pressure of air immediately downstream of the damper **32** and send a downstream pressure signal (see arrow **48**) to the controller **26** over pathway **44**. The flow sensor **40** may be generally located downstream of the damper **32**, and is configured to measure airflow exiting the damper and sending an airflow signal (see arrow **50**) to the controller **26** via the pathway **44**. The pathway **44** may be hard wired or wireless.

[0035] Referring to FIGS. **2** and **3**, the controller **26** may generally be dedicated toward the forced air handling system **20**, or may be part of other systems such as a building management system. The controller **26** may include at least one processor **52** (e.g., microprocessor) and at least one electronic storage medium **54** that may be computer writeable and readable. In one embodiment, the controller **26** is configured to control and/or monitor the AHU **22** and the plurality of VAV assemblies **24**.

[0036] The air conditioning system **20** may further include a service system **56** that may be a commissioning service system. The service system **56** may be configured to determine a need for service of a particular zoned segment, or assembly, **24**, the location of the assembly **24** in need of service, the discipline needed to provide the service, the appropriate field technician to perform the service, and providing data, or information, to the field technician to assist in performing the service. The service system **56** may include the controller **26**, an application **58**, and a user device module, or application, **60**. The application **58** and the module **60** may be software-based. The application **58** may be stored in the electronic storage medium **54** and generally executed by the processor **52** of the controller **26**. The device module **60** may be programmed into a user device **62** adapted to communicate with the controller **26** over a pathway (see arrow **64** in FIG. **3**) that may be hard wired or wireless. The user device **62** may include a user interface **66**, a processor **68** (e.g., microprocessor) configured to execute the device module **60**, and an electronic storage medium **70** configured to store the device module **60**. In one embodiment, the user device **62** may be a mobile device carried by, for example, a field technician assigned to perform field commissioning and/or maintenance upon the air condition system **20**. Examples of the mobile device **62** may include a smartphone, goggles, and others.

[0037] For at least the example of the user device being googles **62**, the user interface **66** may be a visual screen generally superimposed upon the goggle lenses. The goggles

62 may include an augmented reality feature, wherein a computer-generated image is superimposed on the real world view of the user. In this way, the goggles provide a composite view. As an example, the real world view may be a wall within an office of a building. The superimposed reality view, may be the computer-generated outline of an assembly **24** located (i.e., visually hidden) behind the wall. The goggles **62** may include, or may be further supported by, circuitry **71** (see FIG. **3**) that is capable of determining the physical orientation of the goggles **62** in the real world in order to correctly superimpose the virtual image upon the real world image. The circuitry **71** may generally be any technique known in the art of augmented reality. One example of such circuitry **71** may be a Global Positioning System (GPS). It is further contemplated and understood that the augmented reality technology may be applied to other examples of the user device **62** including a mobile tablet and a smartphone.

[0038] The application **58** of the service system **56** may include specification data **72**, a results module **74**, an optimization module **76**, discipline data **78**, and a report module **80**. The specification data **72** and the discipline data **78** may be preprogrammed into the electronic storage medium **54** for reference by the processor **52** of the controller **26**. The modules **74**, **76**, **78** may, at least in-part, be stored in the electronic storage medium **54**, and executed by the processor **52** of the controller **26**.

[0039] The specification data **68** may generally include an information model and topology information. The information model may be relative to a structure that may be a building that the air conditioning system **20** supports. The topology information may be building topology information, and may generally pertain to information related to association and interconnections of various components of the air conditioning system **20** and supporting equipment. The building information model may generally pertain to a map of the building and the positioning of various components (e.g., zone segments **24**) of the air conditioning system **20** relative to the building map.

[0040] The discipline data **78** may generally include a listing of, for example, field technicians, the expertise or discipline of each technician, contact information, the current location of each technician, and other related information that may be used to improve, or optimize, the efficiency of the service system **56**.

[0041] The results module **74** of the application **58** is configured to receive any one or more of the sensor signals **42**, **46**, **48**, **50**, or other sensory signals indicative of at least one operating condition, from each one of the zoned segments **24**. From the sensory signal(s), the results module **74** is configured to determine a need for service of the corresponding zoned segment **24** and/or a particular component of the zoned segment. The results module **74** may be further configured to categorize, or assign a magnitude of importance, for a particular need for service based on, for example, preprogrammed data that reflects system ramifications if a need for service is not addressed. As best illustrated in FIG. **4** that illustrates one example of a report **82** generated by the report module **80**, magnitudes may include "major," "minor," and "healthy" (i.e., no need for service). In one embodiment, the need for service may be relative to commissioning activity of the system **20**, and the operating condition is part of a system commissioning test.

[0042] The optimization module **76** of the application **58** may be configured to apply the need for service determined by the results module **74**, apply the specification data **72**, and apply the discipline data to allocate a discipline to the need for service, and assign the associated service activity to an appropriate field technician possessing the discipline expertise. The optimization module **76** may further allocate service priorities based on the magnitudes established by the results module **74**, thus notifying the field technician(s) accordingly. Examples of various disciplines may include electrical, tin smith, mechanical, plumbing, and others.

[0043] Referring to FIGS. **3** and **4**, the report module **80** of the application **58** may be configured to tabulate and/or formulate various reports for delivery to, for example, a building manager via the controller **26**, and/or a field technician via the user interface **66** of the user device **62** and over pathway **64**. As best shown in FIG. **4**, a first report **82** may be, or may include, a system **20** overview. The report **82** may generally depict the percent of "major" needs for service, the percent of "minor" needs for service, and the percent of "healthy" VAV assemblies **24**. The same report **82** may also depict the types of services needed. For example, the report **82** may depict: six VAV assemblies **24**, out of fifty-two assemblies, that have obstructed dampers **32**; three VAV assemblies **24** that have a flow sensor **40** with a calibration, or offset, issue; one VAV assembly **14** that has a stuck damper **32**, and other depictions.

[0044] More refined reports, not shown, may include information relative to a specific VAV assembly **14** requiring service and the location of the assembly (i.e., utilizing the building information model of the specification data **72**. To further assist the field technician, the refined report may include building topology data to assist a field technician with concerns relative to, for example, equipment interactions and/or connections.

[0045] Referring to FIG. **5**, a method of operating the service system **56** is illustrated. At block **100**, the controller **26** may be preprogrammed with a building information model of the specification data **72**. At block **102**, the controller **26** may be preprogrammed with a building topology of the specification data **72**. At block **104**, at least one sensory signal associated with, for example, a commissioning test may be sent to the results module **74** of the application **58**. At block **106**, the results module **74** may also receive the specification data **72**, and may then incorporate location and magnitude of a need for service into a topology. At block **108**, discipline data **78** that is preprogrammed into the controller **26**, may be sent to the optimization module **76**. At block **110**, the optimization module **76** may utilize the established topology from the results module **74** and the discipline data **78** to optimize a routing of individual installers (i.e., field technicians), thereby matching skills to a particular zoned segment **24** needing a service to minimize total time to achieve an efficiently operating system **20**.

[0046] At blocks **112**, **114**, **116**, the optimization module **76** may respectively communicate with the appropriate user devices **62** of the respective field technicians based on, at least, discipline allocations. Referring to arrow **118**, each field technician may provide service progress feedback to the optimization module **76** for re-planning.

[0047] Advantages and benefits of the present disclosure include an improved diagnostics and control algorithm performance, a reduction in system commissioning time by about fifty percent (50%), greater customer satisfaction via

reduced installer expenses and fewer callbacks, and a savings of energy and improved comfort.

[0048] The present disclosure may be a system, a method, and/or a computer program product. The computer program product may include a computer readable storage medium (or media) having computer readable program instructions thereon for causing a processor to carry out aspects of the present invention.

[0049] The computer readable storage medium can be a tangible device that can retain and store instructions for use by an instruction execution device. The computer readable storage medium may be, for example, but is not limited to, an electronic storage device, a magnetic storage device, an optical storage device, an electromagnetic storage device, a semiconductor storage device, or any suitable combination of the foregoing. A non-exhaustive list of more specific examples of the computer readable storage medium includes the following: a portable computer diskette, a hard disk, a random access memory (RAM), a read-only memory (ROM), an erasable programmable read-only memory (EPROM or Flash memory), a static random access memory (SRAM), a portable compact disc read-only memory (CD-ROM), a digital versatile disk (DVD), a memory stick, and any suitable combination of the foregoing. A computer readable storage medium, as used herein, is not to be construed as being transitory signals per se, such as radio waves or other freely propagating electromagnetic waves, electromagnetic waves propagating through a waveguide or other transmission media (e.g., light pulses passing through a fiber-optic cable), or electrical signals transmitted through a wire.

[0050] Computer readable program instructions described herein can be downloaded to respective computing/processing devices from a computer readable storage medium or to an external computer or external storage device via a network, for example, the Internet, a local area network, a wide area network and/or a wireless network. The network may comprise copper transmission cables, optical transmission fibers, wireless transmission, routers, firewalls, switches, gateway computers and/or edge servers. A network adapter card or network interface in each computing/processing device receives computer readable program instructions from the network and forwards the computer readable program instructions for storage in a computer readable storage medium within the respective computing/processing device.

[0051] Computer readable program instructions for carrying out operations of the present disclosure may be assembler instructions, instruction-set-architecture (ISA) instructions, machine instructions, machine dependent instructions, microcode, firmware instructions, state-setting data, or either source code or object code written in any combination of one or more programming languages, including an object oriented programming language such as Smalltalk, C++ or the like, and conventional procedural programming languages, such as the "C" programming language or similar programming languages. The computer readable program instructions may execute entirely on the user's computer, partly on the user's computer, as a stand-alone software package, partly on the user's computer and partly on a remote computer or entirely on the remote computer or server. In the latter scenario, the remote computer may be connected to the user's computer through any type of network, including a local area network (LAN) or a wide area network (WAN), or the connection may be made to an external computer (for example, through the Internet using an Internet Service Provider). In some embodiments, electronic circuitry including, for example, programmable logic circuitry, field-programmable gate arrays (FPGA), or programmable logic arrays (PLA) may execute the computer readable program instructions by utilizing state information of the computer readable program instructions to personalize the electronic circuitry, in order to perform aspects of the present invention.

[0052] Aspects of the present invention are described herein with reference to flowchart illustrations and/or block diagrams of methods, apparatus (systems), and computer program products according to embodiments of the invention. It will be understood that each block of the flowchart illustrations and/or block diagrams, and combinations of blocks in the flowchart illustrations and/or block diagrams, can be implemented by computer readable program instructions.

[0053] These computer readable program instructions may be provided to a processor of a general purpose computer, special purpose computer, or other programmable data processing apparatus to produce a machine, such that the instructions, which execute via the processor of the computer or other programmable data processing apparatus, create means for implementing the functions/acts specified in the flowchart and/or block diagram block or blocks. These computer readable program instructions may also be stored in a computer readable storage medium that can direct a computer, a programmable data processing apparatus, and/or other devices to function in a particular manner, such that the computer readable storage medium having instructions stored therein comprises an article of manufacture including instructions which implement aspects of the function/act specified in the flowchart and/or block diagram block or blocks.

[0054] The flowchart and block diagrams in the Figures illustrate the architecture, functionality, and operation of possible implementations of systems, methods, and computer program products according to various embodiments of the present invention. In this regard, each block in the flowchart or block diagrams may represent an application, module, segment, or portion of instructions, which comprises one or more executable instructions for implementing the specified logical function(s). In some alternative implementations, the functions noted in the block may occur out of the order noted in the figures. For example, two blocks shown in succession may, in fact, be executed substantially concurrently, or the blocks may sometimes be executed in the reverse order, depending upon the functionality involved. It will also be noted that each block of the block diagrams and/or flowchart illustration, and combinations of blocks in the block diagrams and/or flowchart illustration, can be implemented by special purpose hardware-based systems that perform the specified functions or acts or carry out combinations of special purpose hardware and computer instructions.

[0055] The term "about" is intended to include the degree of error associated with measurement of the particular quantity based upon the equipment available at the time of filing the application. For example, "about" can include a range of ±8% or 5%, or 2% of a given value.

[0056] The terminology used herein is for the purpose of describing particular embodiments only and is not intended

to be limiting of the present disclosure. As used herein, the singular forms "a", "an" and "the" are intended to include the plural forms as well, unless the context clearly indicates otherwise. It will be further understood that the terms "comprises" and/or "comprising," when used in this specification, specify the presence of stated features, integers, steps, operations, elements, and/or components, but do not preclude the presence or addition of one or more other features, integers, steps, operations, element components, and/or groups thereof.

[0057] While the present disclosure has been described with reference to an exemplary embodiment or embodiments, it will be understood by those skilled in the art that various changes may be made and equivalents may be substituted for elements thereof without departing from the scope of the present disclosure. In addition, many modifications may be made to adapt a particular situation or material to the teachings of the present disclosure without departing from the essential scope thereof. Therefore, it is intended that the present disclosure not be limited to the particular embodiment disclosed as the best mode contemplated for carrying out this present disclosure, but that the present disclosure will include all embodiments falling within the scope of the claims.

What is claimed is:

1. A service system for an air conditioning system including a central treatment unit and a plurality of zoned segments each adapted to condition air in respective zones, the service system comprising:

a controller including a processor and an electronic storage medium;

specification data stored in the electronic storage medium and applied by the processor, the specification data including information pertaining to at least one component of the air conditioning system for each zoned segment;

a results module stored in the electronic storage medium and executed by the processor, the result module configured to receive a sensor signal indicative of an operating condition and outputted from a sensor of each zoned segment, and determine a need for service; and

an optimization module stored in the electronic storage medium and executed by the processor, the optimization module configured to apply the specification data, the need for service from the results module, and allocate a discipline of a plurality of disciplines relative to the service.

2. The service system set forth in claim **1**, further comprising:

discipline data stored in the electronic storage medium and applied by the optimization module, wherein the optimization module is configured to assign a field technician to the need for service based on the allocated discipline.

3. The service system set forth in claim **2**, further comprising:

a device module programmed into a user device, and configured to communicate with the optimization module.

4. The service system set forth in claim **3**, wherein the user device includes a user interface configured to communicate with the field technician.

5. The service system set forth in claim **4**, wherein the user interface is configured to output service information associated with the need for service relative to a specific zoned segment of the plurality of zoned segments.

6. The service system set forth in claim **5**, wherein the service information includes data corresponding to a building information model of the specification data.

7. The service system set forth in claim **5**, wherein the service information includes data corresponding to a building topology of the specification data.

8. The service system set forth in claim **6**, wherein the service information includes data corresponding to a building topology of the specification data.

9. The service system set forth in claim **4**, wherein the optimization module is configured to receive a progress feedback report from the field technician via the mobile device.

10. The service system set forth in claim **4**, wherein the user device is a mobile device.

11. The service system set forth in claim **10**, wherein the user interface includes a visual screen, and the mobile device includes an augmented reality feature configured to superimpose a hidden component of the at least one component upon the visual screen.

12. The service system set forth in claim **11**, wherein the mobile device includes goggles and the visual screen is integrated upon at least one lens of the googles.

13. The service system set forth in claim **1**, wherein the service system is a commissioning service system.

14. The service system set forth in claim **11**, wherein the operating condition is part of a commissioning test.

15. The service system set forth in claim **1**, wherein the results module is configured to determine a magnitude of the need for service.

16. The service system set forth in claim **1**, wherein each one of the plurality of zoned segments include a Variable Air Volume (VAV) assembly, and the central treatment unit is an Air Handling Unit (AHU).

17. The service system set forth in claim **16**, wherein the sensor includes an air flow sensor of the VAV assembly.

18. A method of commissioning an air conditioning system comprising:

preprogramming specification data into a controller of the air conditioning system;

receiving at least one sensory signal associated with a commissioning test by a results module stored and configured to be executed by the controller;

receiving at least a portion of the specification data by the results module; and

applying the sensory signal and the specification data by the results module to generate a topology that includes a need for service, a magnitude of the need for service, and a location of the need for service.

19. The method set forth in claim **18**, further comprising:

preprogramming discipline data into the controller; and

receiving the discipline data and the topology by an optimization module stored and configured to be executed by the controller to optimize a routing of individual field technicians to respective zoned segments of the air conditioning system requiring a need for service.

20. The method set forth in claim **10**, wherein the routing is based at least in-part on allocations of discipline, and the

optimization module is configured to communication with a mobile device including an augmented reality feature carried by the field technicians.

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