REQUEST FOR INTER PARTES REVIEW

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of	*Inter Partes* Review No.: Unassigned
David Sandelman and Daniel Shprecher	Issued: November 14, 2000
U.S. Patent No. 6,147,601	Application No. 09/317,235
Filing Date: May 24, 1999	

For: **ELECTRONIC MESSAGE DELIVERING SYSTEM UTILIZABLE IN THE MONITORING OF REMOTE EQUIPMENT AND METHOD OF SAME**

DECLARATION OF ARTHUR ZATARAIN, PE IN SUPPORT OF ALARM.COM INCORPORATED'S REQUEST FOR INTER PARTES REVIEW OF U.S. PATENT NO. 6,147,601 UNDER 35 U.S.C. §§ 311-319, 37 C.F.R. § 42

Mail Patent Board
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EXHIBITS AND ATTACHMENTS

I may refer to the following Exhibits that I understand were submitted by Petitioner in connection with this *Inter Partes* Review (IPR).

Exhibit	Description
1201	U.S. Patent No. 6,147,601 ("'601 Patent")
1202	File History of U.S. Patent No. 6,147,601
1203	U.S. Patent No. 6,067,477 ("Wewalaarachchi")
1204	*Honeywell Engineering Manual of Automatic Control For Commercial Buildings*
1205	*BACnet: A Data Communication Protocol for Building Automation and Control Networks* (ANSI/ASHRAE Standard 135-1995)
1206	U.S. Patent No. 6,034,970 ("Levac")
1209	*Scadaware System Design Concepts*
1210	U.S. Patent No. 5,808,907 ("Shetty")
1211	U.S. Patent No. 6,040,770 ("Britton")
1212	U.S. Patent No. 5,061,916 ("French")
1213	Provisional Patent Application 60/140793

ATTACHMENT A: CV of Arthur Zatarain, PE

I. INTRODUCTION AND BACKGROUND

1. I have been retained by counsel for Alarm.com Incorporated ("Alarm.com" or "Petitioner"), and asked to review and provide my opinion on the patentability of claims 1-43 of U.S. Patent No. 6,147,601 (Ex. 1201, "the '601 Patent"). I am being compensated for my time at my normal consulting rate of $380 per hour. My compensation is not contingent on the outcome of this proceeding or the content of my opinions.

2. I am an electrical and control systems engineer with extensive experience in the design, fabrication, programming, and operation of remote monitoring and control systems. My engineering and executive career since 1975 has included industrial and oilfield control systems, product design and development, computer systems engineering, and engineering management. Between 1997 and 2009, while primarily employed as an engineer and executive with other companies, I also worked part-time as a forensic engineering and management consultant for patent, accident, and commercial matters. I now work solely as an engineering consultant for my own company, Artzat Consulting. My work generally involves technical and commercial matters related to intellectual property, accidents and damages, and design and operations. The practice areas in which I currently work include electrical and electronic engineering, control systems engineering, and industrial computer equipment and systems. I have

experience with mini and microcomputer hardware and software since 1976. I have written software for operating systems, hardware and software device drivers, networking, industrial monitoring and control, and personal computer applications. I was certified as a Systems Integrator by the Institute of Industrial Engineers, and was certified in Computer Forensics at Oregon State University.

3. I received a Bachelors of Science in Engineering from the University of New Orleans in 1975, and a Masters of Science in Engineering from the University of New Orleans in 1979. I am a Registered Professional Control Systems Engineer in Louisiana, and a registered Professional Electrical Engineer in Louisiana, California, Alaska, and Alabama. I am a Board Certified Forensic Engineer and a Member of the National Academy of Forensic Engineers (NAFE). I am also a Licensed Member of the National Society of Professional Engineers (NSPE), and a Senior Member of the International Society of Automation (ISA) and of the Institute of Industrial Engineers (IIE). I am also a Professional Member of the American Society of Safety Engineers (ASSE), and a Member of the Institute of Electrical and Electronic Engineers (IEEE) and of the Louisiana Engineering Society.

4. Prior to 1988, my own consulting company (Dataran Engineering) was active in developing Supervisory Control and Data Acquisition ("SCADA") systems using hardware developed by other companies; the SCADA software,

however, was developed by me to suit specific applications. One of Dataran's SCADA clients was Total Engineering Services Team Inc., later known as TEST Automation & Controls (TEST). Dataran was purchased by TEST in January of 1998 primarily for Dataran's expertise in SCADA systems. A major aspect of my work at TEST was as lead designer and programmer for a remote monitoring and control system known as SCADAware®. *See* Ex. 1209. I remained with TEST for another 20 years and had continuous involvement in the SCADA industry throughout that time. Beginning in 1998, I served as the company's only Vice President until I retired from TEST in 2008. I personally started development of TEST's Scadaware hardware and software system beginning in January 1988 to provide a solution to the limited capability of commercially available RTUs, and also the limits of their associated Host computers. TEST's Scadaware systems were applied to a wide range of industrial equipment, processes, and mechanical systems for industries such as oil and gas production, wastewater management, petrochemical plants, power generation, facility monitoring, and pipelines. The most common application of Scadaware was to monitor remote equipment and its associated, often unattended, environment.

5. I am a co-inventor of U.S. Patent No. 5,103,395, entitled "System for Remote Positioning of a Radioactive Source into a Patient Including Means for Protection Against Improper Patient Exposure to Radiation," which issued on

April 7, 1992. This invention disclosed monitoring and control of a nuclear-tipped wire that enters a human body through a catheter.

6. A more complete summary of my experience, expertise, and publications is set forth in my CV, which is attached as Attachment A to this Declaration.

II. SUMMARY OF MY OPINIONS

7. It is my opinion that claims 1-3, 22-24, 26, 30, 32, and 42-43 of the ’601 Patent are unpatentable. My opinions are based on my expertise in the technology of the ’601 Patent at the time the application was filed, as well as my review of the ’601 Patent, its file history, and the prior art applied by the Petitioner. If the patent owner is allowed to submit additional evidence pertaining to the validity of the ’601 Patent, I intend to review that as well and update my analysis and conclusions as appropriate and allowed under the rules of this proceeding.

A. Instructions

8. I am not an attorney. My analysis and opinions are based on my expertise in this technical field, as well as the instructions I have been given by counsel for the legal standards relating to patentability.

9. The materials I have reviewed in connection with my analysis include the ’601 Patent, its file history, and the cited references and exhibits.

10. I understand that unpatentability in this proceeding must be proven by a preponderance of the evidence, and this is the standard I have used throughout my declaration. Further, I understand that each patent claim is considered separately for purposes of unpatentability.

11. My analysis assumes that a "person having ordinary skill in the art," or "PHOSITA," at the time of the alleged invention would have had at least a degree in computer science, electrical engineering, or computer engineering, or equivalent experience, and at least two years of experience in remote monitoring and control systems. Because at the time of the alleged invention I had bachelors and masters degrees in engineering, 20 years of experience in monitoring and control systems, had developed commercial products in monitoring and control, and was licensed as both an Electrical Engineer and Control Systems Engineer, I feel that I was a person of ordinary skill in the art in regard to the '601 Patent.

12. I am informed that a patent claim is unpatentable as "anticipated" if each and every feature of the claim is found in a single prior art reference.

13. I understand that a patent claim is unpatentable as "obvious" if, in view of a prior art reference or a combination of prior art references, it would have been obvious to a PHOSITA at the time of the invention, taking into account:

- the scope and content of the prior art;
- the differences between the prior art and the claim under construction;

- and the level of ordinary skill in the art.

14. I am informed that legal principles regarding unpatentability of a claim due to obviousness have been addressed by the U.S. Supreme Court. I am informed that, while not absolute, the principles relating to a "motivation," "suggestion," or "teaching" in the prior art to combine references are useful in analyzing whether an invention is obvious. I am informed that the suggestion or motivation may be either explicit or implicit, and may come from knowledge generally available to a PHOSITA, from the nature of the problem to be solved, or from a combination of these factors. The test for an implicit motivation, suggestion, or teaching is what the combined teachings, knowledge of a PHOSITA, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art. The problem examined is not the specific problem solved by the invention, but the general problem that confronted the inventor before the invention was made.

15. I am further informed that the U.S. Supreme Court has clarified that additional principles may also be applied in such an analysis. Some of those principles are set forth below.

16. As I understand it, it is no longer always required to present evidence of an explicit teaching, suggestion, or motivation to combine prior art references for purposes of determining whether an invention is obvious. Prior art

can be combined based on an express teaching, suggestion, or motivation from the prior art itself, or from a reasoned explanation of an expert or other witness.

17. A patent claim composed of several elements, however, is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art. In order to prove obviousness, it must be shown that the improvement is not more than the predictable use of prior-art elements according to their established functions. To determine whether there was an apparent reason to combine the known elements in the way a patent claims, it will often be necessary to look to interrelated teachings of multiple pieces of prior art, to the effects of demands known to the design community or present in the marketplace, and to the background knowledge possessed by a PHOSITA. Also, in determining obviousness, one must be aware of the distortion caused by hindsight bias and be cautious of arguments relying upon hindsight reasoning. An obviousness argument cannot be sustained by mere conclusory statements. Instead, it must be some articulated reasoning with some rational underpinnings to support the legal conclusion of obviousness.

18. In an obviousness analysis, it is my understanding that there are "secondary considerations" that should be analyzed if they apply. I am told that these considerations include (a) whether the prior art teaches away from the claimed invention, (b) whether there was a long felt but unresolved need for the

claimed invention, (c) whether others tried but failed to make the claimed invention, (d) skepticism of experts, (e) whether the claimed invention was commercially successful, (f) whether the claimed invention was praised by others, and (g) whether the claimed invention was copied by others.

19. I have also been instructed that in the instant *Inter Partes* Review, claims are given their ordinary and customary meaning, as understood by a PHOSITA at the time of the invention, taking into consideration the language of the claims, the specification, and the prosecution history of record construed in light of how a PHOSITA would understand the claims. I have also been informed that the Board construes claims during *Inter Partes* Review according to the "broadest reasonable interpretation" in view of the specification to the PHOSITA. Therefore, it is my understanding that what is to be considered includes the claims, the patent specifications and drawings, and the prosecution history, including any art listed by the Examiner or the Applicant. It is my understanding that information external to the patent, including expert and inventor testimony and unlisted prior art, are to be considered in construing the claims only if ambiguities remain. However, expert testimony may be useful in helping to explain the technology. In my analysis, I have considered and applied the proposed claim constructions of the Petitioners, unless otherwise indicated.

20. I have also been instructed that, when a claim's recitation is purely functional and does not include any definite structure for performing the function claimed, the term is a "means-plus-function" claim. It is my understanding that means-plus-function claims are construed using a two-step process: first, determination of the claimed function, and second, identification of the corresponding structure. If the term is understood by a PHOSITA as referring to a particular structure, however, this two-step process is not followed. I am instructed that, where the claim uses the word "means," there is a presumption that it is a means-plus-function claim term, and that the same presumption applies to the word "mechanism" in the absence of any actual structural recitation. I am also instructed that an applicant for a patent must disclose adequate structure in the specification to perform the recited function, and that if adequate structure is not recited, the claim is indefinite. I am further instructed that when the corresponding structure is a general purpose computer or microprocessor, the specification must disclose the algorithm or process to be performed by the general purpose computer or microprocessor, or the claim is indefinite.

B. Effective Filing Dates and Prior Art Patents and Printed Publications

21. I am informed that the claims of the '601 Patent (Ex. 1201), have an effective filing date no earlier than January 9, 1999, the filing date of U.S.

Provisional Application No. 60/115,305 ("the '305 provisional application"), of which the Applicants claimed the benefit. In this declaration, I do not offer any opinion on whether what is claimed in the '601 Patent was adequately disclosed by the '305 provisional application.

22. Petitioners rely upon the following patents, none of which was disclosed during prosecution of the '601 Patent, and all of which are prior art to all claims of the '601 Patent:

- Ex. 1203 – U.S. Patent No. 6,067,477 ("Wewalaarachchi"), the application for which was filed on January 15, 1998, and which issued on May 23, 2000.
- Ex. 1204 – *Honeywell Engineering Manual of Automatic Control For Commercial Buildings* ("Honeywell"), which has a copyright date of 1997 and bears Library of Congress Catalog Card Number 97-72971.
- Ex. 1205 - American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., *BACnet®: A Data Communication Protocol for Building Automation and Control Networks* (ANSI/ASHRAE Standard 135-1995) ("BACnet"), which was approved in, and has a copyright date of, 1995.
- Ex. 1206 – U.S. Patent No. 6,034,970 ("Levac"), the application for which was filed on July 2, 1997, and which issued on March 7, 2000.

23. The chart below summarizes my conclusions of unpatentability.

Ground	Claim(s)	Basis for Rejection
1	1-3, 22-24, 26, 30, 32, and 42-43	Obviousness: Wewalaarachchi, Honeywell, and BACnet in view of Levac
2	1-3, 22-24, 26, 30, 32, and 42-43	Obviousness: Wewalaarachchi, Honeywell, and BACnet in view of Levac

III. OVERVIEW OF THE TECHNOLOGY

24. The technology addressed in the '601 Patent in the 1998 timeframe centers on an industry-specific application of a general purpose technology known as Supervisory Control and Data Acquisition (SCADA). The "Supervisory Control" aspect of SCADA refers to manipulation of equipment at a remote location; the "Data Acquisition" aspect of SCADA refers to monitoring equipment located at a remote location. Other terms that identified the same technology include telemetry, surveillance, building management system, security systems, and simply "remote control."

25. The SCADA terminology that I use below varied among different applications and end-user industries, but the technical principles and applications were the same. The terminology with which I am most familiar will be used here;

the specific terms used in the ’601 Patent will be used later when discussing the patent’s specification and claims.

26. In the patent application’s timeframe, typical SCADA systems used three primary components. First, the “Remote Terminal Unit” (RTU) was the interface device located near the equipment to be monitored. The RTU was connected to one or more sensors (i.e. switches, temperature gauges, flow meters, fire detection) that detected physical conditions of the monitored equipment or facility. The sensor-to-RTU connection could be wired or wireless.

27. In addition to monitoring functions, the RTU could also provide outputs at the remote location to control the monitored equipment. Example outputs could turn equipment off and on, adjust speeds or other settings, and reset external systems.

28. A small SCADA system would have only one or a few RTU stations positioned over an area. An example small system would be a central station that monitored several power transformer stations in a public utility. Larger systems, such as in oil production, telecommunications, pipelines, or security systems, might have hundreds of RTUs spread across hundreds of square miles. Other commonly used terms for the component I refer to as the RTU included slave unit, interface unit, signal conditioner, and data acquisition system.

29. The second primary SCADA system component was the "Host" unit that connected to and controlled the remote RTUs. Legacy systems installed in the 1960s and 1970s used special purpose electronic equipment, or computers from IBM, Digital Equipment DEC, Hewlett Packard HP, etc. to perform the Host operations. In the mid-1980s, newer technology SCADA systems shifted to IBM-compatible personal computers (or servers) for the Host unit. At the time of the '601 Patent priority date, most operational SCADA systems were using standard personal computers for the Host component. Other terms commonly used for the component I refer to as the Host include master station, master terminal unit (MTU), central computer, and computer server.

30. The third primary SCADA component was the communications system (or systems) used to connect the RTU with the Host. This connection allowed sensor data messages to be transmitted from RTU to the Host, and for control messages to be sent from Host to RTU. Each RTU typically communicated with its associated Host over a dedicated or shared communications path; typical paths included phone, radio, and direct wire. In some instances, multiple paths were provided between the RTU and Host to enhance reliability or reduce communications cost.

31. The only aspect limiting the geographical coverage of a SCADA system was the availability of suitable communications. A SCADA system with an

RTU and Host separated by one mile operated in the same manner as one separated by a thousand miles. Therefore, similar SCADA components could be applied to a very wide range of circumstances that required remote monitoring and control.

32. In most systems, a single Host computer managed all operations of a complete SCADA system. The Host would contact an RTU to retrieve information, and also to manipulate outputs connected to an RTU. The Host's update operation (referred to as a "poll") could occur at timed intervals, at specific times of day, by manual operation, or as the result of a program operation within the Host computer. The Host could also be programmed to provide graphic displays, reports, and specialized data processing associated with the messages and data retrieved from the RTUs.

33. The Host, after having been updated by an RTU, could also forward data and messages to other computers as well as user devices such as fax machines, voice auto-dialers, digital pagers, and voice radios. Those secondary devices were useful for alerting users who were not physically located at the Host unit that connected to the RTU.

34. Unlike the programmable Host units from 1980 to the 1990s, most RTUs had limited autonomous capability; they mostly did as they were told by the Host computer. However, for many years prior to 1998, many RTUs had a useful feature termed "call on exception" that allowed a suitably configured RTU to

initiate contact with its Host based on conditions determined locally at the RTU (rather than as periodically directed by the Host). For example, an RTU could detect that an abnormal condition had occurred such that it needed to update the Host right away. "Call on exception" in an RTU allowed it to update the Host without waiting for the Host to contact the RTU for a routine update. An exception message received at the Host could initiate any further processing, including local or remote alerts for human operators.

35. SCADA technology in 1988-1998 was rapidly changing due to several interrelated technical advances, including: 1) the increased use of low power and low cost microprocessor-based RTU devices; 2) the emergence of standardized ("IBM compatible") personal computer hardware and software for Host applications; 3) the expanding availability of low cost communications using cellphones and license-free radios; and 4) increased demand for remote monitoring systems to reduce production downtime, inefficient manpower allocation, and energy consumption. SCADA systems were also useful for environmental temperature monitoring, and for detection of gas, fire, smoke, and unauthorized intrusion at remote sites.

36. By no later than 1992, a related incentive to implement wired and wireless SCADA was the rapidly expanding use of electronic control devices called Programmable Logic Controllers (PLCs). A PLC had input and output

components similar to a simple RTU, but was equipped with much more processing power, having the ability to perform user-defined logic for monitoring and control. PLCs were replacing older technologies such as mechanical switches and relays historically used in many control applications including industrial processes, facility equipment, and manufacturing. I presented a paper at an Entelec SCADA industry conference in 1992 that addressed the use of both RTUs and PLCs in systems connected via radio to a central Host unit. In the 1998 timeframe, PLC units were often incorporated into SCADA applications along with traditional RTUs.

37. SCADA systems prior to the ’601 Patent priority date generally operated with their own message format that was incompatible with that of other vendors. By the mid 1990s, the market’s desire for remote access to diverse brands of RTU and PLC devices required system developers to devise and use what was termed “open architecture” interfaces. This concept used standardized communication “protocols” in addition to the vendor’s proprietary protocols with which RTUs, PLCs, and Hosts of a particular vendor communicated. This arrangement allowed products from multiple vendors to form integrated systems. Although those systems used open architecture to exchange messages in multiple formats, each computer stored and processed the message information in its own proprietary format. This required transformation of messages received by the Host

computer into a standardized structure for storage within the Host computer's memory. Further, any messages sent out by the central Host computer would be based on that normalized information format rather than on the original incoming message format. By the 1990s, this was often accomplished through object-oriented programming.

38. The term "object-oriented programming" (or "OOP") refers to a computer software concept in which data and functions are stored and manipulated in a standardized manner. OOP provides a useful "abstraction" of a real or virtual entity such that software (or people) can use it in a consistent manner without regard to any particular embodiment. A simple example is a graphic element (i.e. a square or circle) that appears on a computer screen. An OOP application would define and store such entities as objects having common attributes (or "properties") such as size, color, screen position, and blinking status without regard to the entity's physical shape. This allows the entity to be manipulated or modified (i.e. moved, or color changed) in an abstract manner. OOP, and its underlying principles of abstraction and "normalization," are useful in all programming applications, including SCADA and Building Management Systems, that contain diverse but related data types. OOP programming concepts date to the 1960's, and was commonplace by the 1990's in most fields of computer science.

39. SCADA and related remote control systems were developed by equipment manufacturers such as Motorola, Amocams, Honeywell, Six-net, and Analog Devices. Many systems were also developed by "systems integrators" using SCADA equipment developed in-house or from other parties. TEST, the systems integrator for which I worked, competed in the 1990s with dozens of similar companies in both domestic and international markets for project values ranging from $15,000 to $5,000,000.

40. Further, SCADA systems were also developed directly by end users who built and maintained their own large scale systems. Exxon, AT&T, and Transco were examples of companies that developed their own SCADA systems. Each developer configured the systems to accommodate the particular needs of each specific application.

41. My experience with SCADA systems until 1988 had primarily been with industrial situations such as oil and gas production, storage facilities, compressor and generator stations, living quarters, and pipelines. SCADA system providers in this market included a wide range of players such as TEST, Systronics, ControlSystamologists (CSI), Baker CAC, Hydril, Halliburton, Allen Bradley, Bailey, Fisher, Motorola, and many small and regional companies serving narrow markets. My work after 1988 expanded to include industrial sites, waste water management, power utilities, industrial facilities, and other applications.

42. Other industries, such as public utilities and building management, were served by companies such as Johnson Controls, Bristol, Allen Bradley, Honeywell, GE, Westinghouse, Motorola, and Siemens. Although the markets differed, and the systems included different brands of components, the SCADA technology used in all these industry segments was similar or, in some cases, identical. Vendors and customers of SCADA systems across these industry segments gathered and shared information at annual industry conferences or trade shows, including those hosted by Instrument Society of America (ISA), Institute of Electrical and Electronic Engineers (IEEE), Institute of Industrial Engineers, Energy Telecommunications and Electrical Association (Entelec), Offshore Technology Conference, and American Water Works Association. Thus, it is my opinion that a PHOSITA in any of these market segments was and would be aware of systems in the other segments, and in some instances would interface with them using an "open architecture" interface to bridge incompatibilities among the connected systems.

IV. SCOPE OF THE PRIOR ART

43. I have been informed by counsel that when determining whether a patent is obvious, the general scope and content of the prior art at the time is relevant. That is, a finding of obviousness is more likely if there is a wide variety of prior art that disclosed functionalities and system architectures identical or

similar to those of the challenged patent. Conversely, a finding of obviousness is less likely if there is a scarcity of prior art that discloses similar functionalities and architectures.

44. Here, the body of prior art disclosing the major functionalities and architecture of the ’601 Patent was expansive as of the ’601 Patent priority date. Numerous references in the art disclosed: (a) remote monitoring and control of equipment through the use of on-site sensors, an on-site interface unit, and an off-site server; (b) user-generated message profiles determining when and how alerts or notifications would be sent to users; (c) the ability of users to adjust message profiles from a remote location; and (d) sending periodic status or “heartbeat” messages to indicate normal system functioning.

45. In my opinion, at least the following prior art references disclose remote monitoring and control of equipment through the use of on-site sensors, an on-site interface unit, and an off-site server: Ex. 1209.0010-12; Ex. 1210 at 4:20-28; Ex. 1203 at 5:6-8; Ex. 1204.0042; Ex. 1212 at 4:65-5:11; Ex. 1205.0001; Ex. 1213 at 6:15-16, 9:11-18, 15:54-56; U.S. Patent No. 6,580,950 (Johnson II) at 3:24-26; 4:17-23, 5:29-39.

46. It is also my opinion that at least the following prior art references disclose user-generated message profiles determining when and how alerts or notifications would be sent to users: Ex. 1209.0086-93; Ex. 1210 at 2:18-21, 2:43-

45; Ex. 1203 at 19:34-63; Ex. 1212 at 8:48-59, 10:19-37; Ex. 1205.0064; Ex. 1213 at 12:9-17, 21:13-20; U.S. Patent No. 6,580,950 (Johnson II) at 40: 30-33, 6:3-6.

47. It is also my opinion that at least the following prior art references disclose the ability of users to adjust message profiles from a remote location: Ex. 1209.0079; Ex. 1203 at 19:34-63; Ex. 1210 at 2:34-37; Ex. 1213 at 7:19-8:1; U.S. Patent No. 6,580,950 (Johnson II) at 40: 30-33, 6:3-6.

48. It is also my opinion that at least the following prior art references disclose the sending of periodic status or "heartbeat" messages to indicate normal system functioning: Ex. 1209; U.S. Patent No. 6,054,920 (Smith) at 6:59-67; Ex. 1104 at 8:45-52, 14:25-30.

49. Based on my experience with remote monitoring and control, I am confident that numerous other prior art references had also disclosed all of the major functionalities claimed by the ’601 Patent well before its priority date. While my analysis below is focused on the specific items of prior art I identify in ¶ 22 above, my knowledge of the broader prior art available to a PHOSITA as of the priority date of the ’601 Patent informs my judgments concerning obviousness.

V. SUMMARY OF THE ’601 PATENT

A. Brief Description

50. The ’601 Patent is directed to systems and methods for “monitoring remote equipment,” such as HVAC equipment. FIG. 1; 5:37-42,

Abstract. HVAC is an acronym for equipment and systems in the field of Heating, Ventilation, and Air Conditioning. The information concerning the equipment is communicated to a monitoring computer "server." The monitored equipment is remote from the computer. If an abnormality is detected in the remote equipment, and communicated to the server, the server sends notifications to user-defined communication devices. The user specifies which communication devices receive equipment-related notifications by remotely configuring a message profile on the server via a user interface. Certain claims of the patent add details to the core functionalities described above.

51. A PHOSITA would understand that the alleged invention is an HVAC industry-specific application of the technology widely known as Supervisory Control and Data Acquisition (SCADA), as described earlier in this declaration. At the time of the alleged invention, SCADA and related systems were applicable to a wide variety of monitoring and control situations. Common examples included power distribution systems, waste water management, oil & gas production, telecommunications systems, building management (*e.g.,* HVAC), pipelines, chemical plants, industrial equipment, and weather stations. For example, in 1992, I presented a paper on SCADA at an Entelec industry trade show, which was attended by thousands of people from a range of industries who viewed products displayed in dozens of booths. Although the industries and

detailed needs of those attendees varied, they all shared the same interest in RTUs, communication systems, and Host computer systems related to remote monitoring and control.

52. The ’601 Patent provides examples of SCADA applied to HVAC equipment, the status of which may be (a) monitored by a sensor and (b) communicated to a “central computer server” (the “electronic message delivery server” (1)) via an interface unit (denoted “10” in Figure 1). Ex. 1201 at 2:55-65; 5:43-47; 8:21-23; 10:43-54; FIG. 1. When an abnormality (referred to as an “exception condition,” 3:46-52) is detected in the monitored equipment, the interface unit sends an “incoming message” to the server (2:60-65; 5:47-51). Note that the “incoming” aspect of the message sent by the interface unit refers to the message flow relative to the central computer server rather than the sending interface unit.

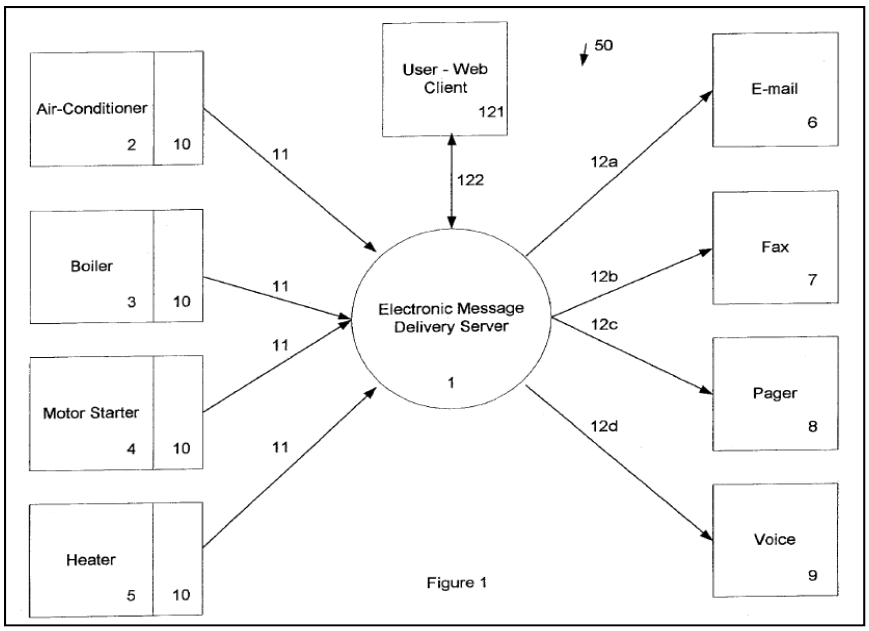

Figure 1

53. The interface unit may also send a "status signal," which indicates that the monitored equipment and the interface unit are functioning properly (5:44-47). Also, as claimed in claims 3, 24, 32, and 42-43, the "incoming messages are normalized at the normalization module 26 so that all incoming messages can then be processed without regard to their incoming medium." 7:16-18; *see also* 7:62-67.

54. As shown above in Figure 1, upon receipt of an exception message, the server sends "an outgoing exception message" to at least one device specified by the user. 5:51-55; *see also* 2:60-3:10, 6:7-25. Note that the "outgoing" aspect of the message is relative to the computer server rather than to the user device that receives the message. The identification information of the user device or devices that receive exception messages is specified in a "message profile" (3:3-

17; 4:41-47, 5:51-55), which is stored on the server and which may be remotely configured by the user via a user interface (2:37-44; 3:17-20).

B. Summary of the Prosecution History of the '601 Patent

55. I have reviewed the prosecution history of the '601 Patent. The '601 Patent was issued on November 14, 2000 from U.S. Patent Application No. 09/317,235, filed May 24, 1999, which claimed the benefit of U.S. Provisional App. No. 60/115,305, filed on January 9, 1999. Ex. 1102.0010. There were 50 proposed claims in the application filed on May 24, 1999. None of the original proposed claims issued in the '601 Patent. In an office action dated January 20, 2000, the Examiner rejected all pending claims under 35 U.S.C. § 103(a) on the basis of U.S. Patent No. 5,400,246 ("Wilson"), stating that the "sensor" and "interface unit" limitations of the then-pending claims were disclosed in Wilson, and that it would have been obvious to add a computer server. Ex. 1102.0065.

56. In advance of a May 11, 2000 interview with the Examiner, Applicants submitted proposed amendments to the claims, and argued that there were three features purportedly distinguishing the invention over Wilson: (a) the ability to remotely configure via a user interface the message profile that specifies where outgoing messages are to be sent; (b) the ability to monitor "remote," as opposed to "local," equipment; and (c) the ability to accommodate multiple users via multiple user profiles. On May 11, 2000 the Examiner stated in an Interview

Summary that adding limitations to "claims 1, 31, 51, and 52 . . . concerning the routing of outgoing message profiles pertaining to the operating status of monitored devices, the message profiles being user definable and modifiable" would be sufficient to overcome the prior art of record. Ex. 1102.0072.

57. On May 17, 2000, in order to overcome the prior art including Wilson, Applicants submitted an amendment identical to the proposed amendments that they provided prior to the interview with the Examiner, and that were consistent with the limitations suggested by the Examiner. That is, Applicants amended the claims to add: (a) enabling a user to remotely modify a message profile stored on the computer server; and (b) sending an outgoing message to the devices specified in the message profile. The Examiner then allowed the claims of the '601 Patent with no further comment.

58. I have reviewed Wilson, and it is my opinion that the Examiner was correct in concluding that Wilson anticipates all major limitations of the '601 Patent, except the two limitations described above that the Applicants added to overcome the Examiner's initial rejection.

59. Wilson discloses gathering "measurement data" from various types of devices (1:38-50), including building equipment (19:13-20:14; Figs. 4A-4D), that may be monitored by sensors (26:5-20). Equipment and/or sensor status, including alarms, may be communicated by means that include radio to a remote

"host PC." 6:55-68; 8:38-48; 33:28-52; FIGS. 2, 12. Users may specify alarm or alert conditions (6:33-43; 17:15-37), and the system may be configured to send alarm messages to different devices such as phones, cellphone or pagers (FIG. 12; 34:4-15). Wilson also discloses that monitored devices can send regular status messages to the remote PC. 34:16-35.

60. It is my opinion that the only limitations in the independent claims of the '601 Patent that are not squarely disclosed by the Wilson patent are: (a) enabling a user to remotely modify a message profile stored on the computer server; and (b) sending an outgoing message to the devices specified in the message profile. But as discussed in detail below, these limitations are disclosed in detail in prior art to the '601 Patent, and in my opinion those references render the '601 Patent unpatentable.

VI. CLAIM CONSTRUCTION

61. I am informed that a claim subject to *Inter Partes* Review is given its "broadest reasonable construction in light of the specification of the patent in which it appears." 37 C.F.R. § 42.100(b). I am also informed that the words of the claim are given their plain meaning from the perspective of a PHOSITA unless that meaning is inconsistent with the specification.

62. I am informed that the Petitioner submits that the following terms may need to be construed in connection with this IPR. Based upon my review of

the ’601 Patent, and my experience in the remote monitoring and control industry, I agree with the claim term constructions offered by the Petitioner in light of the patent language.

A. “[M]essage profile containing outgoing message routing instructions” (claims 1 and 22)

63. Claims 1 and 22 of the ’601 Patent describe “a user-defined message profile containing outgoing message routing instructions.”

64. The Petitioner asserts that the broadest reasonable interpretation of “message profile containing outgoing message routing instructions” is “information identifying a communications device or devices to receive an outgoing message from the computer server.” I agree that this is a reasonable construction of this claim term, and no broader reasonable construction is apparent to me. As a PHOSITA at the time of the priority date, I believe my opinion in this regard would have been the same at that time.

B. “[M]essage generating mechanism” (claims 22-41, 43)

65. Claim 22 of the ’601 Patent describes “an interface unit locally connected to said sensor, said interface unit having a message generating mechanism.” Claim 23 of the ’601 Patent describes “A system according to claim 22, wherein said message generating mechanism of the interface unit forwards said incoming exception messages to said computer server via at least one of a plurality

of communications media." Claim 43 of the '601 Patent describes "an interface unit, coupled to said sensor, said interface unit having a message generating mechanism for generating messages indicative of the state of the at least one parameter of the piece of the remote equipment." Petitioner contends that the claim term "message generating mechanism" should be construed as a means-plus-function claim. The term would not have been, and is not, understood by a PHOSITA as referring to any particular structure.

66. As discussed above, I am informed that the use of the term "mechanism" without structure renders this claim a "means-plus-function" claim, and that means-plus-function claims must be construed in two steps: first, determination of the claimed function, and second, identification of the corresponding structure. The function here is clear from the claim language: "generating messages."

67. The Petitioner asserts that there is no corresponding structure, and the claim is thus indefinite. I agree that the patent does not disclose any corresponding structure. The claims make clear that the message is generated by the interface unit. The specification teaches that the message sent from the interface unit to the server is a "multi-digit code" representing a remote equipment identifier, and a specific exception condition. Ex. 1201 at 5:23-35, 5:39-51, 8:22-26. But the specification does not describe any processor at the interface unit for

generating such a multi-digit code, and even if such a processor can be inferred, the specification does not describe any program, algorithm, or code that a processor would use to generate such a multi-digit code. As such, I agree that the term is indefinite.

68. In the event that the Board concludes, or assumes for purposes of its *Inter Partes* Review, that the term is not indefinite, Petitioner contends that the only possible corresponding "structure" in the specification is "a processor of the interface unit executing an algorithm that generates a message including an indication of message format, an indication of the equipment to which the message relates, and an indication of the specific exception condition if an exception condition exists." I agree that this is a reasonable construction of this claim term, and no broader reasonable construction is apparent to me. As a PHOSITA at the time of the priority date, I believe my opinion in this regard would have been the same at that time.

C. "[N]ormalization module" (claims 24, 32)

69. Petitioner contends that the term "normalization module" should be treated as a means-plus-function claim term under 35 U.S.C. § 112, ¶ 6 because it is a purely functional recitation and does not recite any definite structure for performing the function of "normalizing incoming messages into a uniform

format." It is my opinion that the term "normalization module" is not understood by one of ordinary skill in the art to refer to any particular structure.

70. Here, the claimed function is "normalizing incoming exception messages into a uniform format." The specification confirms that "incoming messages are normalized at the normalization module 26 so that all incoming messages can then be processed without regard to their incoming medium." Ex. 1201 at 7:16-19.

71. Petitioner contends that the specification does not disclose a sufficient structure corresponding to the "normalization module." Claims 24 and 32 indicate that the "normalization module" is part of the "computer server." Likewise, in the specification the normalization module is part of the "message delivery server," which "[i]n the preferred embodiment … includes four hardware devices 200, 300, 400, and 500." Ex. 1201 at 6:43-45. In Figure 4, the normalization module is simply a label in "Device 200," which is described as "responsible for receiving incoming messages, processing them in accordance with the user's preferences, and routing them for output." Ex. 1201 at 6:45-48; *see also* FIG. 4, FIG. 5 (step S2). The specification teaches that "at step S2, normalization module 26 removes the required elements from the incoming message and arranges them in a normalized format and stores them as a record in a table." Ex. 1201at 7:64-67.

72. Although these disclosures make clear that the normalization module is implemented on a processor within the server, the specification does not disclose any program, algorithm, or code that a processor would use to normalize messages. Consequentially, it is my opinion that the claim is indefinite.

73. However, if the Board concludes that the claim is not indefinite, then the only possible corresponding structure is "a processor of a computer server executing an algorithm that takes data from incoming messages, reformats that data, and stores the data in a standardized format on the computer server", as disclosed in 5:33-36, 7:16-18 and 7:64-67 of the Patent (Ex. 1201). I agree that this is a reasonable construction of this claim term, and no broader reasonable construction is apparent to me. As a PHOSITA at the time of the priority date, I believe my opinion in this regard would have been the same at that time.

VII. CLAIMS 1-3, 22-24, 26, 30, 32, AND 42-43 OF THE '601 PATENT ARE UNPATENTABLE UNDER WEWALAARACHCHI, HONEYWELL, AND BACNET.

74. For the reasons I set out below, it is my opinion that claims 1-3, 22-24, 26, 30, 32, and 42-43 of the '601 Patent were obvious as of the claimed priority date of the '601 Patent.

A. Overview of Wewalaarachchi, Honeywell, and BACnet

1. General Overview

75. Note that the quoted citations in the following discussion sometimes denote the server computer as the "remote" location. This is the inverse of the '601 Patent and other references, which denoted the monitored equipment as "remote." The difference is purely semantic. Except in direct citations, this discussion will denote the equipment as "remote" wherever possible in order to be consistent and avoid confusion.

76. The Wewalaarachchi patent disclosed an object-oriented software approach to computer implemented SCADA. Ex. 1203 at 1:12-13. Note that, for simplicity, the Wewalaarachchi patent will sometimes be referred to herein as "Wewa."

77. In the OOP SCADA system disclosed in Wewa, an "external device network" received status data from, and communicated data to, various distributed field devices. Ex. 1203 at 7:17-20. Those devices included a variety of

sensors and building equipment. S*ee* Ex. 1203 at 4:22-26, 8:53-62, 16:46-63, 17:31-35, 20:2-5). Data from the field devices was processed by a "communications gateway" that converted it into a standard, device independent format. Ex. 1203 at 8:1-12. The data from the field device network was then sent to a "central host computer," where computer applications such as alarm and notification processes could access the standardized data. *See generally* Ex. 1203 at 3:26-5:26; 18:19-19:63. Users interacted with the system through a user interface in which they could (a) specify alarm notification conditions based on equipment status data; (b) select an alarm message to be sent when the condition is satisfied; and/or (c) define particular types (e.g., phones, pagers) and numbers of devices to receive notifications. *See* Ex. 1203 at 19:34-63; FIGS. 15a, 15b, 15c.

78. The Wewa system could be used with a variety of monitored devices, including building equipment, and was disclosed as applicable to prior art SCADA systems. *See e.g.* Ex 1203 at 3:19-24; 4:22-30. The Wewa inventors explicitly referenced building management systems (BMS) and building equipment. Ex. 1203 at 4:22-30. A PHOSITA would therefore read the Wewa specification in light of known BMS and SCADA systems.

79. By the early 1990s, one of the most prominent prior art BMS vendors was Honeywell; that well-known supplier was (and still is) one of the leading providers of building management systems. In 1997, Honeywell had

produced an updated version of its detailed engineering manual that described a state-of-the-art BMS; the disclosed system had an architecture similar to that of Wewa. *See* Ex. 1204 at 187, FIG 1. Thus, given Honeywell's prominence in the BMS field, and the similarities between the Honeywell and Wewa system architectures, a PHOSITA in remote monitoring and control would be motivated to combine the teachings of Honeywell and the system disclosed in Wewa.

80. The monitoring and control system disclosed by Honeywell was an example of an industrial control concept known as a Distributed Control System (DCS). A DCS was based on remote electronic controllers to which sensors and actuators were connected. One or more of those controllers communicated with a central superisory computer. In the Honeywell system, the distributed control concept was specifically applied to a Building Management Sytem (BMS).

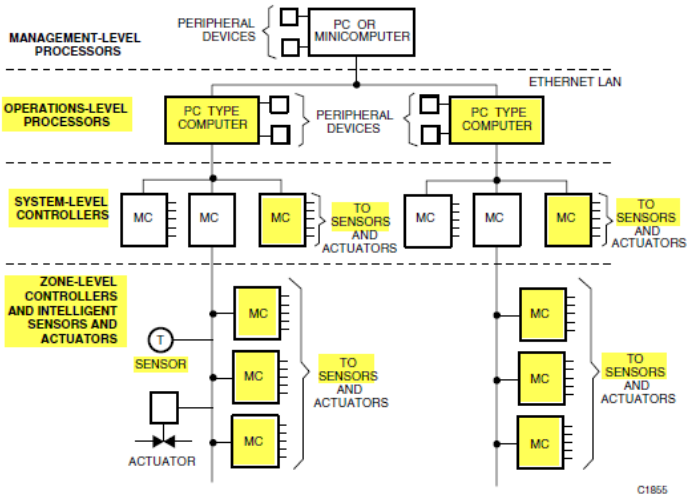

Fig. 1. Hierarchical BMS Configuration.

81. The BMS disclosed by Honeywell had sensors and actuators that communicated with digital "controllers" for the purpose of monitoring and controlling HVAC equipment. *E.g.*, Ex. 1204 at 9-14, 30-33, 135-37. Note that the

Honeywell system termed the microprocessor-based controllers a "MC" in the diagram shown above. That architecture was similar to that of Wewa, which included "field devices" that communicated via an "external device network." It is my opinion that a PHOSITA would understand that Honeywell's sensors and controllers comprised an "external device network" as that term is used by Wewa. One or more of Honeywell's controllers then sent equipment and sensor data (including alarms) to a central operations-level processor. *E.g.*, Ex. 1204 at 142, 187-191. Honeywell's central operations-level processor performed the same function as Wewa's central host computer in that it similarly received and processed data from remotely located field devices. *E.g.*, Ex. 1204 at 142, 187-191.

82. In my opinion, it would have been obvious for a PHOSITA to incorporate Honeywell's disclosure of sensors, controllers, and data message communication to a central computer (the "operations-level processor") in the Wewa system. As mentioned above, the Wewa reference would be read in light of prior BMS and SCADA systems, a field in which Honeywell was an industry leader. Additionally, the systems architecture of Honeywell and Wewa were similar, with Honeywell's sensors and controllers corresponding with Wewa's "external device network," and Honeywell's operations-level processors corresponding with Wewa's "central host computer."

83. A PHOSTA would understand that messages between Honeywell's controller and central computers would have been transmitted and received using a communications protocol that supported multiple remote controllers reporting to a central computer. Both Wewa and Honeywell expressly disclosed the use of BACnet as one of various communication protocols for communicating data in a BMS. *See* Ex. 1203 at 8:16-21, Ex. 1204 at 197-98. BACnet was an object-oriented communications protocol that was specifically developed for use with building automation systems, including HVAC systems. *E.g.*, Ex. 1205 at 1. Thus, it would have been obvious for a PHOSITA to apply the BACnet protocol for communicating data within the combined Wewa/Honeywell system. Applying BACnet to the combined Wewa/Honeywell system would provide specific implementation details, including the disclosure of (a) equipment/sensor ID, (b) specific data fields for indicating equipment sensor values or other data values, and (c) indications of equipment status, including indications of alarm status.

84. As stated above, it would be natural for a PHOSITA to combine the Wewa, Honeywell, and BACnet references. *First*, the Wewa patent would be read in light of known BMS and SCADA prior art. At the time, the Honeywell system was one of the most prominent examples of the "building management systems" referred to in Wewa and was thus a natural choice of prior art. *Second*, both Wewa and Honeywell expressly disclosed the use of BACnet as a

communications protocol for use with a BMS. Thus, Wewa took a well-known BMS (Honeywell) and a well-known communications protocol (BACnet) and extended their functionality by disclosing an Object-Oriented software approach and user interface. For the rest of my analysis, I will refer to a system containing the teachings of Wewa, Honeywell, and BACnet as the "Object-Oriented BMS."

2. Wewalaarachchi, Honeywell, and BACnet rendered all claim limitations in the 601 Patent obvious.

85. The Object-Oriented BMS disclosed all the limitations within the '601 Patent. The '601 Patent required (a) the detection of the state of a parameter of remote equipment; (b) an interface unit connected to a sensor with a message generating mechanism; (c) a central computer server adapted to receive incoming exception messages from an interface unit and send outgoing messages to a remote communications device; (d) a user interface allowing users to specify which remote communications device would receive notifications; (e) user remote configuration of a message profile; and (f) normalization and storage of incoming messages.

a) *Detection of the state of a parameter of remote equipment*

86. The Object-Oriented BMS disclosed the detection of the "state" of a "parameter" of remote equipment. Honeywell disclosed HVAC equipment and various types and purposes of sensors typically used in a BMS (see Ex. 1204 at 9-14, 30-33), including sensors that verify whether a given piece of equipment is

functioning: "[p]roof-of-operation sensors are often required… to monitor fan and pump operation status when a central monitoring and management system is provided" (Ex. 1204 at 33). Additionally, Honeywell specifically noted that "sensors… interface directly with the controlled equipment." Ex. 1204 at 187. These sensors and controllers formed the "external device network" of Wewa.

87. Wewa disclosed a central computer that "communicates with an external device network 216 which provides communication with various distributed field devices 218…" (Ex. 1203 at 7:17-23; *see also* Ex. 1203 at 7:6-11, Fig. 2). Wewa taught that the field devices could include HVAC equipment (*see* Ex. 1203 at 4:22-26, 8:53-62, 16:46-63, 17:31-35, 20:2-5), and data could be measured by sensors (*see* Ex. 1203 at 3:63-4:2, 17:29-35). In my opinion, a PHOSITA would understand an "external device network" to refer to preexisting control networks and building management systems, such as that taught by Honeywell. The data measurements taught by Wewa were generally transmitted in data packets that included a device ID, a device parameter name, and the real-time data for the device parameter. *See* Ex. 1203 at 8:22-28. A PHOSITA would understand that the data packet information indicated the state of a uniquely identified piece of monitored equipment.

88. When the BACnet communications protocol was used, these data packets communicated information in the form of "objects" (*see* Ex. 1205.0014).

Each BACnet object was an abstract data structure that represented the attributes, such as current value and alarm status, of a specific physical device within a building management system. (*see* Ex. 1205.0014, .0149). The BACnet reference disclosed "Objects" representing sensors or equipment that had various "properties," including (a) an identifier for the sensor/equipment (e.g., Ex. 1205.0152 (§12.1.1), Ex. 1205.0168 (§12.4.1)), (b) a present value of the input from the sensor/equipment (e.g., Ex.1205.0153 (§ 12.1.4), Ex. 1205.0168 (§12.4.4)), and (c) status flags (Ex.1205.0163 (§ 12.3.6)). One status flag, in particular, indicated normal status, namely when the "IN_ALARM" flag was set to zero. "[B]y reading and writing the properties of [these] particular objects" (Ex. 1105.0014), communication of equipment status and alarm data could be accomplished.

89. For example, a sensor in BACnet could be represented by an "Analog Input Object" (Ex. 1205.0153 (§ 12.1.6)). A typical such sensor would indicate air temperature or humidity. Alternately, the off-on state of a piece of mechanical equipment could be represented by a "Binary Input Object." (Ex. 1205.0167 (§12.1.4)). An example piece equipment would be a chilled water pump or cooling fan. In both examples, the BACnet object could contain a property that indicated the normal or abnormal status of the monitored equipment.

b) *An interface unit connected to a sensor with a message generating mechanism*

90. The Object-Oriented BMS also disclosed an interface unit connected to a sensor with a message generating mechanism that generates exception messages and sends those messages to a remote computer server. As I detail below, the Object-Oriented BMS specifically disclosed the interface unit, the "message generating mechanism," and the communication of messages to a remote computer server.

91. As I stated above, a PHOSITA would understand that the "controller" disclosed in Honeywell corresponded to the claimed "interface unit," and that the sensors and controller of Honeywell corresponded to the "network of field devices" of Wewa. A Honeywell controller included a microprocessor that received data from various inputs such as locally connected sensors. *See* Ex. 1204 at 135; *see also* Ex. 1204 at 33, 133. The microprocessor uses "alarm and monitoring software" (Ex. 1204 at 137), which "[s]cans all analog and digital points and tests for alarm status." Ex. 1204 at 142. Similarly, a "controller must know [a digital input's] normal state (open or closed), whether the

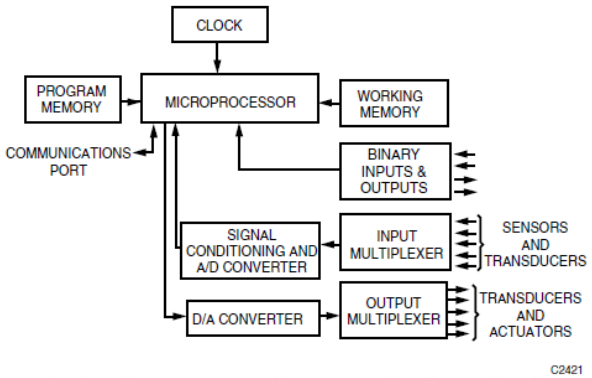

Fig. 3. Microprocessor Controller Configuration for Automatic Control Applications.

given state is an alarm state or merely a status condition." (Ex. 1204 at 143.) Similar to the 601 Patent, a controller was coupled to or locally connected to sensors and recognized when an exception condition in the monitored equipment is sensed. A person of skill in the art would understand that the controller of Honeywell would have been a component in the "external device network" of Wewa.

92. In addition to communicating with sensors, the controller in Honeywell could communicate data and parameters to a central operations-level processor, or central server. The controller had a communications port, which "allows dynamic data, setpoints, and parameters to be passed between… a central building management system" (Ex. 1204 at 137; *see also* 135), such that "sensors and data files can be shared with building management system (BMS) functions." (Ex. 1204 at 142.) Thus, as shown in Figure 4 (reproduced above [Ex. 1204.0199]), sensor data produced by controllers may be sent to a central "operations-level processor," which is a "PC or other device." (Ex. 1204 at 186.) This PC corresponds to the "central host computer" of Wewa. The controllers may be remote from the operations-level processor, and as shown in Figure 4 of Honeywell, the controller

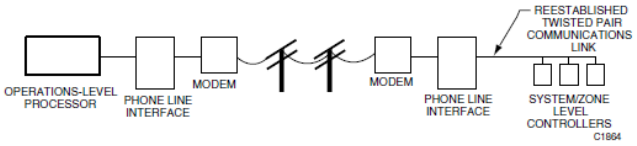

Fig. 4. Dialup to Remote Controllers.

may communicate with the processor via telephone lines.[1] Using BMS software (HO at 142), a controller could communicate various types of data to the central operations-level processor using such protocols as BACnet.

93. For example, the controller of Honeywell could forward alarms (*e.g.,* Ex. 1204 at 191), including via a telephone link: "[c]ritical alarms can be programmed at the remote to dial the central system immediately." (Ex. 1204 at 190.) The controller could also communicate "trend data," which are data for particular sensors that the controller reports to the operations-level processor either periodically or upon data point changes. (*Id*. at 191)

94. Wewa and BACnet disclosed similar teachings with respect to sensors, messages concerning monitored equipment, and related messages. Wewa, for instance, noted that in a "typical device protocol" such transmissions of sensor and equipment-related data generally take the form of "data packets [that] include a device ID, a parameter name, a type (application level and protocol specific), a

[1] Both Wewa and BACnet disclose sending equipment data via telephone links. Ex. [WE] at 8:16-17; 8:19-20; BAC/§ 4.1. Thus, each of Wewa, Honeywell and BACnet disclose monitoring of *remote* equipment, which is one of the three alleged points of novelty on which the '601 patent applicants relied (*see* discussion above at section V(B)).

data length, and the real time data." Ex. 1203 at 8:26-28. BACnet teaches objects, such as an analogue input object, with various properties including an "object identifier," "object type," "present value," and "status flags" ("IN-ALARM" flag is 'Logical FALSE(0) if the Event_State property (see 12.1.8) has a value of NORMAL, otherwise logical TRUE (1).'") *See* Ex. 1205. (§§ 12.1.1, 12.1.3 and 12.1.7).

c) *A central computer server adapted to receive incoming exception messages from an interface unit and send outgoing messages to a remote communications device*

95. Furthermore, the Object-Oriented BMS disclosed a central computer server adapted to receive incoming exception messages from an interface unit, and that could send outgoing exception messages to remote communications devices. As I previously discussed, in the conventional BMS of Honeywell, the controller may be remote from the central operations-level processor. The central processor also contained communications software that allowed it to receive communications that include alarm or trend data, such as BACnet communications. *See* Ex. 1204 at 191. This operations-level processor corresponded to Wewa's central host computer that operated a "virtual application service [which] communicates with an external device network…. [and] typically execute[s] on a central host computer…." (7:18-23). The "communications gateway" of that application service was responsible for receiving "real time data

from the field devices" (3:36-40) in the form of the data packets referenced above (8:1-7, 8:22-28.) The communication gateway operated with services such as MAPI (email) and TAPI (telephone), which confirms that the monitored devices could be remote from the central host computer (8:17-21; *see also* 11:60-62). Thus, the central computer in both Honeywell and Wewa received incoming exception messages. BACnet taught a communications protocol that can be used in conjunction with any of Honeywell, Wewa, or the combined system of Honeywell and Wewa.

96. After exception messages (such as alarms) were received from the central controller (Honeywell) or external device network (Wewa), Honeywell and Wewa disclosed the forwarding of exception messages to other devices, such as a computer server. Honeywell disclosed that alarms can be forwarded to other devices, such as other computers or printers. *See* Ex. 1204 at 191 ("Alarm Processing"). Wewa extended this forwarding capability by teaching that the central computer could forward alarm notifications to user-specified remote devices. *See* Ex. 1203 at 18:20-31; 19:34-64. In this regard, the real-time device data received by the communications gateway of Wewa's central host computer was further processed in "application cells" (Ex. 1203 at 3:57-4:8, 8:47-9:12), then stored as a "data object" in an "object server" (Ex. 1203 at 4:9-21, 9:30-40). The application cells (of the central host computer, Ex. 1203 at 7:13-15, 7:22-23) could

then use real-time monitored device data from the object server to perform actions based on user-specified conditions (Ex. 1203 at 19:16-33), including user notifications. In Figs. 15a-c, Wewa expressly disclosed "user interfaces of application cells for defining event driven automation for notification of a user of an alarm condition." (Ex. 1203 at 19:34-36.) Using this interface, the user was able to specify the data source and ranges that triggered alarm notification. The user could also specify the message or sound file comprising the alarm notification, and the communications devices that received the alarm. The user could select between a pager or a telephone. (Ex. 1203 at 19:34-60, Figs. 15a-c.) As a result, "the system can automatically notify any number of users directly by telephone or pager when an alarm condition is detected by a personalized SCADA application." (19:60-63.)[2] To the extent that claim 1 and 22 require that the incoming equipment

[2] Wewa also disclosed an alternative embodiment in which "presentation cells," rather than "application cells," performed notification operations. The disclosed "cells" are software application programs. The object server provided real-time data to user-customized monitoring applications and graphical interfaces called "personal agents," which were also software programs. (Ex. 1203 at 4:57-63) Those programs ran on the central host computer (Ex. 1203 at 7:25-27). The personal agents comprised a number of cells capable of monitoring and displaying

data be an alarm message, as opposed to data that causes the central computer to detect an alarm, that would have been obvious based on Wewa. Wewa disclosed alerting users when, for example, the monitored data was below 1 and above 5 (see FIG. 15a); thus, it would certainly be capable of alerting the user when the monitored data was a BACnet message indicating that a particular property is IN_ALARM.

d) *a user interface allowing users to specify which remote communications device would receive notifications; and*

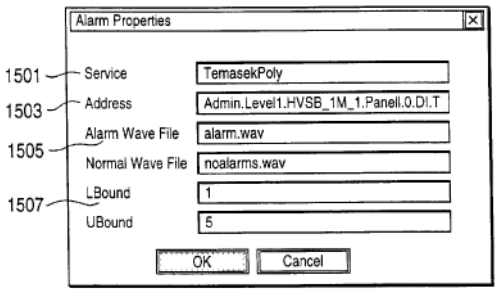

FIG. 15a

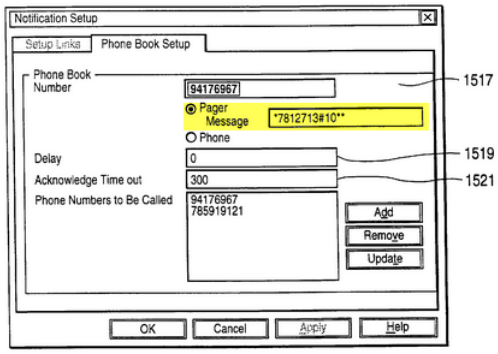

FIG. 15c

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device data or alarms (Ex. 1203 at 4:64-5:9, 11:16-18, 11:28-45, 16:46-55, FIG. 12). The cells had various user-configurable properties (Ex. 1203 at 11:16-18) that regulated user notifications that included "email" or "telephone" messages based on real-time monitored device data (Ex. 1203 at 18:19-40). A person of skill in the art would understand this embodiment of user-configured software "cells" to disclose the claimed message profile of the '601 Patent.

97. Wewa also disclosed a "user interface" (UI) that allowed users to specify which remote communications device would receive notifications based on specified exception conditions. The user interface had application cells for defining automatic notification to a user based on particular events. Ex. 1203 at 19:34-36. Wewa described an "application cell [as] a cell which communicates data between the communications gateway and the object server" to either update the values in the object server or to send commands/values to the communications gateway and field devices. *See* Ex. 1203 at 3:57-63.

98. Through the UI seen in FIG 15a, users could define "the object server [and] the data object that provides the input data to be monitored." Ex. 1203 at 19:36-39. In other words, the user identified the sensor or device data (see Ex. 1203 at 9:41-56) to be monitored for alarms. The UI also allowed the user to specify the criteria for an alarm notification. Ex. 1203 at 19:39-40. In the user interface of FIG 15b, the user could specify the communications service to be used for notification, such as TAPI (telephony), and the sound file that communicated the alarm notification (see Ex. 1203 at 19:41-52). In the UI of FIG. 15c, the user could "define[] telephone numbers of various persons to dial when the alarm condition is met" (Ex. 1203 at 19:53-54). As a result of the user choices entered via these user interfaces, "the system can automatically notify any number of users directly by telephone or pager when an alarm condition is detected" (Ex. 1203 at

60-62).[3] It is my opinion that the information entered through these user interfaces, and the notification processing that occurred as a result of this information, corresponded to the claimed "message profile" of the '601 Patent.

e) *user remote configuration of a message profile*

99. Because Wewa disclosed user interfaces to configure "application cells" residing on a "central host computer," in my opinion, a PHOSITA would know that the application cells (or some related data structure) would have stored the user-specified criteria that defined exception conditions. Similarly, the system would store the user-specified contact numbers and device types (e.g., pager or telephone) of the devices to be notified. It is therefore my opinion that Wewa taught the storage of the claimed message profile. Further, because Wewa taught that multiple users can use the system (see Ex. 1203 at 5:67-6-2), a PHOSITA would understand that in such implementations there must be multiple such user profiles. Wewa also taught that the application cells are found in a "base" or "sub

[3] Additionally, as discussed above, Wewa disclosed an alternative embodiment wherein notifications are performed by presentation cells.

framework" (Ex. 1203 at 8:48-51), and even without such a teaching, a PHOSITA would find it obvious to store data in a database.[4]

100. Wewa also taught the remote configuration of a "message profile." The Wewa Patent enabled each user to define and operate a personalized SCADA application from any remote location, which would include the interfaces shown in FIGS. 15a-15c. 1203 at 5:67-6-2. Therefore, it would have been obvious to implement Wewa's user interface via remote access, including over the Internet, thereby allowing users to input or edit criteria and device information corresponding to the claimed "message profiles."

f) *normalization and storage of incoming messages.*

101. Additionally, the Object-Oriented BMS disclosed normalizing incoming messages, storing such messages, and basing outgoing exception messages on the normalized incoming messages. As I described the introductory section on SCADA, data normalization was commonly used in SCADA systems,

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[4] In the Wewa embodiment in which notification is performed by "presentation cells" (Ex 1203 at 18:19-40), a PHOSITA would know that the presentation cell serves as a user interface (e.g., Ex. 1203 at 4:64-5:9; 16:46-63; FIG. 12) and that this cell too must store notification criteria and notified device identifiers in a data structure that would correspond to the claimed "message profile."

including those applied to Building Management. Many SCADA and BMS systems in the 1990's used their own proprietary protocol for controller-to-server communications; however, multiple protocols from controllers could also be accommodated within a single system using "open architecture" interfaces available to all vendors. That concept allowed multiple protocols and data formats to be used in a single system. Diverse protocols required that data exchanged in any format be converted to a single "normalized" format by the receiver; that same normalized format would also be used for any messages that were subsequently generated based on that normalized data. Such normalization was also an inherent aspect of Object-Oriented Programming (OOP) that abstracted data from multiple sources into a standardized format. This concept is evident both Wewa as well as systems based on BACnet that used OOP concepts to normalize BMS data into uniform entities regardless of the format in which the sensor data had originated.

102. In my opinion, a PHOSITA would understand that Wewa disclosed normalization of incoming data by the central host computer:

> the input format to a communication gateway 202 comprises a low level byte stream of data packets containing real time data formatted according to a particular device protocol by the device network 216. In the typical device protocol, the data packets include a device ID, a parameter name, a type (application level and protocol specific), a data length, and the real time data…. The communication gateway

> converts this information into a standardized data format that includes fully structured and typed data, with an indication of the source and the value of the data. Ex. 1203 at 8:22-35; *see also* 8:35-46; 3:38-51, 17:31-42.

After further processing by the application cells (Ex. 1203 at 8:63-67), the normalized data is stored in the standardized <name, value> format on the object server (Ex. 1203 at 9:30-40). Wewa thus disclosed normalization of all incoming device data and storage of that data in an object server, which is a "data store" (WE at 9:30-35).

103. Wewa also disclosed that generation of notification messages was based on normalized data. As discussed above, notification operations were performed by application cells and presentation cells, each of which received their data from the object server (*see* Ex. 1203 at 18:4-8, 18:19-31, 9:30-40; 19:36-40).

B. Aspects of the Prior Art Particularly Applicable to the '601 Patent

104. In my opinion, the Wewa, Honeywell, and BACnet references disclosed all of the key components and performed all of the same basic functions as the system described in the '601 Patent.

105. The Object-Oriented BMS comprised the following components that are particularly relevant to the '601 Patent:

- Sensors of different types and purposes that monitored equipment (Ex. 1204 at 9-14, 30-33, 135-37, 187), and "field devices" that measured

data with sensors (Ex. 1203 at 3:63-4:2, 7:17-20, 17:29-35). *See also* ¶¶ 75, 80, and 86-87 above. Wewa and Honeywell's sensors are analogous to sensors in the '601 Patent. *See* Ex. 1201 at 10:45-47.

- A "controller" that included a microprocessor that received data from inputs, including locally connected sensors, and recognized when the sensor detected an exception condition in the monitored equipment. Ex. 1204 at 135; *see also* Ex. 1204 at 33, 133; see also ¶ 80, 86-87, and 90-93 above. The "controller" is analogous to the "interface unit" of the '601 Patent. Ex. 1201 at 10:48-50.
- An "operations-level processor" (Ex. 1204 at 186), or a "central host computer" (Ex. 1203 at 3:26-5:26; 18:19-19:63) each of which received sensor data and communicated with the controller or interface unit. *See also* ¶¶ 75, 80-82, 87, and 95-96 above. The "operations-level processor" and/or "central host computer" are analogous to the central "computer server" of the '601 Patent (Ex. 1201 at 10:52-59).
- Communication of data concerning equipment status (both "normal status" and "exception messages") from a local controller to a central server. *See* ¶¶ 92-96 above, and ¶ 115 below.

- A "user interface" by which users could specify which remote communication devices receive notifications based on user-specified exception conditions. Ex. 1203 at 19:34-36; *see also* ¶¶ 97-99 . This specification of communications devices is analogous to the "message profile" stored at the computer server of the '601 Patent.
- "[A] pager or a telephone" that, upon user specification, received the alarm notification. Ex. 1203 at 19:34-60, Figs. 15a-c; *see also* ¶¶ 96-97 This is analogous to the "user-defined remote communications device" in the 601 Patent. Ex. 1201 at 8:67-9:3, 10:65-11:2.
- A "communications gateway" which was a structure that received data and normalized that data before sending it to "application cells." The communications gateway is analogous to the "normalization module" and related limitations of the '601 Patent. Ex. 1203 at 8:22-35; *see also* 8:35-46; 3:38-51, 17:31-42; *see also* ¶¶ 101-103.

C. Ground 1: Claims 1-3, 22-24, 26, 30, 32, and 42-43 are rendered obvious by Wewalaarachchi, Honeywell, and BACnet.

106. It is my opinion that the Wewalaarachchi (Wewa), Honeywell, and BACnet references rendered obvious every limitation of claims 1-3, 22-24, 26, 30, 32, and 42-43.

107. The primary functionalities required by the claims in this Ground are: (a) a user-defined message profile on the central server containing outgoing message routing instructions; (b) an outgoing message sent to a user-defined communication device; and (c) enabling a user to remotely configure a message profile stored on the server. Wewa, Honeywell, and BACnet disclosed all of these functions.

108. As discussed in Section VI.A above, Wewa expressly disclosed a "user interface" by which users could specify which remote communication devices received notifications based on particular user-specified exception conditions. The user interface allowed the user to specify criteria for an alarm notification (Ex. 1203 at 19:39-40), and to specify the communications service to be used for notifications (see Ex. 1203 at 19:41-52). The user could "define[] telephone numbers of various persons to dial when the alarm condition is met" (Ex. 1203 at 19:53-54), and as a result of these choices, the system could automatically notify users when an alarm condition was detected (Ex. 1203 at 60-62). Thus, Wewa disclosed a system with a user defined message profile and outgoing messaging functionality analogous to that in the 601 Patent.

109. Furthermore, a PHOSITA would know that in order to send notifications based on exception conditions detected using that data, the application cells (or some related data structure) would necessarily have stored the user-

specified criteria that defined exception conditions, as well as the user-specified contact numbers and device types (e.g., pager or telephone) of the devices that were notified. Thus, Wewa rendered obvious the claimed "message profile."

110. Wewa also disclosed, or at least rendered obvious, remote configuration of a "message profile." As I stated above, the Wewa patent enabled each end user to define and operate a personalized SCADA application from any remote location. Thus, Wewa disclosed the ability for a user to remotely configure a user profile analogous to the functionality of the '601 Patent.

111. In addition to the primary functionalities required by the claims, various of the claims of the '601 Patent also require (a) determination of the state of a parameter of remote equipment; (b) a message communicating the state of remote equipment to a computer server; (c) determination of whether an incoming message is an exception condition at which point the server sends an outgoing exception message to one or more remote communication devices; and (d) "normalizing" incoming messages to the computer server and generating outgoing exception messages on the basis of the normalized messages. The Object-Oriented BMS comprised of Wewa, Honeywell, and BACnet disclosed all of these functions.

112. *First*, the '601 Patent requires determining or detecting the "state" of a "parameter" of remote "equipment." This determination is made by a

"sensor" in local communication with the equipment. As I stated in Section IV.A, Honeywell disclosed HVAC equipment and various types and purposes of sensors to measure now a piece of equipment was functioning. Ex. 1204 at 9-14, 30-33. The controller determined the normal state of a piece of equipment and whether or not such state triggered an alarm. Ex. 1204 at 143. Likewise, Wewa disclosed a central computer that "communicates with an external device network 216 which provides communication with various distributed field devices 218…" (Ex. 1203 at 7:17-23; *see also* Ex. 1203 at 7:6-11, Fig. 2). Thus, the Object-Oriented BMS disclosed detection of the state of a parameter of remote equipment as required by the '601 Patent.

113. *Second*, claims 1 and 42 of the '601 Patent require that a message communicating the state of remote equipment be sent to a central computer server. Claims 22 and 43 require an interface unit coupled to a sensor with a "message generating mechanism" that generates messages. The messages may be indicative of the state of an equipment parameter, or may be exception messages sent to the central server when a sensor senses an equipment exception condition. It is my opinion that a PHOSITA would understand that the Object-Oriented BMS performed this function. Honeywell disclosed that "controllers should be equipped with a communications port . . . [to] allow[] dynamic data, setpoints, and parameters to be passed between a local operator terminal, a central building

management system, and/or other controllers." Ex. 1204 at 137. Then, alarms could "be programmed at the remote to dial the central system immediately." Ex. 1204 at 190.

114. As I discussed in section VI(B) above the function of the "message generating mechanism" is to "generate messages." *See* ¶ 66 above. As I stated above, I do not believe the '601 Patent discloses sufficient corresponding structure, and it is therefore my opinion that the "message generating mechanism" claim term is indefinite. *See* ¶ 67 above. However, if the Board does not find the claim term to be indefinite, it is my opinion that the corresponding structure is "a processor of the interface unit executing an algorithm that generates a message including an indication of message format, an indication of the equipment to which the message relates, and an indication of the specific exception condition if an exception condition exists." *See* ¶ 68 above.

115. Because the controller in an Object-Oriented BMS was a microprocessor based component that generated messages to the central computer by executing an algorithm, including messages indicative of the state of equipment parameters, it performed the identical functions of the claimed "message generating mechanism" using an identical or equivalent structure: a processor executing the algorithm described above in section IV(B). Because the central operations-level processor received data from multiple remote controllers, as

shown in Figure 1 of Honeywell (reproduced above), a PHOSITA would understand a controller's software to perform communications functions by generating protocol-specific messages (such as BACnet messages); such messages would have data packet fields that, for example, identified the relevant sensor or equipment, and could include trend data or an alarm status. *See* ¶¶ 86-88 above.

116. Even if not considered an identical structure, a PHOSITA would understand the microprocessor-based controller to be an equivalent structure because (a) it performed the same function (generating equipment status messages) (b) in the same way (indicating message format/equipment ID) to (c) achieve the same result (assembling a message packet). Because there are no substantial differences between the CPU/algorithm disclosed by the Object-Oriented BMS and the CPU/algorithm disclosed by the '601 Patent (to the extent that algorithm is sufficient), it is my opinion that a PHOSITA would have considered them to be equivalent.

117. *Third*, Claim 1 of the '601 Patent requires determining whether an incoming message to a computer server is an exception message and, if so, forwarding an associated outgoing exception message to one or more "remote communication devices." Similarly, claims 42 and 43 require determining from the incoming message whether an outgoing exception message is to be sent to the remote communications device and, if so, sending the message. In addition, Claim

22 requires that the server be adapted to receive messages from the remote interface unit; the claim further requires that based on an incoming exception message, the server forward an outgoing exception message to one or more "remote communication devices." Wewa disclosed that its "virtual application services communicate[] with an external device network," typically on a central host computer, and use a "communications gateway" to receive "real time data from the field devices." Ex. 1203 at 3:3-40, 7:18-23. The central computer could then forward alarm notifications to user-specified remote devices. *See* Ex. 1203 at 18:20-31; 19:34-64, 19:57-63 ("The notification cell will cause the specified telephone numbers to be dialed, and will play either the alarm wave file specified at 1505, or a default message file specified at 1513. In this manner the system can automatically notify any number of users directly by telephone or pager when an alarm condition is detected by a personalized SCADA application."). Wewa detected (a) whether a "user defined conditional behavior" was satisfied, (b) determined what action to perform based on the condition's satisfaction, and (c) initiated an action upon such satisfaction. Ex. 1203 at 18:20-31. Wewa's detection of whether a defined condition had been satisfied is analogous to the '601 Patent's determination of whether an incoming message is an exception message, and Wewa's initiation of action is analogous to the 601 Patent's forwarding of an outgoing exception message to a user-defined communication device.

118. *Fourth*, independent claims 42 and 43, and dependent claims 3, 24 and 32 of the ’601 Patent each require “normalizing” incoming messages to the computer server into a uniform format, and generating outgoing exception messages on the basis of the normalized messages. In claims 24 and 32, the function of the “normalization module” is “normalizing incoming messages into a uniform format.” *See* ¶ 70 above. As I opined above, I do not believe that the ’601 Patent discloses sufficient structure for the “normalization module” claim term, and as such, it is my opinion that this claim term is indefinite. *See* ¶¶ 71-72 above. However, if the Board concludes that the claim is not indefinite, then the only possible corresponding structure is “a processor of a computer server executing an algorithm that takes data from incoming messages, reformats that data, and stores the data in a standardized format on the computer server.”

119. As stated above in Section VI(A), Wewa disclosed a structure equivalent to the claimed normalization module. Data from the monitored field devices was received and normalized by the “communications gateway” before being sent to application cells and stored (in the normalized form) on the object server. Ex. 1203 at 9:30-40; *see also* ¶¶ 101-103 above. This data was stored in a standardized <name, value> format on the object server (Ex. 1203 at 9:30-40). *See also* ¶¶ 101-103 above.

120. Each of these components was implemented by software algorithms executing on a central host computer. *See* Ex. 1203 at 7:7-15; 7:22-23. As the descriptions above indicate, this software performed an algorithm that took incoming data messages, reformated the data and stored it in standardized format in the object server (which corresponds to the claimed "computer server"). In effect, "unstructured, raw real time data from many different sources, having different and often incompatible protocols, is restructured into a consistent representation and format." Ex. 1203 at 3:38-51; 8:2-11. As a result, to the extent the claimed "normalization module" is not indefinite, Wewa disclosed identical structure. Alternatively, Wewa disclosed structure equivalent to that disclosed in the '601 Patent because it (a) performed the same function (reformatting received data), (b) in the same way (a CPU executing software reformats the data) to (c) accomplish the same result (data is stored in a standardized format). Because there are no substantial differences between the CPU/algorithm disclosed by the Object-Oriented BMS and the CPU/algorithm disclosed by the '601 Patent (to the extent that algorithm is sufficient), it is my opinion that a PHOSITA would have considered them to be equivalent.

121. The Petitioner's tables, inserted below, show how each limitation of claims 1-3, 22-24, 26, 30, 32, and 42-43 of the '601 Patent is taught by the Shetty patent. I have reviewed these tables in detail, and agree that they accurately

set out attributes and features of the Shetty patent that renders obvious each and every element of each of these claims.

Claim 1	**Wewalaarachchi, Honeywell, and BACnet**
1. A method of monitoring remote equipment comprising the steps of:	"A system and *method provide for the creation and operation of real-time enterprise-wide, personalize[d] supervisory and control data acquisition systems*." Ex. 1203 at Abstract; *see also id.* at 4:24-25; 5:6-8; 16:46-67; 19:65-20:4; FIGS. 12, 16. *See* Ex. 1207 at § VII(A)(1).
a) determining a state of at least one parameter of at least one piece of the remote equipment;	"*Proof-of-operation sensors* are often required… to *monitor fan and pump operation status* when a central monitoring and management system is provided." Ex. 1204.0043; *see also* FIG. 3, 1204.0145, 1204.0143. "If the point is digital, the *controller must know* its normal state (open or closed), *whether the given state is an alarm state or merely a status condition*, and whether or not the condition triggers an event-initiated program." Ex. 1204.0153; *see also* 1204.0152. *See also* 1204.0040; Ex. 1203 at 4:24-25; 4:65-5:1; 5:6-8; 8:22-28; 16:46-67; 19:65-20:4; FIGS. 12; 16.
b) communicating a message indicative of the state from the piece of remote equipment to a computer server as an incoming message;	*See* claim chart for Claim 1(a), Ground 1. "The virtual application services 200 typically execute on a *central host computer*…." Ex. 1203 at 7:22-23. "Each virtual application service 200 includes its own *communication gateway* 202…. responsible for *receiving real time data from the field devices 218*…" Ex. 1203 at 8:2-7; *see also id.* at 3:38-40, 8:22-31, 11:60-62. "Zone- and system-level controllers should be equipped with a communications port. This allows *dynamic data, setpoints, and parameters to be passed*

Claim 1	Wewalaarachchi, Honeywell, and BACnet
	between a local operator terminal, *a central building management system*, and/or other controllers." Ex. 1204.0147. "Critical *alarms can be programmed at the remote to dial the central system immediately.*" Ex. 1204.0200. "*Upon receiving an alarm from a controller*, operations-level processors initiate alarm processing…" Ex. 1204.0201; *see also* FIG. 1, 1204.0197; FIG. 3, 1204.0145; 1204.0152; 1204.0197; 1204.0196; FIG. 4, 1204.0199; 1204.0205. *See also* Ex. 1203 at 7:17-20; Ex. 1205.0230-32; Ex. 1205.0152-53 (§§ 12.1, 12.1.6, 12.1.7). *See* Ex. 1207 at § VII(A)(2)(b).
c) enabling a user to remotely configure or modify a user-defined message profile containing outgoing message routing instructions, the user-defined message profile being storable on the computer server;	"FIGS. 15a, 15b, and 15c illustrate *user interfaces of application cells for defining event driven automation for notification of a user of an alarm condition*. In FIG. 15a, the user defines, via service 1501, the object server, and via 1503 the data object which provides the input data to be monitored, and via bounds 1507 defines the valid range of input data…. In 1513, *the user defines the notification to be provided to the recipient (whether the alarm message specified in the linked cells, or a particular sound file)....* In FIG. 15c, under the phonebook setup tab *the user defines 1517 telephone numbers of various persons to dial when the alarm condition is met and the notification occurs*…. The notification cell will cause the specified telephone numbers to be dialed, and will play either the alarm wave file specified at 1505, or a default message file specified at 1513. In this manner *the system can automatically notify any number of users directly by telephone or pager when an alarm condition is detected by a personalized SCADA application*." Ex.

Claim 1	Wewalaarachchi, Honeywell, and BACnet
	1203 at 19:34-63; *see also* FIGS. 15a, 15b and 15c; Ex. 1203 at 7:13-23. *See* Ex. 1207 at § VII(A)(2)(d) and (e).
d) determining whether an incoming message is an incoming exception message indicative of improper operation of the piece of remote equipment;	*See* claim chart for Claim 1(b) and 1(c) (*e.g.*, Ex. 1203 at 19:34-63), Ground 1. "*A notification operation* is similar to the monitoring operation, but takes the additional step of *causing a condition to occur and an action such as sound alert, email, telephone*. For a *notification operation*, a *presentation cell 302 will have a user defined conditional behavior defined by a rule condition, an action to perform if the condition is satisfied*, and a target entity (presentation cell or application cell) on which to perform the action. . . . *[T]he presentation cell 302 determines whether the condition is satisfied. If so, the presentation cell initiates the action upon the target*." Ex. 1203 at 18:20-31.
e) if it is determined in step d) that an incoming message is an incoming exception message, forwarding at least one outgoing exception message based on the incoming message to at least one user-defined communication device specifiable in the user-defined message profile,	*See* claim chart for 1(b), 1(c), and 1(d), Ground 1. "*The notification cell will cause the specified telephone numbers to be dialed, and will play either the alarm wave file specified at 1505, or a default message file specified at 1513. In this manner the system can automatically notify any number of users directly by telephone or pager when an alarm condition is detected by a personalized SCADA application*." Ex. 1203 at 19:34-36; 19:57-63.
[f] wherein the user can remotely configure or modify the user-defined message profile by remotely accessing the computer server.	*See also* claim chart for Claim 1(c), Ground 1.

Claim 2	**Wewalaarachchi, Honeywell, and BACnet**
2. A method according to claim 1**,** wherein said step b) further comprises the step of communicating a plurality of incoming messages to the computer server via one of a plurality of different communication media.	*See* claim charts for Claim 1(b), Ground 1. "The communication gateway 202 operates with such protocols as BacNet (building automation), *LonBus* (control networks), and Echelon (control networks), *MAPI* (email applications), *TAPI* (telephony applications)…." Ex. 1203 at 8:16-20; *see also id.* at 7:22-23; 8:2-3; 8:6-7. "The most common choices for BMS transmission trunks are: — Twisted copper pairs[;] — Fiber optic cable[;] — *Common carrier telephone channels*." Ex. 1204.0199.

Claim 3	**Wewalaarachchi, Honeywell, and BACnet**
3. A method according to claim 2**,** further comprising the step of normalizing the incoming messages into a uniform format to create normalized messages, wherein the outgoing exception messages are generated based on the normalized messages.	"*The communication gateway converts this information into a standardized data format that includes fully structured and typed data, with an indication of the source and the value of the data. The indication of source specifies the particular field device 218* or application 220 *which generated the data. . . . This reformatted data is preferably in the format of <name, value> pairs, where the name indicates the data source, and the value is the structured real time data. In this manner, unstructured, raw real time data from many different sources, having different and often incompatible protocols, is restructured into a consistent representation and format*." Ex. 1203 at 8:32-46. *See also id.* at 8:47-53; 3:38-51; 8:2-11. *See also* claim charts for claims 1(e) and 2, Ground 1. *See* Ex. 1207 at § VII(A)(2)(f).

Claim 22	**Wewalaarachchi, Honeywell, and BACnet**
A system for monitoring remote equipment, comprising:	*See* claim chart for claim 1 preamble, Ground 1.
[22a] a sensor in	"[I]n a building management system, the *raw, real time*

Claim 22	Wewalaarachchi, Honeywell, and BACnet
local communication with a piece of remote equipment, said sensor detecting a state of at least one parameter of the piece of remote equipment;	*data from the field devices will be for many different types of field devices*, such as lights, *heating units*, thermostats, window controls, *ventilation systems*…. data from *different field devices* (e.g., readings from *different temperature sensors in the same tank*)." Ex. 1203 at 4:22-25; 4:27-31; *see also id.* at 3:63-4:2, 16:47-48, 4:50-52, 17:31-35. "*Proof-of-operation sensors* are often required… *to monitor fan and pump operation status* when a central monitoring and management system is provided." Ex. 1204.0043; *see also* Ex. 1204.0040, 1204.0197, 1204.0198.
[22b] an interface unit, locally connected to said sensor, said interface unit having a message generating mechanism; and [22c1] a computer server in remote communication with said interface unit, said server adapted to receive messages generated by said interface unit,	*See* claim charts for claims 1(b) and 2 Ground 1. "[M]icroprocessor-based *controllers… measure signals from sensors*…. Microprocessor-based controllers can be used… as *controllers incorporated into a building management system utilizing a personal computer (PC) as a host*…." Ex. 1204.0143; *see also* Ex. 1204.0043, 1204.0040, 1204.0153. "Zone- and system-level *controllers should be equipped with a communications port*. This allows *dynamic data,* setpoints*, and parameters* to be passed between a local operator terminal, a *central building management system*…." Ex. 1204.0147; *see also* Ex. 1204.0146, 1204.0153. "The following *BMS software is normally included in the controller…. Communications module: Controls transmissions* between controllers and *between controllers and a central computer*…." Ex. 1204.0152. "*The trend report utility allows for archival of data point status and values* for subsequent review. Archival may be based upon a time interval or a change in status or value…. *Trend sample requirements are usually set-up in the controller and automatically reported to the BMS*

Claim 22	Wewalaarachchi, Honeywell, and BACnet
	thereafter." Ex. 1204.0201. "*Software at the operations level communicates with all system- and zone-level processors in a peer-to-peer fashion*. Communications functions include…. *Receiving alarm* and return-to-normal *reports* (including remote device communications failures)[;] *Receiving trend status' and values*." Ex. 1204.0201; *see also* FIG. 1, 1204.0197.
[22c2] said computer server having a user interface, a user being capable of remotely accessing said computer server via said user interface to remotely configure a user-defined message profile containing outgoing message routing instructions,	*See* claim charts for claim 1(c), Ground 1.
[22d] wherein when said sensor detects an exception condition in the piece of remote equipment, said interface unit generates an incoming exception message indicative of the exception condition and forwards said message to said server,	"*Microprocessor-based controllers are used extensively as data gathering panels (DGP) for building management systems*. . . . [M]any *sensors and data files can be shared with building management system (BMS) functions*. . . . The following *BMS software is* normally included *in the controller*…. *Alarm monitoring: Scans all analog and digital points and tests for alarm status*….[;] *Communications module: Controls transmissions* between controllers and *between controllers and a central computer* based on an established bus protocol." Ex. 1204.0152. "*Critical alarms can be programmed at the remote to dial the central system immediately*." Ex. 1204.0200; see FIG. 4 (reproduced in chart for Claim 22b and 22c1).

Claim 22	Wewalaarachchi, Honeywell, and BACnet
	See also claim charts for [22b] and [22c1], Ground 1.
[22e] and wherein said server forwards at least one outgoing exception message to at least one predetermined user-defined remote communication device based on said incoming exception message as specified in said user-defined message profile.	*See* claim chart for Claim 1(e), Ground 1. *See* Ex. 1207 at § (A)(2)(d) and (e).

Claim 23	Wewalaarachchi, Honeywell, BACnet, & Levac
A system according to claim 22**,** wherein said message generating mechanism of the interface unit forwards said incoming exception messages to said computer server via at least one of a plurality of communication media, said media comprising at least one of a cellular telephone network, radio transmissions, telephone lines, and the Internet.	*See* claim charts for claim 22, particularly claim [22b] and [22c1], Ground 1.

Claim 24	Wewalaarachchi, Honeywell, and BACnet
A system according to claim 23**,** said server comprising a normalization module, wherein said server receives said incoming exception messages from said interface unit and said normalization module normalizes said incoming exception messages into a uniform	*See* claim charts for claims 3 and 23, Ground 1. "The *software architecture* comprises a framework for application development which in turn *includes… a virtual application service* 200…. The *virtual application service* 200 *includes a*

Claim 24	**Wewalaarachchi, Honeywell, and BACnet**
format to create normalized messages, wherein said outgoing exception messages are generated based on said normalized messages.	*communications gateway*…. The *virtual application services* 200 *typically execute on a central host computer*….” Ex. 1203 at 7:8-23.

Claim 26	**Wewalaarachchi, Honeywell, and BACnet**
A system according to claim 22**,** said system monitoring a plurality of pieces of equipment, each piece having an identification code, said server further comprising:	*See* claim charts for claims 1(a), [22a], Ground 1; *see also* claim charts for claim 22, Ground 1. “The presentation cells thereby *allow the user to visually monitor* and control *any number of field devices* directly from their remote computers, while having assurance of real time quality of service.” Ex. 1203 at 5:5-9. *See also* Ex. 1205.0167-68 (§§ 12.4, 12.4.1, 12.4.2).
[26a] a first memory on which equipment identification codes of all monitored equipment are stored;	“The *virtual application service 200 includes* a communications gateway 202, an application cell base 204, and *an object server* 206…. The *virtual application services 200 typically execute on a central host computer*.” Ex. 1203 at 7:13-15; 7:22-23. *See also id.* at 8:32-36; at 8:48-51. “*The object server* 206 is a *data store* that receives from a number of application cells the derived real time data and stores that data in various data objects. *Data objects store both the context or source of the data*…. The published *data is in the form of <name, value> pairs*, as described above.” *Id.* at 9:31-34; 9:38-40.
[26b] a second memory in which communication device identification codes of all of said user-defined communication	*See* claim chart for claim [1c], Ground 1.

Claim 26	Wewalaarachchi, Honeywell, and BACnet
remote devices are stored, said communication device identification codes being configured in a plurality of said user-defined message profiles.	

Claim 30	Wewalaarachchi, Honeywell, and BACnet
A system according to claim 26, wherein said interface unit periodically generates a normal status message if said sensor to which said interface unit is connected detects a normal status condition indicative of proper operation of said respective piece of equipment to which said sensor is connected, said normal status message including an equipment identification code of said respective piece of equipment.	*See* claim charts for Claim [22b], 26, Ground 1. "[M]icroprocessor-based controllers used in commercial buildings…. *measure signals from sensors*…. Microprocessor-based controllers can be used… as *controllers incorporated into a building management system utilizing a personal computer (PC) as a host.*…" Ex. 1204.0143. "*Proof-of-operation sensors are often required… to monitor fan and pump operation status* when a *central monitoring and management system* is provided." Ex. 1204.0043. "*Trend sample requirements are usually set-up in the controller and automatically reported to the BMS thereafter*." Ex. 1204.0201. Ex. 1205.0167 (§12.4): **12.4 Binary Input Object Type** The Binary Input object type defines a standardized object whose properties represent the externally visible characteristics of a binary input. A "binary input" is a physical device or hardware input that can be in only one of two distinct states. In this description, those states are referred to as ACTIVE and INACTIVE. A typical use of a binary input is to indicate whether a particular piece of mechanical equipment, such as a fan or pump, is running or idle. The state ACTIVE corresponds to the situation when the equipment is on or running, and INACTIVE corresponds to the situation when the equipment is off or idle. … **12.4.1 Object_Identifier** This property, of type BACnetObjectIdentifier, is a numeric code that is used to identify the object. It shall be unique within the BACnet Device that maintains it.

Claim 30	Wewalaarachchi, Honeywell, and BACnet
	12.4.2 Object_Name This property, of type CharacterString, shall represent a name for the object that is unique within the BACnet Device that maintains it. The minimum length of the string shall be one character. The set of characters used in the Object_Name shall be restricted to printable characters. . . . 12.4.6 Device_Type This property, of type CharacterString, is a text description of the physical device connected to the binary input. It will typically be used to describe the type of device attached to the binary input. . . . 12.4.7 Status_Flags This property, of type BACnetStatusFlags, represents four Boolean flags that indicate the general "health" of a binary input. Three of the flags are associated with the values of other properties of this object. A more detailed status could be determined by reading the properties that are linked to these flags. The relationship between individual flags is not defined by the protocol. The four flags are {IN_ALARM, FAULT, OVERRIDDEN, OUT_OF_SERVICE} *See also* Ex. 1205.0152-53 (§§12.1, 12.1.1, 12.1.2, 12.1.6, 12.1.7). *See* Ex. 1207 at ¶¶ 92-96, 115.

Claim 32	Wewalaarachchi, Honeywell, and BACnet
A system according to claim 30**,** said server further comprising a normalization module, wherein said server receives said incoming exception messages from said interface unit and said normalization module normalizes said incoming exception messages into a uniform format to create normalized messages, wherein said outgoing exception messages are generated based on said normalized messages.	*See* claim charts for claims 3, 24 and 30, Ground 1. *See* Ex. 1207 at § (A)(2)(f).

Claim 42	Wewalaarachchi, Honeywell, and BACnet
A method for monitoring remote equipment comprising the steps of:	*See* claim chart for claim 1 preamble.
a) determining a state of at least one parameter of at least one piece of the remote equipment;	*See* claim chart for Claim 1(a), Ground 1.
b) communicating a message indicative of the state to a computer server as an incoming message, the incoming message	*See* claim chart for Claim 1(b), Ground 1. "More particularly, the input format to a communication gateway 202 comprises a low

Claim 42	**Wewalaarachchi, Honeywell, and BACnet**
having a respective incoming format;	level byte stream of *data packets containing real time data formatted according to a particular device protocol* by the device network 216. In the typical device protocol, the *data packets* include a *device ID*, a *parameter name*… and the *real time data*." Ex. 1203 at 8:22-28.
c) normalizing the incoming message to form a corresponding normalized message having a predetermined uniform format;	*See* claim charts for claim 3, Ground 1. *See* Ex. 1207 at § A(2)(f).
d) storing the normalized message in a normalized message database on the computer server;	"The *object server* 206 *is a data store that receives from a number of application cells the derived real time data and stores that data in various data objects*…" Ex. 1203 at 9:31-33; *see also* Ex. 1203 at 8:54-66. *See* Ex. 1207 at § A(2)(f).
e) determining from the incoming message whether at least one exception message related to the incoming message is to be sent to at least one remote communication device specified by a plurality of message profiles stored at the computer server;	*See* claim chart for claims 1(c) and 1(d), Ground 1.
f) if it is determined in step e) that at least one exception message related to the incoming message is to be sent, deriving the at least one exception message from the stored normalized message corresponding to the related incoming message and the message profiles, the at least one exception message derived	*See* claim charts for claim 1(e), 42(d), Ground 1. "*An automation operation… takes place automatically based on either an event (condition satisfaction).... For event driven automation, the application cell contains a user defined data input source, a condition which is to be satisfied by the data received, an output data or action to be performed, and a target entity for receiving the output. The input source*

Claim 42	**Wewalaarachchi, Honeywell, and BACnet**
thereby having a respective format suitable for reception by the at least one remote communication device to which the at least one exception message is to be sent; and g) sending the at least one exception message derived in step f) to the at least one remote communication device specified by the message profiles,	*will be a selected data object 400 from an object server 206*…." Ex. 1203 at 19:17-26. "In FIG. 15a, *the user defines… the data object which provides the input data to be monitored*, and… *the valid range of input data*…. In 1513, *the user defines the notification* to be provided to the recipient (whether the alarm message specified in the linked cells, or a particular sound file)." Ex. 1203 at 19:36-40; 19:48-50; *see also id.* at 19:57-62.
42[h] wherein the message profiles may be created or modified at least in part by a user by remote access of the computer server.	*See* claim charts for claim 1(c), Ground 1.

Claim 43	**Wewalaarachchi, Honeywell, and BACnet**
43. A system for monitoring remote equipment, comprising:	*See* claim chart for preamble of claim 22, Ground 1.
[43a]. a sensor in communication with a piece of the remote equipment for detecting the state of at least one parameter thereof;	*See* claim chart for claim [22a], Ground 1.
[43b]. an interface unit, coupled to said sensor, said interface unit having a message generating mechanism for generating messages indicative of the state of the at least one parameter of the piece of the remote equipment; and	*See* claim charts for claims 1(a), [22b], and [22c1], Ground 1.
[43c]. a computer server in communication with said interface unit, said server comprising:	*See* claim charts for claims [22b] and [22c1], Ground 1.
[43d]. a message interface for receiving messages generated by said interface unit;	*See* claim charts for Claim 1(b), Claim 22[c1].

Claim 43	**Wewalaarachchi, Honeywell, and BACnet**
43[e]. a message normalizer for normalizing each one of the messages received from the interface unit to form corresponding normalized messages having a predetermined uniform format;	*See* claim charts for claims 3 and 24, Ground 1.
[43f]. a normalized message database for storing normalized messages, including normalized messages from the message normalizer;	*See* claim charts for claim 42(d), Ground 1.
[43g]. a message profile database for storing a plurality of message profiles;	*See* claim charts for claims 1(c), 1(f) and 10, Ground 1.
[43h]. a message processor for determining from each one of the messages received from the interface unit whether at least one exception message related to the received message is to be sent to at least one remote communication device specified by the message profiles;	*See* claim chart for claims 1(d), 42(e), Ground 1.
[43i]. an exception message generator for deriving the at least one exception message determined to be sent by the message processor to the at least one remote communication device, the at least one exception message being derived from a normalized message corresponding to the related message received from the interface unit and the message profiles, the at least one exception message derived thereby having at least one respective format suitable for reception by the at least one remote communication device to which the at least one exception message is to be sent;	*See* claim chart for claim 42(f). *See also* claim charts for Claim 1(e).
[43j]. a message interface for sending the at least one exception message derived by the exception message generator to the at least one remote communication device specified by the message profiles; and	*See* claim charts for claims 1(e) and 42(g), Ground 1. *See also* Ex. 1203 at 19:43-45 ("the user defines a *target service 1509, here a telephony interface TAPI which will be accessed in response to the alarm condition*….").

Claim 43	**Wewalaarachchi, Honeywell, and BACnet**
[43k]. a user interface for enabling a user at a remote location to create or modify at least a portion of the message profiles in the message profile database,	*See* claim chart for Claim 1(c), Ground 1.

VIII. CLAIMS 1-3, 22-24, 26, 30, 32, AND 42-43 OF THE '601 PATENT ARE UNPATENTABLE UNDER WEWALAARACHCHI, HONEYWELL, AND BACNET IN LIGHT OF LEVAC.

122. For the reasons I set out below, it is my opinion that claims 1-3, 22-24, 26, 30, 32, and 42-43 of the '601 Patent were unpatentable as obvious as of the claimed priority date of the '601 Patent.

A. Overview of Levac

123. Levac disclosed a system for automatically sending a message generated by one of various message sources to designated recipients via a communication device. (Ex. 1206 at 2:21-25). Such devices included e-mail, fax, and pagers (*see* Ex. 1206 at Fig. 5; 3:49-57, 6:66-7:27, 7:49-53). The Levac system was suited for use in many applications, such as employee communications and emergency messaging. Ex. 1206 at 3:58-60. Types of messages included alarm notifications and variable data updates. Ex. 1206 at 3:62-64. In summary, Levac disclosed a general purpose centralized notification system that could accept data inputs from a remote source, compare the data to user-defined criteria, and send notification messages according to user-defined preferences. The relationship of the incoming data to the "trigger" criteria, and to the device receiving the outgoing

message, was stored in a template (termed the .msa file, discussed below) that could be remotely configured by the user. These are the same functionalities at which Wewa was directed. Thus, in my opinion, a PHOSITA would recognize that Levac's teachings were directly relevant to the Object-Oriented BMS.

124. Levac's architecture disclosed a message server with a variable database able to store .msa files, also referred to as a "message template" or "message file." Ex. 1206 at Fig. 2; 4:36-39; 7:63-8:9; 11:8-13. The .msa file included identifying information configured by the user to identify: (a) the user who saved the file ; (b) the content of the message; (c) the variable conditions to be met before triggering the message; , and (d) the destination parameters and recipients. Ex. 1206 at 4:48-57, 4:63-67, 5:35-38, 5:49-52, 8:14-17. Triggers in Lavec could relate to a sensor value, as in Wewa, or to data in other software applications or hardware devices. Ex. 1206 at 3:50-51, 3:51-52. Messages could be triggered when data variables match predetermined criteria, or values specified in the .msa file. *See* Ex. 1206 at 6:35-43 ("variable data can be monitored and pending messages can be activated when the variable attains a specified value"). Based on the content of the .msa file, the message server routed the messages to the "communications interface

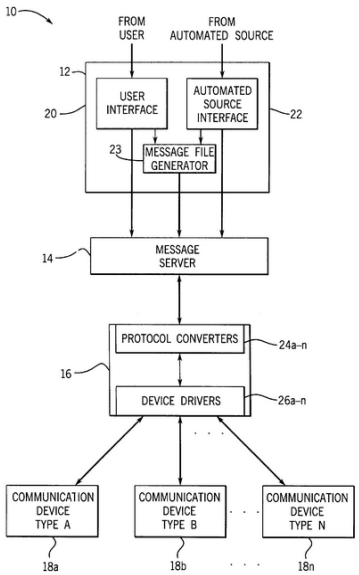

FIG. 1

16" (6:28-30), which converted the message to a protocol compatible with the receiving user's communication device(s). A user's communication destination was set based on the message parameters. Ex. 1206 at 6:47-57.

B. Ground 2: Claims 1-3, 22-24, 26, 30, 32, and 42-43 are rendered obvious by Wewalaarachchi, Honeywell, and BACnet in view of Levac.

125. As discussed above (*see e.g.* ¶¶ 91-93), in the context of the Object-Oriented BMS, Wewa disclosed (a) user selection of the conditions that triggered notification, (b) the content of the notification, (c) the types of devices that received notification (telephone versus pager) and (d) the specific device contact numbers. However, Wewa does not expressly disclose the particulars of the data structure that held these categories of information. Because Levac's .msa file had fields corresponding to each of these categories, it would have been obvious to use Levac's .msa file (or an equivalent structure) for this purpose. In addition, as discussed below, a PHOSITA would have been motivated to include in the Object-Oriented BMS the additional features associated with Levac's .msa file and notification capabilities.

126. *First*, Levac disclosed that the .msa file contains user identification information (Ex. 1206 at 4:48-57), which allowed different users to set up different .msa files, each with specific messaging triggers, destinations, etc. Levac thus disclosed multiple message profiles corresponding to multiple users. Since Wewa

was expressly disclosed as serving multiple users (Ex. 1203 at 3:18-31), it would have been desirable to include a specific implementation for allowing multiple users to customize notifications.

127. *Second*, like Wewa, Levac disclosed configuration of the notification particulars via a user interface.

> User interface 20 permits an individual… to provide message parameters providing information about the message, such as the designated recipients, running time for the message etc. User interface 20 also… allows the individual to create a message template that may be used in conjunction with data, messages, or other information received by automated source interface 22.

Ex. 1206 at 4:16-21; *see also* 11:8-12.

128. In addition, Levac disclosed that the user could access the message server and submit .msa files remotely, including via the Internet:

> *Message server 14 includes an in-box 28 providing the interface for receiving message files*…. Message server 14 supports various interfaces, such as… *TCP/IP messaging*. Thus, *message files can be received from* a variety of local or *remote message sources and can be generated* either *by* automated sources or *individual users*.

Ex. 1206 at 7:64-8:5 (emphasis added).

129. Levac thus disclosed the remote configuration of a message profile as claimed by the ’601 Patent.

130. As the foregoing demonstrates, Wewa and Levac disclosed overlapping, but not identical, functionalities concerning user notification. Both references also disclosed user interfaces for remotely configuring message profiles governing which devices receive notifications for particular conditions. Wewa further disclosed specific examples of graphical user interfaces that utilize BMS or other SCADA data. Although each system required the storage of user selections to govern subsequent notifications, Levac disclosed a particular data structure and fields (the “.msa file”) for that specific purpose. Each reference disclosed remote configuration in somewhat different ways: Levac disclosed configuration of message profiles in the form of modifying “.msa files” over the Internet, while Wewa taught the importance of remote user access to the system (e.g., Ex. 1203 at 7:41-50), and taught remote Internet access to the object server on which monitored equipment data is stored (Ex. 1203 at 14:58-61). For these reasons, a PHOSITA would have been motivated to incorporate, into the Object-Oriented BMS, Levac’s various teachings of remote configuration of a message profile, including Levac’s teaching of adding Internet access to the user interface taught by Wewa (to the extent such an addition was not already obvious—*see* ¶¶ 98-100 above).

131. Therefore, because Levac provided a detailed implementation of the functionality disclosed by Wewa in the context of the Object-Oriented BMS—namely, sending messages to particular communications devices based on specific triggering conditions received from external sources—it would have been obvious to utilize the teachings of Levac in implementing the BMS.

132. The Petitioner's tables, inserted below, show how each limitation of claims 1-3, 22-24, 26, 30, 32, and 42-43 of the '601 Patent is taught by the Wewa, Honeywell, and BACnet references. I have reviewed these tables in detail, and agree that they accurately set out attributes and features of the Wewa, Honeywell, and BACnet references in light of Levac that renders obvious each and every element of each of these claims.

Claim 1	**Wewalaarachchi, Honeywell, BACnet & Levac**
1. A method of monitoring remote equipment comprising the steps of:	*See* claim chart for claim 1 preamble, Ground 1.
a) determining a state of at least one parameter of at least one piece of the remote equipment;	*See* claim chart for claim 1(a), Ground 1.
b) communicating a message indicative of the state from the piece of remote equipment to a computer server as an incoming message;	*See* claim chart for claim 1(b), Ground 1.
c) enabling a user to remotely configure or	*See* claim chart for claim 1(c), Ground 1.

Claim 1	Wewalaarachchi, Honeywell, BACnet & Levac
modify a user-defined message profile containing outgoing message routing instructions, the user-defined message profile being storable on the computer server;	"*Message server 14 supports various interfaces, such as… TCP/IP messaging*. Thus, *message files can be received from* a variety of local or *remote message sources and can be generated* either *by* automated sources or *individual users*." Ex. 1206 at 8:1-5. "*[T]he message template* with the variable value *may be submitted* to message server 14 *through user interface* 20 and message file generator 23 *as a .msa file. The .msa file can then be stored in variable database 29* to await receipt of variable data…" *Id.* at 11:8-13. "Preferably, *the .msa file* created by message file generator 23 *may incorporate… the following information*: 4. DATA: *contains the message*…. 7. VARSTART: describes the *variable conditions that must be satisfied before triggering a message to run*…. 10. *DESTPARAMS: supplies a list of destination parameters, such as recipient site location, required for transmitting the message to the destination*." *Id.* at 4:48-50; 4:63; 5:35-36; 5:49-53; *see also* 8:14-17; 3:49-56; 4:4-21; FIG. 1; 2:21-25. *See* Ex. 1207 at § VII(B).
d) determining whether an incoming message is an incoming exception message indicative of improper operation of the piece of remote equipment;	*See* claim chart for claim 1(d), Ground 1. "[A]utomated source interface 22 provides an avenue for automated sources, such as real-time production databases, to provide variable data…. *variable data can be monitored and pending messages can be activated when the variable attains a specified value*. . . [M]essage server 14 then routes the variable data and any activated messages to communication device interface 16." *Id.* at 6:35-46.
e) if it is determined in step d) that an incoming message is an incoming	*See* claim chart for claim 1(e), Ground 1. "*[S]ystem 10 is particularly suited for use in many*

Claim 1	**Wewalaarachchi, Honeywell, BACnet & Levac**
exception message, forwarding at least one outgoing exception message based on the incoming message to at least one user-defined communication device specifiable in the user-defined message profile,	*applications, such as… emergency messaging….* *Types of messages include… alarm notifications, variable data updates…*" *Id.* at 3:58-64; *see* also *id.* at 6:66-7:27, 7:49-53.
[f] wherein the user can remotely configure or modify the user-defined message profile by remotely accessing the computer server.	*See* claim chart for claim 1[f], Ground 1. "*Message server 14 includes an in-box 28* providing the interface *for receiving message files*, commands and variable data *from communication source interface 12…. Message server 14 supports various interfaces, such as… TCP/IP messaging*. Thus, *message files can be received from* a variety of local or *remote message sources and can be generated* either *by* automated sources or *individual users*." *Id.* at 7:64-8:5. *See* Ex. 1207 at § VII(B).

Claim 2	*See* claim charts for claim 1, Ground 2 and claim 2, Ground 1.
Claim 3	*See* claim charts for claim 1, Ground 2 and claim 3, Ground 1.

Claim 22	**Wewalaarachchi, Honeywell, BACnet & Levac**
A system for monitoring remote equipment, comprising:	*See* claim chart for claim 1 preamble, Ground 1.
[22a] a sensor in local communication with a piece of remote equipment, said sensor detecting a state of at least one parameter of the piece of remote equipment;	*See* claim chart for claim 22[a], Ground 1.
[22b] an interface unit, locally connected to said sensor, said interface unit having a message generating mechanism; and [22c1] a computer server in remote communication	*See* claim charts for claims 1b and 2, Ground 2, and claim 22[b], [c1], Ground 1.

Claim 22	**Wewalaarachchi, Honeywell, BACnet & Levac**
with said interface unit, said server adapted to receive messages generated by said interface unit,	
[22c2] said computer server having a user interface, a user being capable of remotely accessing said computer server via said user interface to remotely configure a user-defined message profile containing outgoing message routing instructions,	*See* claim charts for claim 1(c), Ground 2 and claim 22[c2], Ground 1.
[22d] wherein when said sensor detects an exception condition in the piece of remote equipment, said interface unit generates an incoming exception message indicative of the exception condition and forwards said message to said server,	*See* claim charts for claims 22[d], Ground 1, and 22[b] and 22[c1], Ground 2.
[22e] and wherein said server forwards at least one outgoing exception message to at least one predetermined user-defined remote communication device based on said incoming exception message as specified in said user-defined message profile.	*See* claim chart for Claim 1(e), Ground 2, and claim 22[e], Ground 1.

Claim 23	*See* claim charts for claim 22, (including [22b] and [c1]), Ground 2.

Claim 24	*See* claim charts for claims 3 and 23, Ground 2, claim 24, Ground 1.

Claim 26	**Wewalaarachchi, Honeywell, BACnet & Levac**
A system according to claim 22**,** said system monitoring a plurality of pieces of equipment, each piece having an identification code, said server further comprising:	*See* claim charts for claims 1a, and Claim 22 (particularly claim [22a]), Ground 2, and claim 26, Ground 1.
[26a] a first memory on which equipment identification codes of all monitored equipment are stored;	*See* claim chart for claim [26a], Ground 1.
[26b] a second memory in	*See* claim charts for Claim 1(c), Ground 2, and

Claim 26	**Wewalaarachchi, Honeywell, BACnet & Levac**
which communication device identification codes of all of said user-defined communication remote devices are stored, said communication device identification codes being configured in a plurality of said user-defined message profiles.	claim [26b], Ground 1 "[T]he *message template* with the variable value *may be submitted to message server 14 through user interface 20* and message file generator 23 *as a .msa file. The .msa file can then be stored in variable database* 29 to await receipt of variable data…" Ex. 1206 at 11:8-13. "Preferably, *the .msa file* created by message file generator 23 *may incorporate… the following information*: 1. OWNER: *identifies the user who created the file*…. 10. *DESTPARAMS: supplies a list of destination parameters, such as recipient site location, required for transmitting the message to the destination*." Ex. 1206 at 4:48-4:52; 5:49-53; *see also id.* at 8:14-17. *See* Ex. 1207 at § VII(B).

Claim 30	*See* claim charts for Claim [22b], 26, Ground 2; claim 30, Ground 1.

Claim 32	*See* claim charts for Claims 3 and 24; Ground 2; claim 30, Ground 1.

Claim 42	**Wewalaarachchi, Honeywell, BACnet & Levac**
A method for monitoring remote equipment comprising the steps of:	*See* claim chart for Claim 1 preamble, Ground 2.
a) determining a state of at least one parameter of at least one piece of the remote equipment;	*See* claim chart for Claim 1(a), Ground 1.
b) communicating a message indicative of the state to a computer server as an incoming message, the incoming message having a respective incoming format;	*See* claim chart for Claim 1(b), Ground 1 and claim 42(b), Ground 1.

Claim 42	**Wewalaarachchi, Honeywell, BACnet & Levac**
c) normalizing the incoming message to form a corresponding normalized message having a predetermined uniform format;	*See* claim charts for claim 1, Ground 2, and claim 3, Ground 1
d) storing the normalized message in a normalized message database on the computer server;	*See* claim chart for Claim 42(d), Ground 1.
e) determining from the incoming message whether at least one exception message related to the incoming message is to be sent to at least one remote communication device specified by a plurality of message profiles stored at the computer server;	*See* claim chart for claims 1(c) and 1(d), Ground 2. "Preferably, *the .msa file* created by message file generator 23 *may incorporate… the following information*: …. 7. VARSTART: describes the *variable conditions that must be satisfied before triggering a message to run*…. 10. *DESTPARAMS: supplies a list of destination parameters, such as recipient site location, required for transmitting the message to the destination*." Ex. 1206 at 4:48-50; 4:63-67; 5:49-53; *see also id.* at 8:14-17. "*Variable data can be monitored and pending messages can be activated when the variable attains a specified value*. . . [M]essage server 14 then routes the variable data and any activated messages to communication device interface 16." *Id.* at 6:35-46. *See* Ex. 1207 at § VII(B).
f) if it is determined in step e) that at least one exception message related to the incoming message is to be sent, deriving the at least one exception message from the stored	*See* claim charts for claim 1(e), Ground 2, and 42(d), Ground 1. "*An automation operation… takes place automatically based on either an event*

Claim 42	**Wewalaarachchi, Honeywell, BACnet & Levac**
normalized message corresponding to the related incoming message and the message profiles, the at least one exception message derived thereby having a respective format suitable for reception by the at least one remote communication device to which the at least one exception message is to be sent; and g) sending the at least one exception message derived in step f) to the at least one remote communication device specified by the message profiles,	*(condition satisfaction).... For event driven automation, the application cell contains a user defined data input source, a condition which is to be satisfied by the data received, an output data or action to be performed, and a target entity for receiving the output. The input source will be a selected data object 400 from an object server 206….*" Ex. 1203 at 19:17-19; 19:21-26. "In FIG. 15a, *the user defines… the data object which provides the input data to be monitored*, and… *the valid range of input data*…. In 1513, *the user defines the notification* to be provided to the recipient (whether the alarm message specified in the linked cells, or a particular sound file)." ***Id.*** at 19:37-50; ***see also id.*** at 19:57-62.
42[h] wherein the message profiles may be created or modified at least in part by a user by remote access of the computer server.	*See* claim charts for Claims 1(c), Ground 2.

Claim 43	**Wewalaarachchi, Honeywell, BACnet & Levac**
43. A system for monitoring remote equipment, comprising:	*See* claim chart for claim 1 preamble, Ground 1.
[43a]. a sensor in communication with a piece of the remote equipment for detecting the state of at least one parameter thereof;	*See* claim chart for claim [22a], Ground 1.
[43b]. an interface unit, coupled to said sensor, said interface unit having a message generating mechanism for generating messages indicative of the state of the at least one parameter of the piece of the remote equipment; and	*See* claim charts for claims 1(a), [22b], and [22c1].

Claim 43	**Wewalaarachchi, Honeywell, BACnet & Levac**
[43c]. a computer server in communication with said interface unit, said server comprising:	*See* claim charts for claims [22b] and [22c1], Ground 2.
[43d]. a message interface for receiving messages generated by said interface unit;	*See* claim charts for claim 1(b), claim [22c1], Ground 2.
[43e]. a message normalizer for normalizing each one of the messages received from the interface unit to form corresponding normalized messages having a predetermined uniform format;	*See* claim charts for Claims 3 and 24, Ground 2.
[43f]. a normalized message database for storing normalized messages, including normalized messages from the message normalizer;	*See* claim charts for Claim 42(d), Ground 1.
[43g]. a message profile database for storing a plurality of message profiles;	*See* claim charts for claims 1(c), 1(f), and [26b], Ground 2.
[43h]. a message processor for determining from each one of the messages received from the interface unit whether at least one exception message related to the received message is to be sent to at least one remote communication device specified by the message profiles;	*See* claim chart for claims 1(d) and 42(e), Ground 2.
[43i]. an exception message generator for deriving the at least one exception message determined to be sent by the message processor to the at least one remote communication device, the at least one exception message being derived from a normalized message corresponding to the related message received from the interface unit and the message profiles, the at least one exception message derived thereby having at least one respective format suitable for reception by the at least one remote communication device to which the at least one exception message is to be sent;	*See* claim chart for claim 42(f), Ground 2. *See also* claim chart for claim 1(e), Ground 2.
[43j]. a message interface for sending the at least one exception message derived by the exception message generator to the at least one remote communication device specified by the message profiles; and	*See* claim charts for claims 1(e), and 42(g), Ground 2 and claim 43[j], Ground 1.

Claim 43	**Wewalaarachchi, Honeywell, BACnet & Levac**
[43k]. a user interface for enabling a user at a remote location to create or modify at least a portion of the message profiles in the message profile database,	*See* claim chart for claim 1(c), Ground 2.

IX. CONCLUSION

133. I declare that the foregoing is true and accurate to the best of my knowledge, and I will testify as such if called to do so.

Respectfully submitted,

Arthur Zatarain, PE

Attachment A

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Industrial Control, Power, and Equipment

September 2015

CAREER TIMELINE

Artzat Consulting, LLC - 1997 to Present (concurrent with fulltime positions prior to Sep 2009)

Engineering Consultant

Consulting for technical and commercial matters related to intellectual property, accidents and damages, and design & operations. Practice areas include industrial equipment, electrical and electronic engineering, industrial automation & control, and construction. Providing fulltime consulting since Sept 2009.

VersaTech Automation Services – April 2009 to April 2012

Senior Consultant

Serve in an adjunct advisory capacity for design, manufacture, and service of industrial control and automation systems for a variety of mechanical and process applications, with operations in Houston, New Orleans, and Dubai.

Stewart Enterprises Inc. – July 2008 to Sept 2009

Director of Stewart Resource Center

Stewart Resource Center (SRC) is the in-house Architecture and Engineering entity that designs and manages the construction of 300+ commercial properties owned and operated by Stewart Enterprises, Inc. throughout North America.

TEST Automation & Controls, Inc. (TEST Inc.) – 1988-2008

1997-2008: VP- Operations
1995-1997: VP - Engineering
1988-1995: Engineering Manager

TEST was a publicly held industrial manufacturing firm dealing with automation and controls, providing design, manufacturing, and construction for projects worldwide. The automation systems used electrical, electronic, pneumatic, and hydraulic technologies. Joined TEST via acquisition of Dataran in 1988. Retired from TEST in July 2008. The company, as a division of Natco (NYSE:NTG), was absorbed into Cameron International (NYSE:CAM) in Nov 2009, and later sold to VersaTech Automation Services in 2013.

Dataran Corporation - 1980-1987 (acquired by TEST in '88)

Principal Engineer

A professional engineering consulting firm that designed and managed the installation of industrial power, control, and automation systems. Also developed and manufactured high performance PC "clone" computers specially configured for industrial and CAD applications. The proprietary technology evolved into TEST's SCADAWARE® telemetry product line when acquired by TEST in January of 1988.

Shell Offshore - 1977-1980

Electrical & Electronic Engineer

Technical Specialist for major oil producer. Duties included design for power, automation, safety and control systems, and communications. Also conducted training sessions related to controls, instrumentation, and computer programming.

University of New Orleans School of Engineering - (full and part time 1977-81)

Served as an instructor of Engineering at UNO in both the Electrical and Mechanical departments while working at Shell and Dataran. Courses included basic electricity, mechanics, fluids, and electronics.

SECO Industries - 1976-1977

Design & Construction Engineer

Design and project engineer for power distribution, controls, and safety systems, focusing on industrial and offshore oilfield environments.

Boeing Services - 1975-1976

Industrial Equipment Engineer

Design, specification, and maintenance of facility equipment, both mechanical and electrical, for NASA's Michoud Assembly Plant in New Orleans.

Coulter Electronics - 1973-1974

Medical Equipment Service Technician

Installed and maintained particle counting and blood analysis equipment for industrial and medical laboratories.

LICENSES & CERTIFICATIONS

- Registered Professional Electrical Engineer: LA (1980), CA (1992), AK (1992), AL (1997)
- Registered Professional Control Systems Engineer: Louisiana (1993)
- Certificate in ISA-84 SFS, Safety Instrumented Systems (SIS) Fundamentals Specialist (2012)
- Board Certified Forensic Engineer (2011)
- Certified in Computer Forensics – Oregon State University (2004)
- Certified Systems Integrator - Institute of Industrial Engineers (1991)
- Licensed Master Electrician, Texas (2004)
- Qualifying Party for Contractor in Louisiana, Texas, Tennessee, Mississippi (1990's)
- Electrical Administrator, Alaska (1989)

ACADEMIC & PROFESSIONAL ACHIEVEMENTS

- University of New Orleans, B.S. Engineering 1975, M.S. Engineering 1979
- Admitted to the National Academy of Forensic Engineers (2011)
- Senior Member: Institute of Electrical and Electronic Engineers (IEEE)
- Senior Member: The International Society of Automation (ISA)

- Senior Member: Institute of Industrial Engineers (IIE)
- Licensed Member: National Society of Professional Engineers (NSPE)
- Professional Member: American Society of Safety Engineers (ASSE)
- Member: Louisiana Engineering Society
- U.S. Patent No. 5,103,395 for Automated Nuclear Medical Device, (1992)

PUBLICATIONS AND PRESENTATIONS

- Forensic analysis of DWH BOP Control System Tests, LA Joint Engineering Conference, Jan 2014
- The Professional Engineer as Expert Witness, LA. Engineering Society, Dec 2012
- Forensic Engineering for Control Systems , ISA New Orleans, Oct 2012
- Don't Gamble with your Safety Instrumented System, Plant Services Magazine, July 2010
- Be Smart about Intellectual Property, Plant Services Magazine, October 2009
- Testing Redundant Systems, Plant Services Magazine, March 2006
- Control Systems Reliability, Plant Services Magazine, March 2005
- Safety and Procurement Management, US Bus Review, Mar 2004 (w/Bill Smitka)
- PC Based SCADA Systems - Trinidad and Tobago - 1995
- Smart RTU & SCADA for Offshore - Abu Dhabi, UAE - 1993
- Shell Oil SCADA Instrumentation, Annually 1977 thru 1993
- Packet Radio for SCADA Applications, ENTELEC Conference, Dallas, 1992
- PC Based Data Acquisition, Am. Soc. of Quality Engrs., Atlantic City, 1986
- Personal Computers for Technical Users, ISA Philadelphia, Oct 1985
- Offshore Safety Systems, ISA '83, Houston, Texas (w/ Bob Bailliet).
- Economics of Wind Generated Power, ASME 1978, Houston, TX. (w/ Bill Janna)

SPECALIZED TRAINING COMPLETED

- Wireless network technology
- ISA 84 Safety Instrumented Systems
- ISA Burner Management Systems
- NFPA 85 / ISA 77 Boiler Control Engineering
- NFPA 70 National Electrical Code (2014 NEC)
- NFPA 70E Electrical Workplace Safety
- NFPA 101 Life Safety Code
- PLC network security
- Construction contracts & engineering liability
- New Technologies computer forensics
- Photovoltaic solar power systems
- Renewable energy systems
- Lean manufacturing processes
- Behavior-based safety systems

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