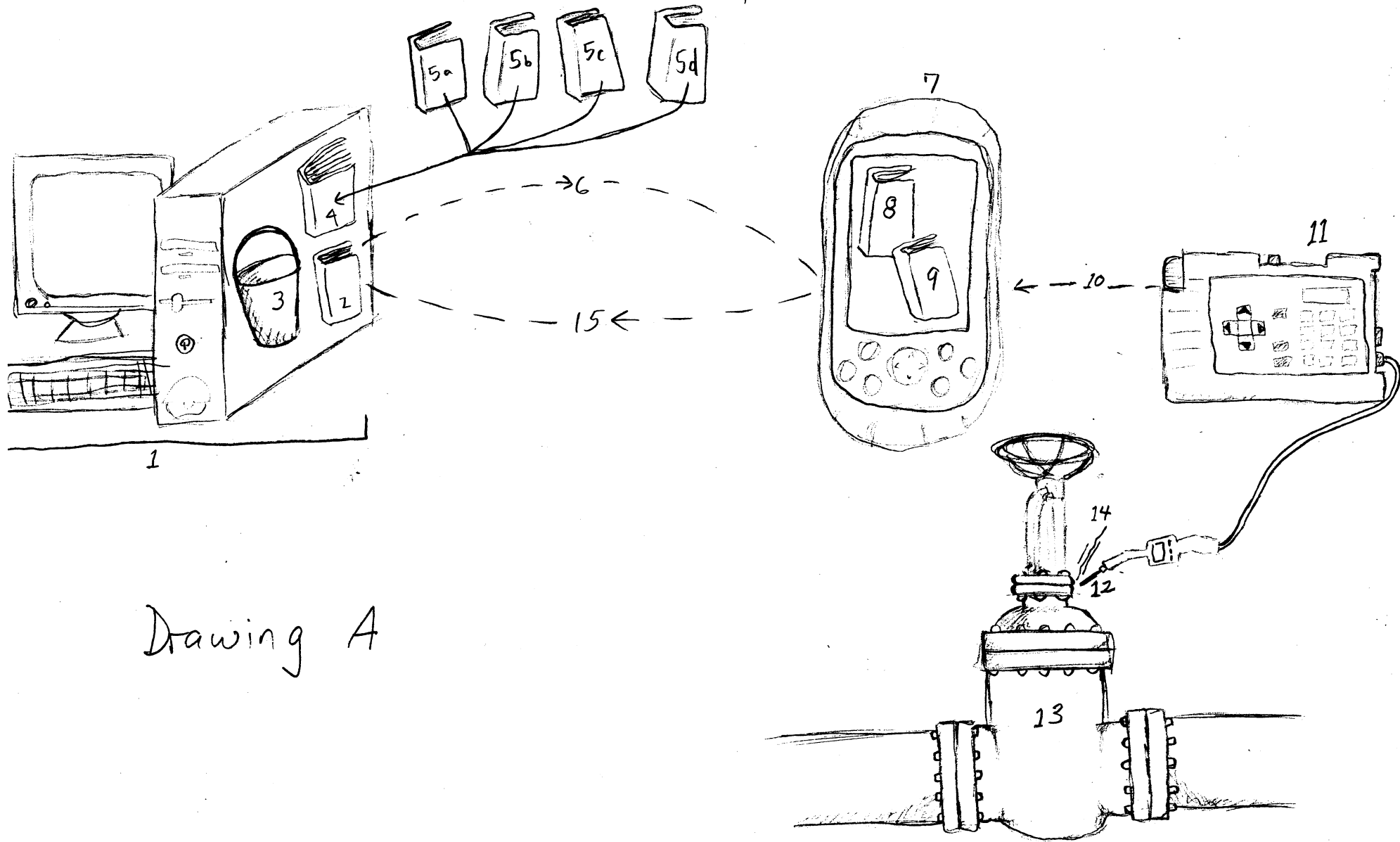


## **Abstract for EAJupiter**

### Abstract

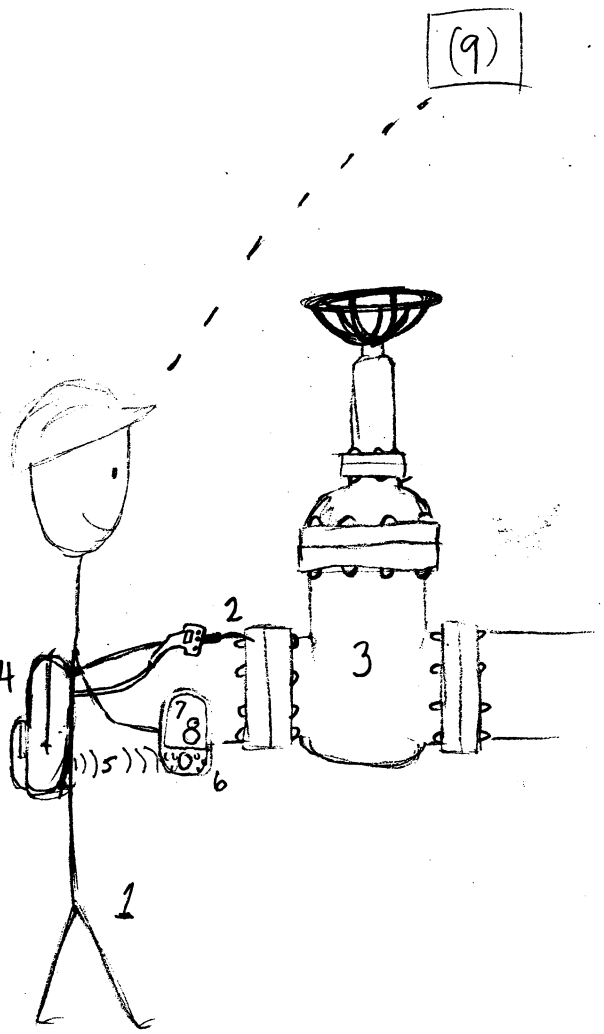
The present invention provides a software program and method that enables the use of a handheld computer for ensuring that a fugitive emission monitoring technician will be aware of and comply with a pre-defined menu of compliance, safety and / or commercially-sensitive requirements. The invention will identify the triggering data event and then guarantee technician awareness of the data condition by intervening in the operation of the underlying program and displaying a pre-set array of alerts, instructions and action steps to be taken. The invention will ensure the proper assessment of the condition on the part of the technician by prompting the appropriate response to an array of questions and then comparing the responses given against the set of appropriate responses. The invention will ensure sufficient documentation of the assessment and the required action steps. The alert, awareness and assessment loop will ensure the technician's proper response to a data event according to a previously designated set of protocols, instructions, checklists and/ or timelines. It will also document the successful completion of each step along with the operator's assessment of any relevant circumstance associated with the data event and follow up steps. In the end, the program will report the circumstance and final result of each intervention to a software program that enables management to review and respond appropriately to each intervention.

Diagram (see next 2 pages)

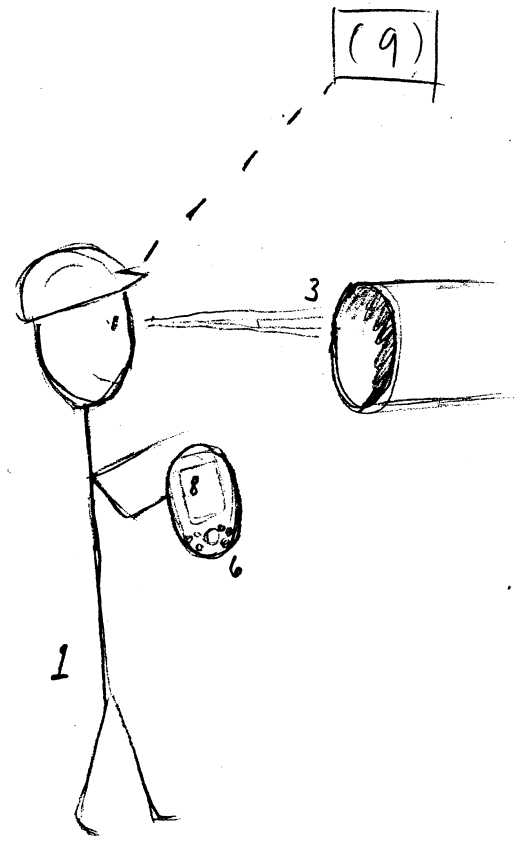


Drawing A

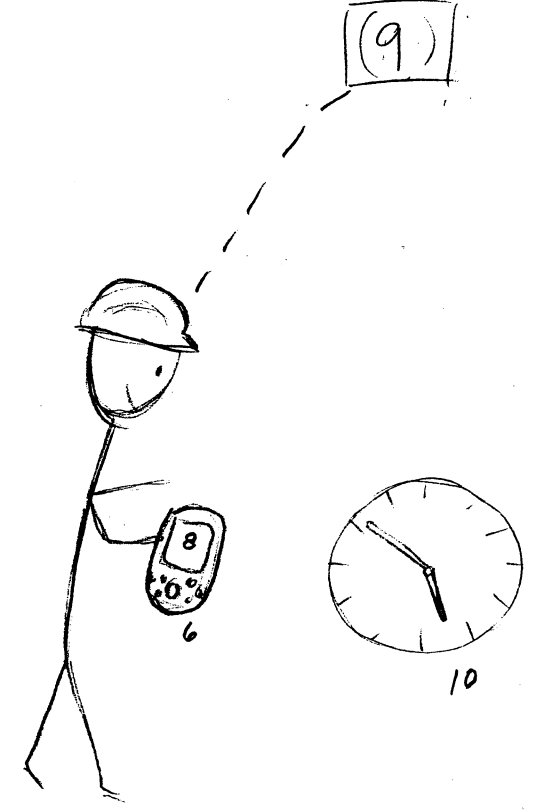
B



C



D



Process:

<p>Primary Database identifies components to be monitored          Desktop computer transfers list of components with associated identification information to a handheld computer for use by the Monitoring Technician.          Desktop computer program communicates all client-specified condition definitions and specific responses to enable EAJupiter to trigger all interventions (otherwise known as Technician Alert and Assessment Loops (TAAL™)).          Collection Software runs in Handheld computer along with EAJupiter.          Technician goes out into the process unit to begin monitoring activities.          Intervention can be triggered in one of three ways:</p>		
<ol style="list-style-type: none"> <li>1. Technician collects sample, Analyzer analyzes sample. The results that generate data event X</li> <li>2. Data is recorded in collection software program.</li> <li>3. EAJupiter (which is running simultaneously on the handheld computer) recognizes that data event x is a trigger event.</li> <li>4. EAJupiter triggers a pre-defined Technician Alert and Assessment Loop (TAAL™) that is customized to this specific data event.</li> <li>5. TAAL™ alerts technician to special condition and informs technician of required response by interrupting the monitoring process and displaying a pre-defined series of screens and text.</li> <li>6. Technician follows steps listed in handheld.</li> <li>7. TAAL™ prompts and then ensures that the technician documents compliance and/or follow up by triggering a non-routine assessment from technician.</li> <li>8. Once the loop has been completed, EAJupiter transfers control of the handheld back to the collection program.</li> <li>9. Monitoring resumes until another Trigger event is identified.</li> </ol>	<p>This category is similar to the previous category except that the TAAL™ is triggered not the assessment of monitoring reading (such as a particular PPM level) but is triggered by a specific observation that the technician makes; to wit</p> <ol style="list-style-type: none"> <li>1. Technician observes a specific condition.</li> <li>2. Technician records existence of condition into EAJupiter.</li> <li>3. EAJupiter recognizes this condition as a trigger event and triggers a pre-defined TAAL™.</li> <li>4. Etc</li> </ol>	<p>The category is similar to the prior one except that EAJupiter tracks, using its own internal clock, the passage of time. At certain times of the day and at certain durations of time, EAJupiter will recognize that a trigger event has occurred and a TAAL™ will be triggered, Etc...          TAAL™ alerts technician to special condition and informs technician of required response. TAAL™ documents compliance and/or follow up by triggering a non-routine assessment from technician.</p>
<p>When the work is complete, the program reports back to the main program computer to ensure that any proper follow-up actions are completed.</p>		

Apparatus and Method for of Ensuring the Proper Technician Awareness, Response and Documentation in the event of the occurrence of a specific data event in the management of a fugitive emission lead detection and repair program.

Cross reference

001

Technical Field

002

The present invention relates to the conduct of Leak Detection and Repair Programs, otherwise known as fugitive emissions programs. These are programs are meant to comply with certain federal, state and local regulations that require the owners of chemical manufacturing and / or petrochemical facilities to conduct leak detection programs that are meant to identify and then repair relatively small leaks that occur on the process equipment (such as pumps, compressors agitators, valves and piping connectors, among others) during the routine operation of the facilities. More particularly, this invention relates to the activities of the technicians who are responsible for performing these tests and then completing the wide array of regulatory, safety and commercial activities in support of the basic leak detection processes.

Description of the Related Art

003

LDAR programs involve the organization of one or more field technicians whose responsibility it is to identify components that need to be tested, use a toxic vapor analyzer to draw and test a sample of the air from the area of each potential leak seam. If an emission is identified that is larger than the amount allowed by law, the technician is responsible for marking the component as a "leaker" and, in some cases, attempting a simple repair by tightening the bolts on the valve, for instance.

The work process that the technicians is involved is characterized by a wide array of issues and concerns. In the course of a typical day, the technician could have to identify, assess, confirm and or correct specific information or engage in specific response to such a large variety of complex issues that is it difficult to imagine doing so without failure. In any single event, the consequences of failure can be costly or, even hazardous.

A sample the issues are:

1. Has the analyzer been calibrated that day?
2. Has the analyzer been precision calibrated for that quarter?
3. Has the analyzer been calibrated that day for the leak definitions associated with the components that are scheduled to be monitored?
4. Has the analyzer been calibrated with the proper calibration gas, considering the components that are scheduled to be monitored that day?
5. Is the analyzer configured with a flame ionization detector or a photo ionization detector, considering the components that are scheduled to be monitored that day?
6. Are the monitoring records being associated with the proper technician code?
7. Are the monitoring records being associated with the proper analyzer identification number?
8. Are the monitoring records being associated with the proper date and time?
9. If a calibration drift assessment is required, is the assessment being confirmed before monitoring can be performed?
10. If a calibration drift assessment is required, is the absence of drift being confirmed before monitoring can be performed?
11. Has the technician performed the proper inspection on any safety equipment, such as ladders, safety harnesses, lanyards, scaffolds, man lifts or cranes that are necessary to access the components that are scheduled to be monitored that day?
12. Is the technician properly certified to perform these inspections

13. Is the technician properly certified to use the required safety equipment?
14. Audio Visual Olfactory Leak is identified.
15. Open-ended line is identified.
16. Potential open-ended line is identified.
17. Technician encounters a component on which he cannot, with certainty, identify the leak interfaces (i.e. he is not sure how to monitor that component).
18. Technician experiences a significant delay in obtaining a safe work permit.
19. Technician identifies a leak and needs to know what sort of repair, if any, he should do.
20. Technician sees a leaker tag hanging on a component.
21. Technician hears an alarm or warning buzzer.
22. Technician experiences operating problems with his analyzer.
23. Technician has an injury or safety incident.
24. Technician is working on a day where heat-related injury is a genuine risk.
25. Technician is working on a day when a severe cold weather poses a serious health risk.
26. Technician is about to monitor a component that is in confined space.
27. Technician is about to monitor the first component of the day that requires climbing or working in an elevated area.
28. Technician is working in an area where a high background reading exists.
29. Facility owner has a special safety, regulatory or commercial concern that requires constant awareness in the minds of the technician.
30. Leak is found that requires immediate repair attempt or other kind of response.
31. Technician monitors more than a set number of components without finding a leak or a reading.
32. Technician identifies a leak on a component that is more than x inches in diameter and will require additional time to monitor.
33. Technician spends more than x minutes looking for a component.
34. Technician finds a component that has previously been labeled as difficult to find by another technician.
35. The technician finds x leaks in a particular area during the course of a day.

In each of these events, as well as in others, the data event that has occurred will require a specific, sometimes complex response from the technician.

The current related art involves relying on the follow factors:

The technician must be trained to recognize the significance of each of these data event;

Technician must be trained to know what to do in each event.

Technician may rely either on memory, written instructions in a pocket notebook, for instance, or by calling a supervisor or co-worker.

Management must then rely on the faithfulness of the technician to recognize, remember and initiate the proper response.

The technician must then assess and document the results of his activities.

Anyone associated with the technician's follow up must have their involvement confirmed through documentation.

For instance, consider item 30. If a technician finds a leak of 10,000 parts per million, or more, on a line that has a highly reactive volatile organic chemical (HRVOC) in Texas, then a repair process must be initiated immediately (rather than at sometime in the next 5 days, which is more often the case). In this event, success depends on the following contingencies:

1. Technician will know that the leak is on an HRVOC chemical;
2. Technician will recognize that the leak is 10,000 ppm or greater;
3. Technician will have been trained to recognize the special condition.
4. Technician will properly recognize the special condition.
5. Technician will know what the proper response for this particular site is.

6. Technician will not be tempted to “monitor just a few more components” before making the proper notification, thereby running the risk of being caused by the distraction to forget.
7. Technician will know whom to notify.
8. Technician will make the notification.
9. The person who receives the notice will document their receipt of the notice.
10. The system will be able to identify later that notice was given, by whom, to whom and when.

If any of these 10 steps is missed, then a serious compliance violation would likely occur.

In other words, current work practices relies on the uncertain mechanism of prior training, human memory, written procedures and personal discipline to ensure the successful response to a wide array of data events in the daily management of a fugitive emissions program.

Therefore, a need exists in the art for a method and system for the fail safe recognition of the occurrence of each of these data events and the corresponding prompts to the technician to ensure that the technician performs and then documents the appropriate follow-up steps.

## Summary of the Invention

The components of the invention include the following:

A process for the managing entity(ies) to identify all customizable features that comport with the program management parameters as they define them. This could include the facility owner and /or the contractor company that employees the technician.

A software program, known as EAJupiter, that will work in conjunction with the software program that is managing the routine process of locating components and recording readings (either leaking or not leaking) (this is called the Collection Software) for each component as the monitoring is taking place.

From time-to-time, one of these three circumstances will occur:

The monitoring process will result in the occurrence of a data event that has previously been defined as a trigger event; or

The technician will, by personal observation, recognize and record a trigger event; or

A certain point in the day will occur or a certain amount of time will elapse, resulting in a trigger event.

When each trigger event occurs, EAJupiter will trigger a Technician Alert and Assessment Loop (TAAL™).

The TAAL™ alerts the technician to the special condition and informs technician of required response.

The TAAL™ documents compliance and/or follow up by triggering a non-routine assessment from technician.

EAJupiter will then record and report the occurrence, status and resolution of each TAAL™ at the end of the day.

## Brief Description of the Drawings

### Drawing A

A main computer (1) (generally referred to as a desktop or network computer or workstation) is used to run the primary computer program that manages all the data related to the management and recordkeeping for the fugitive emissions program. A software program designed to manage the data (2) resides on this computer. In addition to the data for the program (3) and the software (2), there also resides on the computer the EAHero program (4) which contains a series of customized commercial and productivity parameters (5a), safety hazards and risk management parameters (5b), regulatory / compliance oriented protocols (5c) and relevant instrument calibration records (5d). On a daily basis, the data that amounts to a “daily monitoring assignment” is transferred (6) to a handheld computer (7). This transfer (6) can be accomplished via cable or wireless transfer. The handheld computer (7) has a software program that is designed to manage the routine monitoring function (identify components,

accept readings from the analyzer, determine which components are leaking and prompt proper leak response) (8). At the time of the data transfer, the relevant items from EAHero are also transferred to the handheld (6). Also residing on the handheld computer (7) is the EAJupiter software (9) which is at the heart of this invention. When the daily monitoring assignment is transferred (6) to the handheld (7) the log of customized protocols (5a-d) will also be transferred and stored in the EAJupiter program (9). Monitoring is now ready to begin. The air sample (14) for each component (13) will be collected at the sample probe (12) and be transferred to the analyzer (11). The analyzer (11) will analyze the sample and determine that the reading is either 0 or a positive value expressed in parts per million (PPM). The analyzer (11) will convert this result into a binary signal which will be transferred to the handheld (7) either via a cable or wirelessly (10). EA Jupiter (9) will then analyze the data event represented by this PPM reading to determine if a trigger event has occurred and whether or not a TAAL™ should be triggered. (See following drawings.) At the end of the monitoring process, the data will be transferred (15) back to the primary computer for storage and follow-up action by both the primary program (2) and EAHero (4).

#### Drawing B

Technician (1) draws sample through sample probe (2) from leak interface on component (3). Sample passes through sample hose into analyzer (4). Analyzer analyzes the sample and converts ppm level to binary reading. Binary message is passed (either wirelessly or via a cable (5)) to a handheld computer (6). Reading is recognized and stored by the routine monitoring program software program that is running on the handheld (7). EAJupiter (8) analyzes each reading to determine if a trigger event has occurred. If a trigger event has occurred then EAJupiter (8) triggers a Technician Alert and Awareness Loop™ (TAAL™) by interrupting the monitoring process and prompting the proper response, which may include directed notification to an outside entity (such as client contact or technician's supervisor) (9).

#### Drawing C

Technician (1) identifies a data event that is present in the area in which he is working (3). He inputs the existence of this event into the handheld computer (6). EA Jupiter (8), which is running on the handheld (6) identifies the event as a trigger event and triggers a TAAL™ by interrupting the Technician's work process and prompting a proper response, which may include directed notification to an outside entity (such as client contact or technician's supervisor) (9).

#### Drawing D

EAJupiter (8), running the handheld computer (6) recognizes that a certain instant in time has arrived by reference to an internal clock (10). EAJupiter (8) identifies that this is a trigger event and triggers a Technician Alert and Awareness Loop™ (TAAL™) by interrupting the monitoring process and prompting the proper response, which may include directed notification to an outside entity (such as client contact or technician's supervisor) (9).