

VigilManager

White Paper

Making fire departments smarter, safer and more efficient



October 2010

Leading-edge technology to develop superior driving skills and reduce accident risk when operating emergency vehicles.

EXECUTIVE SUMMARY

Each year driving accidents cost city governments billions of dollars nationwide. The toll of a catastrophic accident on the individuals involved and their families can be devastating. Even relatively minor collisions cause damage and down time for essential vehicles and fire apparatus, and can compromise effective delivery of emergency services.

Most driving accidents are caused by driver error. While every department wants to decrease their accident risk, the time and resources to improve driver training and monitor driver performance are usually in short supply. Departments must find ways to improve performance using available resources in the most cost effective manner possible. Vigil Solutions technology can help a department do just that, with an integrated and purpose-designed system that enriches and amplifies the training experience, setting the stage for continuous performance improvement and performance monitoring.

VIGILMANAGER

The core solution is VigilManager, with its ability to maintain training and performance records, while mining data across the organization for accident trends, trouble spots and safety issues.

The VigilManager documents and stores training event data collected from a variety of sources, including VigilVanguard digital video and GPS mapping, for retrieval and analysis.

By linking to other data sources, such as human resources and county accident data, VigilManager can organize information logically to recognize recurring trends, trouble spots and conditions.

With this information you can evaluate overall driver performance, and make intelligent predictions, thus addressing training and risk management issues in a proactive manner.



Figure 1 - VigilManager Route Overview Screen

VIGILVANGUARD

The VigilVanguard On-road Training System creates an integrated learning, evaluation, and feedback process. In this environment, emergency vehicle drivers will develop the vision and skills needed to maneuver safely in traffic under stressful conditions.

The system is compact, portable, and adaptable to cars, vans, ambulances, engines, ladder trucks, and any other mode of mobile fire and rescue apparatus.

VigilVanguard uses advanced GPS mapping and sensor technology to accurately measure acceleration, braking, cornering, and speed along the route traveled. The sensor system incorporates four video cameras to monitor the vehicle, the driver, surrounding traffic, following distance, and other factors.

All these dynamic inputs are integrated onto a tablet PC. The instructor can also mark additional driving events or make notes based on his/her expert observation.

Training and performance evaluations with the VigilVanguard become a permanent digital record that can be retrieved, played back and analyzed quickly and easily. Drivers actually see themselves in action, which provides compelling feedback on their performance.

Significant areas of driver performance can be isolated, reviewed and analyzed so the root cause of errors can be addressed. The system also improves productivity by automating the report and record-keeping process so instructors can spend more time doing what they do best: training drivers.

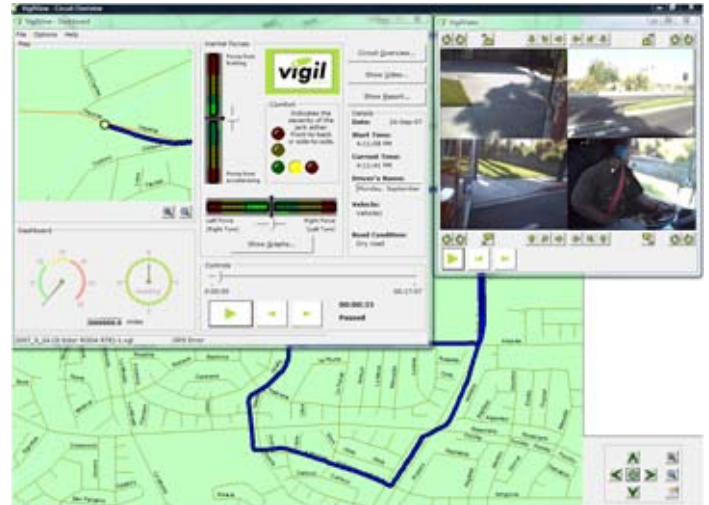


Figure 2 - VigilVanguard Screens

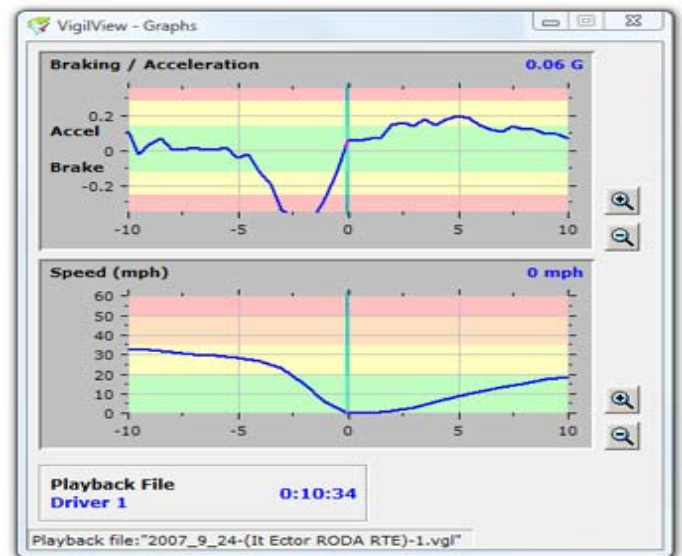


Figure 3 - VigilVanguard Graphs

VIGILPASSENGER

VigilPassenger is a portable assessment tool consisting of a small Pocket PC, an inertia sensor (for measuring braking, accelerating, and cornering) and a GPS to flag locations where driving events occurred.

VigilPassenger allows driver assessments to be performed electronically, reducing processing time while ensuring driver performance records are up-to-date.

The Pocket PC format lends itself to a variety of applications and reports, all of which can be downloaded and stored automatically in VigilManager for later retrieval and analysis.

Vigil Solutions technology and expertise support a department's philosophy concerning safety and professionalism. Drivers receive consistent, quality instruction that conforms to department-specific core skills.

Vigil Solutions technology adds depth and breadth to the training experience unavailable with traditional methods. Plus the ability to mine and analyze data from a variety of sources, supports organizational goals for continuous performance improvement.



Figure 4 - How VigilPassenger Eliminates Paperwork

HOW CAN TECHNOLOGY HELP WITH RISK MANAGEMENT?

Since accidents are caused by unsafe acts or poor judgment on the part of one driver, combined with unsafe conditions or unsafe acts committed by others, reducing accidents means eliminating one or more of these factors. Obviously, the behavior of the driver is the factor easiest to influence and correct.

Also, any unsafe conditions inherent in the physical location or infrastructure (traffic signs or signals, sight lines, illegal parking, etc.) can be addressed. Organizations need to focus their limited resources on minimizing identified risks, (i.e. unsafe acts and unsafe conditions) thereby saving lives and potentially millions of dollars in litigation costs.

Eliminating Unsafe Acts

On investigation most accidents are deemed avoidable and tied to poor driving decisions. Actions such as not allowing proper following distance, failing to scan intersections, or going too fast for current conditions can lead to evasive actions (hard braking or steering), loss of control, and collisions. In fact, the evasive actions, avoidance maneuvers and “near misses” are early indicators of a potentially more serious incident likely to occur. Usually it’s not the first time the driver has committed these errors in judgment. Frequently when an accident is reviewed, the driver’s history reveals repeated observations of similar driving behaviors.



THE SOLUTION

VigilManager merges the power of data collection with an array of established evaluation criteria. These criteria are actions and behaviors that a department identifies as “core skills” with regard to driver qualification standards. When these skills become habits, the result is safer and more proficient drivers. Having a recognized set of “core skills” provides a consistent training message and criteria to evaluate and benchmark drivers.

By using VigilManager to collect information from driver assessments, including “near miss” reports, along with other performance indicators, high-risk drivers can be easily identified. Using established parameters the system will notify instructors or supervisors. Depending on the circumstances, these drivers will be automatically scheduled for the appropriate training to correct the noted behaviors.

Result: The driver receives training or coaching specific to the documented pattern of errant behavior. This training follows the core skill guidelines. Hearing a consistent message, and given an opportunity to correct undesirable behavior, the driver is better able to avoid potential accidents.

HOW CAN TECHNOLOGY HELP WITH RISK MANAGEMENT?

Minimizing Risk Related to Unsafe Conditions

Accidents can also be avoided by minimizing a driver's vulnerability to unsafe conditions. In this case, awareness is the key. Keeping drivers informed about accident locations or apparent trouble spots encourages increased vigilance. In some cases, street modifications or improvements can be made that will eliminate the trouble spot altogether.

THE SOLUTION

VigilManager can easily handle the challenges of identifying unsafe conditions on streets and at intersections, and then facilitating the communication of these hazards to drivers. This information can be incorporated into driver qualification and refresher training, safety bulletins, or e-mail reminders. Changing driver behaviors around known hazards will eliminate that element of the accident equation.

Result: The likelihood and impact of an accident occurring is reduced since drivers will be more alert and aware when traveling through recognized trouble spots.

Freeing Up Resources

Managing training and safety across an organization typically involves a great deal of administration and paperwork. Many departments still conduct driver and equipment qualifications using paper forms requiring a significant amount of manual processing. Other training records must be kept up to date to ensure compliance with state and federal laws. Maintaining these paper records ties up valuable resources that could be better utilized in training delivery.

THE SOLUTION

When driver and equipment qualifications are conducted electronically, they are uploaded to VigilManager automatically. With all the records pertaining to an individual's career performance and training to date in one place, it's readily available for review. Meaningful reports and practical task lists can be routinely generated using established parameters.

Result: Reducing time spent on repetitive administrative tasks frees up resources. Safety and instructional staff can be used for tasks directly related to preventing accidents such as performing more in-depth safety audits. With more resources to conduct safety training, your accident risk will be reduced.



THE VIGIL SYSTEM OVERVIEW

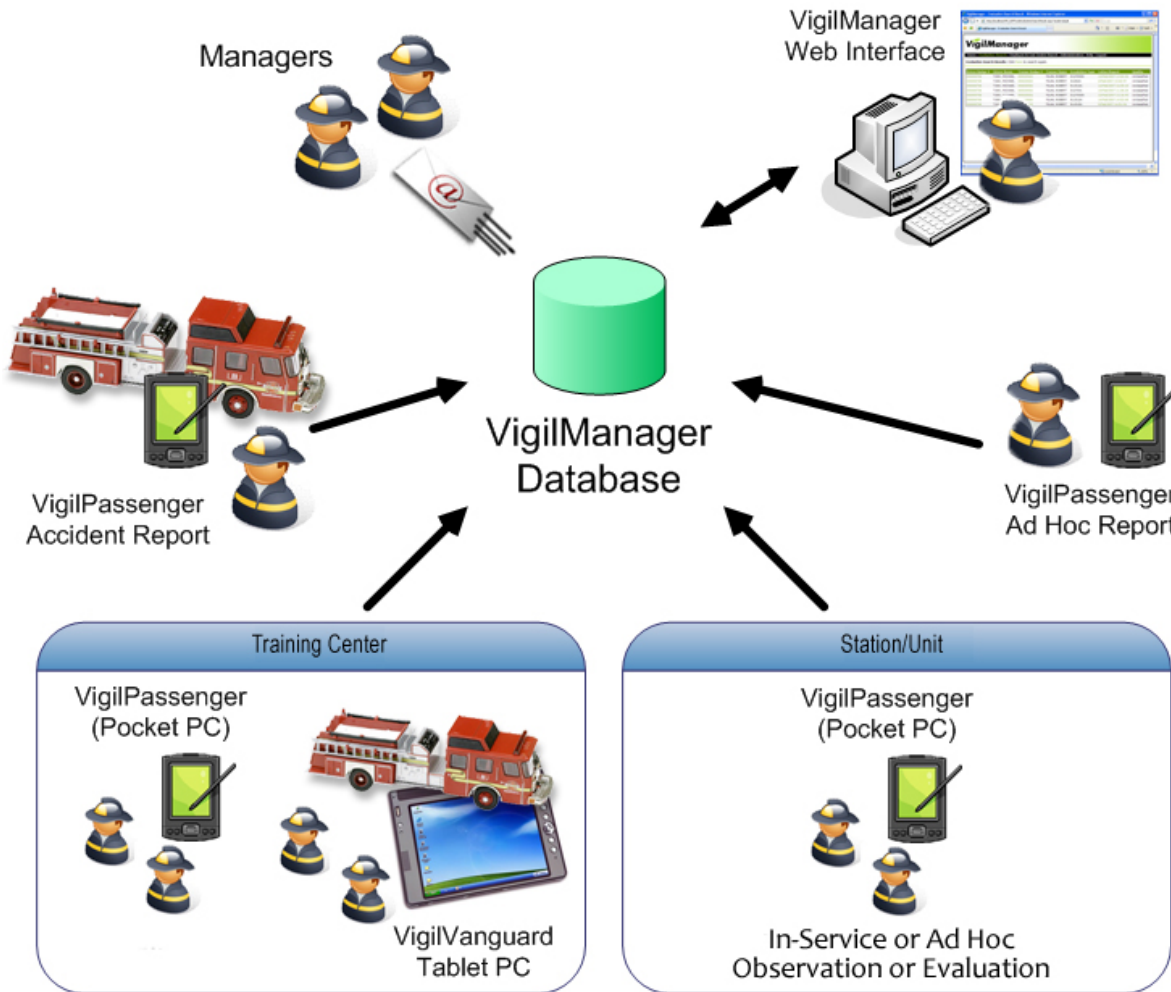


Figure 5: VigilManager Configuration

VigilManager is the core system technology that includes evaluation, training, analysis and data management tools. It is a versatile information system designed to help an organization track and manage risk, training records, and much more. The data can be gathered by Vigil Solutions assessment and training tools, as well as information acquired through integration with HR systems, accident databases and Learning Management Systems (LMS).

VigilVanguard and VigilPassenger work in sync with VigilManager, providing relevant input from training events and in-service observations that deliver a compelling solution to departments. VigilVanguard is a unique 'driver-focused' training and evaluation system aimed at improving vision, hazard recognition, space management and vehicle handling skills on the road. Used in concert with VigilManager, the evaluation becomes a part of the driver's training record. The system can be used to identify and correct driver behavior during refresher or equipment qualification training. Organizations can ensure drivers are maintaining high safety standards through in-service observations using VigilPassenger.

The common thread running through all devices are the "core skills" that provide a consistent index and message for drivers, instructors and supervisors.

ADVANTAGES OF THE VIGIL SYSTEM

With VigilManager a department will experience better data organization and records management, proper benchmarking of drivers using standardized reports and forms, and automated audits of assessment quality.

Having this repository of data assists departments in their safety and training management by:

- Providing access to very powerful queries related to driving trends within the organization.
- Establishing automated alerts that warn management about drivers who could be safety risks.
- Streamlining the management and distribution of data within the organization, particularly that relating to the careers of drivers and instructors.
- Customizing and distributing individual, functional group, and organization-wide profile reports.
- Associating automated recommendations and actions with evaluations.
- Giving instructors and supervisors access to web forms and applications to input data or process reports.
- Providing rich geographic and video information to improve the quality of the decision making processes.



All this improves safety and reduces the risk of accidents by creating an early warning system targeting drivers who are exhibiting errant behavior.

It allows an organization to carry out important accident and assessment trend analysis to ensure training and safety resources are focused as effectively as possible. Efficiency can be increased and a higher quality of training achieved with VigilManager.

The screenshot displays the VigilManager web interface. At the top, there is a navigation bar with the VigilManager logo and links for Home, Evaluation/Profile Search, and Log Out. Below this is a search criteria section with a 'New Search' button and a 'Reset Criteria' button. The main content area is titled 'List of Evaluations:' and contains a table with the following data:

Evaluation Date / Time	Evaluation Type	Quality	Driver Badge #	Driver Name	Trainer Badge #	Trainer Name
11/Sep/2008 11:52:11	1 on 1	Good	30000217	LUDOVICO CASTRO	000040327	EDDY LOPEZ
8/Mar/2007 15:37:38	Line Ride	Undesired	30000704	RICHAE, TUEK	000010497	MARK ANDERSON
8/Mar/2007 15:40:42	Line Ride	Undesired	30000705	RICHAE, TUEK	000010497	MARK ANDERSON
8/Mar/2007 16:14:28	Line Ride	Undesired	30000708	RICHAE, TUEK	000010497	MARK ANDERSON
8/Mar/2007 17:15:56	Line Ride	Undesired	30000704	RICHAE, TUEK	000010497	MARK ANDERSON
8/Mar/2007 13:52:33	Unplanned Infraction	Undesired	30000708	RICHAE, TUEK	000010428	ROBERT FLAN
14/Mar/2007 14:06:35	Unplanned Infraction	Undesired	30000704	RICHAE, TUEK	000010428	ROBERT FLAN

245 records found.

Figure 6: List of Evaluations

VIGILMANAGER FEATURES

The following information highlights some of VigilManager's most prominent features. What's available will depend on the edition you purchase or subscribe to. There are three different levels to choose from:

- VM Lite
- VM Standard
- VM Enterprise

For a complete list of features included under each version contact Vigil Solutions (800) 592-0269 ext. 1017.

SEARCH FUNCTIONALITY

VigilManager allows a user to search for assessments, drivers, instructors, and functional units using a variety of criteria. For instance searches can be made using date ranges, employee IDs, instructor IDs, and departments. Other parameters include vehicle IDs, unit numbers, assessment types (e.g. equipment qualifications), hours spent on different apparatus/vehicles, and evaluation ratings.

One of the most compelling search features in VigilManager is the ability to query using assessment items. The search results will spotlight trainees who had problems with specific core skills. For example, a search may be conducted for trainees who had problems with docking or backing up. Management can decide which core skills are the most problematic and then direct training resources where they are most needed.

Basic searches are included in all versions however the more advanced options are not available in VM Lite.

The screenshot displays the VigilManager web application interface. At the top, there is a navigation bar with the VigilManager logo and links for Home, Evaluation/Profile Search, Administration, and Log Out. Below the navigation bar, there is a 'Quick Search' section with a search input field and a 'Get' button. To the left, there is a 'Shortcuts' section with links for Today assessments, Last week assessments, Organisation profile, and Cost Center comparison. The main content area shows 'Search Criteria' with the following details: Mode: Advanced Search, Date Range: 3/Mar/2007 - 3/Mar/2008, and Type: Evaluations. Below the search criteria, there are 'New Search' and 'Refine Search' buttons. The 'List of matched assessments:' section contains a table with the following data:

Evaluation Date/Time	Evaluation Type	Quality	Driver Badge #	Driver Name	Trainer Badge #	Trainer Name	Map	Alert History	Action
3/Mar/2007 13:52:53	Unplanned Infringement	Unclassified	000000706	MICHAEL TURK	000020926	ROBERT FILAN			
6/Mar/2007 15:37:35	Accident Follow Up Line Ride	Unclassified	000000706	MICHAEL TURK	000020897	MARK ANDERSON			
6/Mar/2007 16:47:35	Accident Follow Up Line Ride	Unclassified	000000706	MICHAEL TURK	000020897	MARK ANDERSON			

At the bottom of the table, it indicates '152 records found.' and there is an 'Export to Excel' button.

Figure 7: Assessment Search Results

VIGILMANAGER FEATURES - PROFILES

PROFILE REPORTING FUNCTIONALITY

Profile reports allow a complete safety profile to be generated for any driver, instructor or functional unit within an organization. Higher-level profile reports that compare divisions or summarize the organization as a whole can also be generated.

DRIVER AND INSTRUCTOR PROFILES

These profiles enable supervisors to compare the issues a driver is having over time and whether or not they have corrected these issues. Supervisors can proactively manage both drivers and instructors by targeting key areas that need improvement. For example, a driver's profile might show they were observed twice during in-service assessments regarding hazard recognition and appropriate speed for conditions. Based on this, a supervisor could take action, such as scheduling this person for refresher training.

Similarly, an instructor's profile might reveal that in two years of training they never cautioned any trainees about proper scanning of intersections. Based on this, a supervisor can bring this to the instructor's attention to ensure he or she is actually assessing drivers on all key criteria.

DIVISION, ORGANIZATION AND COMPARISON PROFILES

Division, organization and comparison profiles allow users to view higher-level trends by summarizing and comparing safety issues being detected at particular divisions or functional units, or for the organization as a whole.

PROFILE REPORT OPTIONS

Each profile report has a number of options. The user can specify advanced summary options that designate whether a profile is to include all evaluations or just a summary of the evaluations by week, month, or year.

Options also allow a report that groups core skills by discipline or individually. The items can be displayed as an X, a numbered total or an average.



VIGILMANAGER FEATURES - ALERTS

ALERTS

VigilManager Alerts can warn supervisors about drivers who may be becoming safety risks. To achieve this, administrators set safety thresholds that relate to “core skill” assessment criteria. These thresholds can be divided into two main groups: **‘Safety Rating’** and **‘Repeat Offense’** thresholds.

SAFETY RATING ALERTS

Safety rating thresholds are calculated by allocating a safety weighting to each core skill used to assess drivers. For example, collision avoidance braking may receive a safety weighting of 25 points whereas inadequate following distance may be marked at 15 points.

A person’s safety rating is then calculated by adding the weightings related to observation reports within a particular time frame. If a person’s safety rating exceeds an established threshold, they are added to an alert list. With this information a supervisor can take necessary action — before an accident occurs.

REPEAT OFFENSE ALERTS

The other type of threshold is a repeat offense alert. These are calculated based purely on the repetition of a specific type of infringement. For example, an administrator may decide that speeding more than twice a year should automatically prompt an alert. The driver’s supervisor can then take remedial action to correct the undesirable behavior.

CUSTOMIZATIONS

Alerts are fully customizable and can be turned on or off. They can be calculated per evaluation or per item and the time frames used in the calculation may be altered. Notification to supervisors or administrators or both can be set with e-mails sent to all relevant parties.

Safety weightings and repeat offense weightings for each item can be tailored based on per-evaluation calculations or per-item calculations. The content of the e-mail alerts is fully customizable as well.

DRIVER ALERT / NOTIFICATION ACTION HISTORY

In many cases it is useful to view both the current and past-prescribed actions for a potentially unsafe driver. For example, a driver who is scheduled for supplementary training to correct a following distance problem may have already undergone remedial training for the issue twelve months earlier. With this information the supervisor may decide that the problem is one related to attitude rather than physical skills and take appropriate action — in the form of corrective counseling — before an accident occurs.

The Alert History allows a user to view all alerts and associated actions for that driver. These details give managers a better overall picture of the driver’s training and safety history and encourage more informed decisions.

VIGILMANAGER FEATURES - ADMINISTRATION AND TASKS

ADMINISTRATION FUNCTIONALITY

VigilManager allows system administrators to perform a range of organizational tasks, including manual administration of HR data, division/station information, vehicle qualification information, alert administration and the assignment of user privileges.

Privilege administration allows employees to be given specific rights:

- Assessment privileges allow them to perform certain types of assessments;
- Management privileges allow them to log on to the web interface to manage people within certain functional units;
- Administration privileges allow them to perform all of the administration tasks above.

MANAGEMENT AND ADMINISTRATION TASK LISTS

Task lists are tools that allow supervisors or administrators to keep track and prioritize assignments and duties. Supervisors' task lists only contain items related to their specific station or functional unit while the administrator task list contains items from across the organization.

The types of lists available include:

- Assessment Quality;
- Alerts;
- Unplanned Assessments (ad-hoc);
- Recommendation Actions.

ASSESSMENT QUALITY TASK LISTS

These are manager or supervisor-only task lists. The Assessment Quality task list for each supervisor contains all assessments done by instructors they supervise that have not yet been assigned a quality grade. The manager/supervisor views each report, and grades the assessment as good, acceptable or unacceptable.

The Assessment Quality task list serves two purposes. First, it allows supervisors to keep track of all assessments taking place in their stations, units or cost centers. In addition, it ensures that unsatisfactory assessments (marked as 'unacceptable') will not unfairly contribute to a driver's safety rating, and can be excluded from searches so as to not skew search results.

Assessment Quality task lists are the only form of task list included in VigilManager Standard Edition.

VIGILMANAGER FEATURES - TASK LISTS

ALERT TASK LISTS

The Alert task list consists of items that relate to drivers who have exceeded some kind of safety threshold or who were deemed a safety risk by the assessor.

A manager or administrator is given evidence to validate the alert along with access to the driver's assessment history. In addition the user can view the driver's alert/action history and (if available) video evidence of exactly what the driver did that was unsafe. With this information the driver can be dealt with proactively. Once action is taken, the item is removed from the task list.

ACCIDENT ALERT BY INTEGRATION WITH ACCIDENT MANAGEMENT SYSTEMS

VigilManager can interface with various accident management systems to automatically gain access to an organization's accident history. This data can also be entered manually through a VigilManager accident assessment form. Having this ability allows additional information to be recorded such as the exact geographic location of the accident as well as any unsafe acts or conditions which may have contributed to the incident.

UNPLANNED ASSESSMENT (AD-HOC) TASK LISTS

The Unplanned Observation task list consists of randomly recorded field observations by supervisors, instructors, or other authorized personnel.

When the identity of the observed driver is unknown, the system can automatically match a vehicle ID to the assigned driver (if vehicle assignments are recorded in a scheduling database), or to the assigned unit, where a supervisor can identify the driver.

INCIDENT ASSESSMENT WITH ONBOARD INCIDENT DETECTION SYSTEM

Many organizations fit their vehicle with permanently mounted onboard incident detection systems. These incidents can be automatically entered into the VigilManager database through customized integration with their back-end databases and repositories. Additionally these incident assessments can be manually inserted into VigilManager via a web-based form.

Like the ad-hoc assessments, VigilManager can automatically determine who was driving a specific vehicle from the vehicle ID, date and time. Location-based information can be associated with each incident for use with trend analysis activities.

RECOMMENDATION/ACTION TASK LISTS

Recommendation/Action task lists allow instructors to bring a driver to the immediate attention of management/supervision regardless of the driver's safety status.

Administrators coordinate actions with instructor recommendations, facilitating the process. Then, whenever a driver receives a recommendation the associated action is added to the appropriate manager or supervisor's Recommendation/Action task list.

LIST AUTOMATION

To automate all of these task lists, VigilManager can be integrated with other technology such as a Learning Management System (LMS).

For example, integration could occur so that any person who ends up on an alert list or one who is observed repeatedly running red lights is automatically scheduled for re-training via an organization's LMS.



VIGILMANAGER FEATURES - VIDEO AND MAPS

The VIDEO Advantage

One of the difficulties in managing drivers across the organization is making decisions based on limited evidence available concerning their performance. In most cases all the decision maker has to go on are available assessment reports, instructor recommendations and general intuition.

VigilManager solves this problem by allowing short video segments recorded in concert with a VigilVanguard to be uploaded for review by a manager or administrator. When an instructor recommends additional training, they can include this video evidence to support the recommendation.

Having video showing exactly why a driver was deemed unsafe gives managers access to compelling impartial data that will improve the quality, consistency, and fairness of the actions they take. This same video can be used to provide unbiased feedback to the driver concerning their performance—improving both the instructor's and the driver's training experience.



MAPS

It is useful to view location-based data related to training and accidents. Being able to access information about the exact location of an assessment and where unsafe acts have been occurring and then comparing it to commonly driven routes has a range of real-world benefits.

Some of these include:

- Ensuring the quality and consistency of in-service assessments. Supervisors can view exactly where and when an assessment was conducted.
- Giving users access to high level trend analysis results relating to where accidents and unsafe acts are occurring. This allows managers/supervisors to more easily identify trouble spots (unsafe conditions) and thereby focus their training on these areas.

Map information helps reduce accidents by improving the quality of assessments, training information, and manager decisions. VigilManager stores any available geographical information for all assessments and accidents, including the route driven and the locations of unsafe acts.

All uploaded video evidence is also geo-coded and can be shown within the exact context of where it occurred. Commonly driven routes can be created and edited to help give context to location-based reports.

VIGILVANGUARD ON-ROAD TRAINING SYSTEM

Instructors use VigilVanguard to capture and document the level of competency achieved on each vehicle or apparatus the trainee qualifies on, as well as driving habits and actions.

VigilVanguard uses advanced GPS and sensor technology to accurately measure behaviors such as acceleration, braking, cornering, clearances, and following distances. The sensor system incorporates four video cameras to monitor the vehicle, the driver, surrounding traffic, and other factors.

The system integrates all these dynamic inputs onto a tablet PC which provides a moment-by-moment playback of the assessment.

VigilVanguard creates an interactive learning environment with unlimited capability for review and playback.

Significant areas of driver performance can be isolated and analyzed so that the root cause of errors can be addressed.

The system also improves productivity by automating the report and record-keeping process so that trainers can spend more time doing what they do best: training drivers.

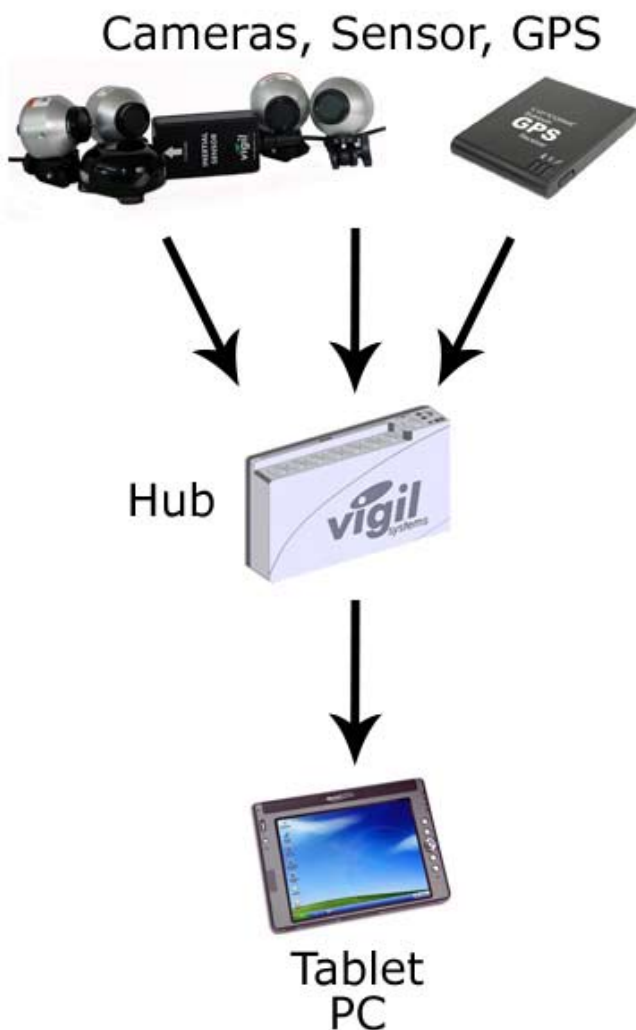


Figure 4: VigilVanguard System components

For more information please
contact us or visit our website:

www.vigil-solutions.com

info@vigil-solutions.com

(800) 592-0269 Ext. 1017

(619) 602-8140

This paper illustrates a product or service offered to a Vigil Solutions or Vigil Systems customer. It is not intended to document specific features within each product. Products and product features are subject to change without notice.