



"If you think knowledge is dangerous, try ignorance" - Mark Twain

PHYSICAL ASSET MANAGEMENT

- YOUR FREE GUIDE

**Some of the issues and business benefits
you may wish to consider before selecting
a property tracking solution**

CONTENTS

SECTION 1.	Introduction and terms of reference
SECTION 2.	Motivations
SECTION 3.	Asset marking
SECTION 4.	Introduction to radio frequency identification RFID
SECTION 5.	Scanning equipment and hand held computers
SECTION 6.	Computer software
SECTION 7.	Asset auditing processes
SECTION 8.	Practical benefits and business applications
SECTION 9.	Practical examples of services delivered

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ASSETtrac Ltd.....Physical asset management guide

SECTION 1. INTRODUCTION AND TERMS OF REFERENCE

As the world's largest collection of inanimate objects, property assets could be the subject of many pages of discussion. Therefore we have made some decisions and assumptions to restrict this paper according to the following guidelines:

- We believe most visitors downloading this Guide will largely comprise managers in facilities, IT, insurance, or finance looking for concise advice and recommendations to improve organisational efficiency, comply with legislation, and resolve security problems.
- Tag and label products are limited to discussion of those devices that can act as both a deterrent and provide day to day asset management benefits. Advice on stencils, covert fluids such as Smart Water™ and microdots, holograms, access control, CCTV, or physical devices such as cables, alarms, and locks can be provided separately through our connections with specialist suppliers.
- Passive RFID, or radio frequency identification is mentioned, but this paper does not contain details of the more specialist applications afforded by 'read-write' transponders nor active battery powered microchips.
- We concentrate on the day to day benefits of physical asset management as the investment in an audit or an in house asset tracking system can be justified more easily than spending on security alone unless of course there is a high theft exposure.
- We assume the asset portfolio is large enough to warrant more than a self created spreadsheet approach to inventory control or procedure management.
- This report concentrates on fixed assets rather than revenue earning products in the supply chain or equipment undergoing return journeys, which is a huge subject worthy of separate study. Nevertheless we have written the software both at Cloud level and applications for mobile devices to cater for such procedures, and remove the old fashioned clipboard check in check out approach.
- There are many sources and types of tags, scanners, and software. One integrated solution is examined in detail as an example of many tracking products for asset management because it is already tried and tested in many public bodies and private companies, and transforms the old slow and inaccurate processes of managing fixed assets to a modern paper free system, making the employee much more agile and productive.

The Guide looks at a typical three part solution suitable for most asset or procedure intensive organisations, being a combination of tag or label, handheld scanner or tablet, and software program. Greater consideration is given to the practical benefits, as the busy line manager needs a fast positive response to the question - What can asset management do for me and will a system reduce the total cost of asset ownership?

SECTION 2. MOTIVATIONS

General Considerations

On taking ownership of an asset, various responsibilities arise from its lifecycle management. These include identification, description, value, location, maintenance, utilisation, safety, security, audit, movements, insurance, and financial reporting

The range of property that needs to be looked after is vast.....

AV screens, building surveys, cameras, CCTV networks, clinical samples, computers, data files, door closures, election delegates, furniture, gas cylinders, grave plots, hotel inventories, industrial/kitchen equipment, leisure equipment, medical devices, mobile phones, machinery, musical instruments, printers, safety records, scientific instruments, school asset registers, sports goods, teaching aids, tools, tote boxes, trees, vehicles, waste bins, and wood

.....and almost all can be classified as moveable, vulnerable, and valuable.



Compliance and Best Practice

There are many reasons why an asset management system should be adopted, not least for the huge saving in staff procedure time through to physical searches for equipment and associated paperwork. Other important motivators are

1. Failure to comply with legislation though lack of planned preventative maintenance (PPM) activity.
2. No asset inventory compromising insurance claims
3. No asset valuation resulting in inaccurate premiums.
4. No asset transparency prejudicing compliance with legislation or directives
5. The risk of contravening accounting rules through publication of inaccurate fixed asset values in the balance sheet.
6. Lack of theft deterrence risking increased crime, or proof of ownership putting recovery at risk.



7. Increased staff time in completing physical asset audits
8. Slow paper processes in booking equipment movements.
9. Unrecorded serial numbers risking repair and warranty claims.
10. Slow discovery of asset conditions extending equipment usage beyond safe limits, and misinforming replacement budgets.
11. Staff turnover resulting in asset locations and procedural knowledge potentially departing with the employee, leaving a dangerous or time- consuming gap.

Crime –

Bearing in mind that the Police are under- resourced, have no central national database for stolen or recovered items (apart from vehicles), and whose identification tools rarely extend beyond the UV lamp, it is up to property owners to deter theft as best they can and have some ability to prove ownership if items are recovered. Our tagging recommendations on the security front are therefore based on defensive measures, as without national agency coverage we cannot ‘sell’ recovery and repatriation to the rightful owner with any degree of confidence. Laptops, cameras, artwork, and site machinery remain high profile targets. Due to budget constraints, access control comprises little more than a single receptionist in many buildings. Stop and search frequency is almost non-existent due to the fear of harassment complaints.

Criminal proceedings of course can arise as a result of not doing something eg safety maintenance, as well as premeditated theft. Although thankfully less frequent, injury compensation awards often dwarf the property losses. Organisations need a link between equipment and maintenance record for inspection, calibration, and health and safety compliance. Items can range from tree branches to memorial headstones, lift cables to electrical insulation, paving to playgrounds. With UK legislation leaning more towards the principle of strict liability and ‘ the deeper pocket pays’, the absence of proper records for the ‘offending’ machinery can lead to accusations of negligence resulting in vast sums to be paid in compensation. Awards for damages now can take into account sums for emotional distress as well as loss of earnings and are contributing to increased accident claims, and a criminal charge of corporate manslaughter is now available to the judiciary.

Money

It is self evident that most organisations spend a great deal of time and money developing their brand and the products that underpin it, while neglecting the administration, which for physical assets and procedures seems often been based on 18th Century practices. As increasing the market share gets more difficult, attention has been turning to ‘the back end’ and examining what 21st century tools there are to make a significant impact on operating overheads.

A clipboard contains just a combination of text, date, and number fields, which coupled with laborious data conversion to spreadsheets is a very slow and error prone way of doing things. A modern combination of unique ID, mobile device, and cloud based management program can automate any procedure, store the audit trail of who did what when over the entire asset life cycle, and make the workforce a lot more agile and productive. Imagine two days of clipboard versus two hours of laser barcode scanner or tablet!

SECTION 3. ASSET MARKING

Tagging Options

There are only two types of tag that will communicate with hand held terminals and computers

a) Barcode Labels- Some considerations.....

Materials -Metallised, aluminium, hard plastic, polyester, tamper resistant, tamper evident, or vinyl tags, even self adhesive paper.

Style -Generic or carrying a logo, postcode and phone number assists recovery

Size- Larger for easy scanning and warning, smaller so that it can be applied to smaller objects like switches, radios, and cameras.

Readability- Barcode and eye readable number (in case the scanner isn't available), provides two decoding options

Branding- Customised message deters theft

Help Desk number- for IT equipment this assists technical support.

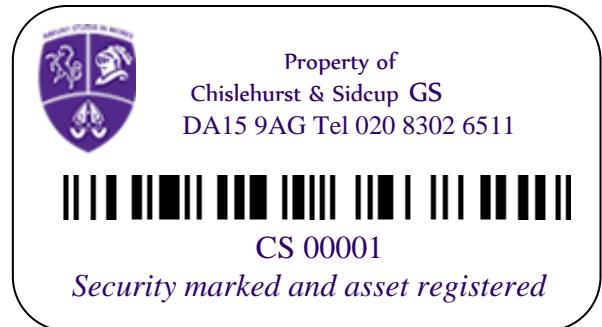
Additional security- Labels can have punched dots through which a compound can be painted to etch an underlying surface with a post code or phone number. Certain hard plastic tags meet industry standards for attack resistance, eg LPS1225, and there are types of tamper resistant vinyl labels which cannot be removed in one piece.

Surface markings are appropriate for marking internal assets, buildings, and people (wrist bands), where threats, environment, and abrasion are minimal.

b) **Radio Frequency Identification (RFID)**

The marking device is the radio frequency transponder, otherwise known as the microchip.

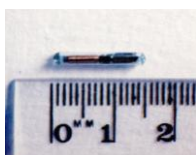
It carries a unique unalterable code number, retrieved and displayed on a small handheld scanner, or terminal. Unlike a bar code, if encapsulated properly, it does not deteriorate with time, can improve security, and can be 'read' through most materials, which is important in rough handling or high threat environments like the British weather! It can be supplied in various formats such as a nail for pallets and trees, discs for underground use, and self adhesive badges for IT equipment, power tools, and vehicles.



Custom Label



Generic label



Selection criteria

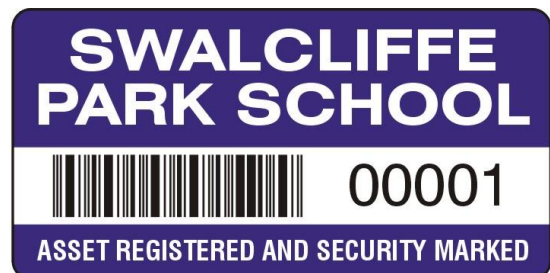
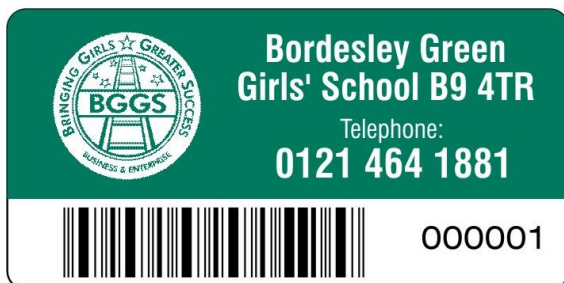
Choices will be based on budget, experience of recent loss or the threat of it, write off periods, label size and customisation, attack resistance, and how important the 'asset visit' is for audit, inspections, testing etc.

Basic paper labels are among the cheapest, but the saving is only significant in large numbers, and some clients report that after a while fingernails do a good job of peeling back the corners!

A dual tagging approach to more vulnerable assets gives the increased benefits of covert chip and overt barcode, with the added benefit of using the chip warning label for branding/help desk purposes.

Vinyl self adhesive barcodes are also economic but have low resistance and short lifespan unless tamper resistant, or hardened or laminated, whereas plastic security tags and microchips in small numbers are the most expensive but have more applications and usually never need replacing during the asset lifetime.

High strength security tags can be credit card or half credit card size, and are bonded with very high strength adhesive. Fully customised if required, laptop sets can be produced which grant authorised removal by an employee with personal ID card and a machine carrying the corresponding tag.



SECTION 4. AN INTRODUCTION TO RADIO FREQUENCY IDENTIFICATION

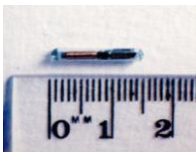
RFID is a broad subject, comprising many different types of microchip, varying in size, shape, operating frequency, and functionality. Applications range from supply chain logistics to fixed asset management, and security to anti counterfeiting. Used in most cases as a covert barcode, there are several benefits beyond the traditional surface label,

- Non line of sight interrogation
- Data can be 'written' to tags
- Withstands hostile conditions
- Simultaneous scanning of multiple tags
- Long range use with 'active' tags.

The following commentary is just a brief introduction to 'passive' read only microchips, and the connections with scanners and software management.

THE MICROCHIP

In one of its smallest formats, the microchip is little more than 10mm long, and is capable of storing and transmitting a unique number sequence that will identify whatever it is attached to. Unlike a barcode, the 'chip' can be placed inside many objects and still be scanned by its reader, giving the device some major advantages compared with 'overt' marks such as labels and serial numbers. One of its well known applications is in domestic pets and agricultural animal for traceability, but it can be fixed inside IT equipment, trees and pallets, power tools, gas cylinders, vehicles, clothes, and smart cards.



The integrated circuit within the device carries a unique number, which will identify whatever it is attached to. Unlike a barcode, the 'chip' can be placed inside most objects and still be read by a scanner without line of sight. It requires no attention and can remain 'passive' indefinitely, until energised briefly by the scanner. The chip number or a group of numbers can be held in the scanner and then delivered to a computer by cable link or wirelessly with Bluetooth or Wi-Fi or GPRS enabled equipment.

FEATURES

- Supplied often as a self-adhesive badge for easy application on flat or slightly curved surfaces. For assets subject to shock or vibration, reinforcement of the adhesive with a two part epoxy compound is highly recommended.
- Passive microchips require no battery or maintenance, and have indefinite life.
- They can be encapsulated in other formats ranging from large badges, nails, and cable ties to discs, pegs, and glass tubes.
- The scanner does not need to touch the chip to read the unique number, it only has to be come within 2-3 cm. Low frequency chips with a larger built in aerial and higher power readers can be read up to 12cm and even further with high frequency tags monitored by doorway antenna.
- Unlike a barcode, line of sight is not necessary as the 'chip' can be placed inside most objects and still be scanned by its reader, giving the device some major advantages over 'overt' marks such as labels and serial numbers. One of these is that it doesn't interfere with the materials or artistic appearance of an item where that is a consideration, for example a musical instrument or antique.
- The chip can be read through almost any physical barrier, including paint, water, wood, and plastics, but not usually metal. It can be read when placed on metal.
- The chips are unaffected by the weather or environment, from -40°C to $+80^{\circ}\text{C}$.
- As a covert 'marker', the chip can deter theft but only when accompanied by warning labels advertising the electronic marker, but not its location.
- A microchip identification system provides instantaneous proof of asset ownership in conjunction with inventory records.
- Microchips cost less than bar codes if they are re-used.



SECTION 5. SCANNING EQUIPMENT AND HAND HELD COMPUTERS

There is of course a wide range of scanners, with various functions covering read distances, barcode formats, RFID frequencies and storage capacities. Although both RFID and barcode scanners can be installed as part of checkout or doorway monitoring systems, most fixed assets need to be visited for counting or condition surveys, therefore the characteristics of three handheld machines are shown here.

Just pressing a button causes the RF scanner to emit a low strength magnetic field which is received by the microchip aerial and induces enough current to transmit back its unique number within a few milliseconds to the hand held display screen. Some scanners can store hundreds of chip numbers for downloading to software programs.



RT100 RFID scanner

This machine is a ruggedized terminal with integral laser barcode scanner, running Windows Mobile or Android, menu driven and when synchronised with the host PC can...

Add assets

Add locations, including people with barcoded ID cards

Carry out audits of individual or multiple spaces

Record movements whether

- a) borrowings from an IT department
- b) IT movements/repairs, on or off site
- c) equipment for a field trip or d) booking a meeting room

Record condition codes of any equipment.

Record surveys and inspections of any item subject to health and safety compliance, and once uploaded will store an audit trail of all inspections, vital for legal defence following an accident.



Cipherlab CP30

Machines like this can include either barcode or RFID integrated readers and data transfer by USB cable, Wi-Fi, Bluetooth, or GPRS depending on model chosen. Operating systems are usually Windows Mobile 6 or Win CE.

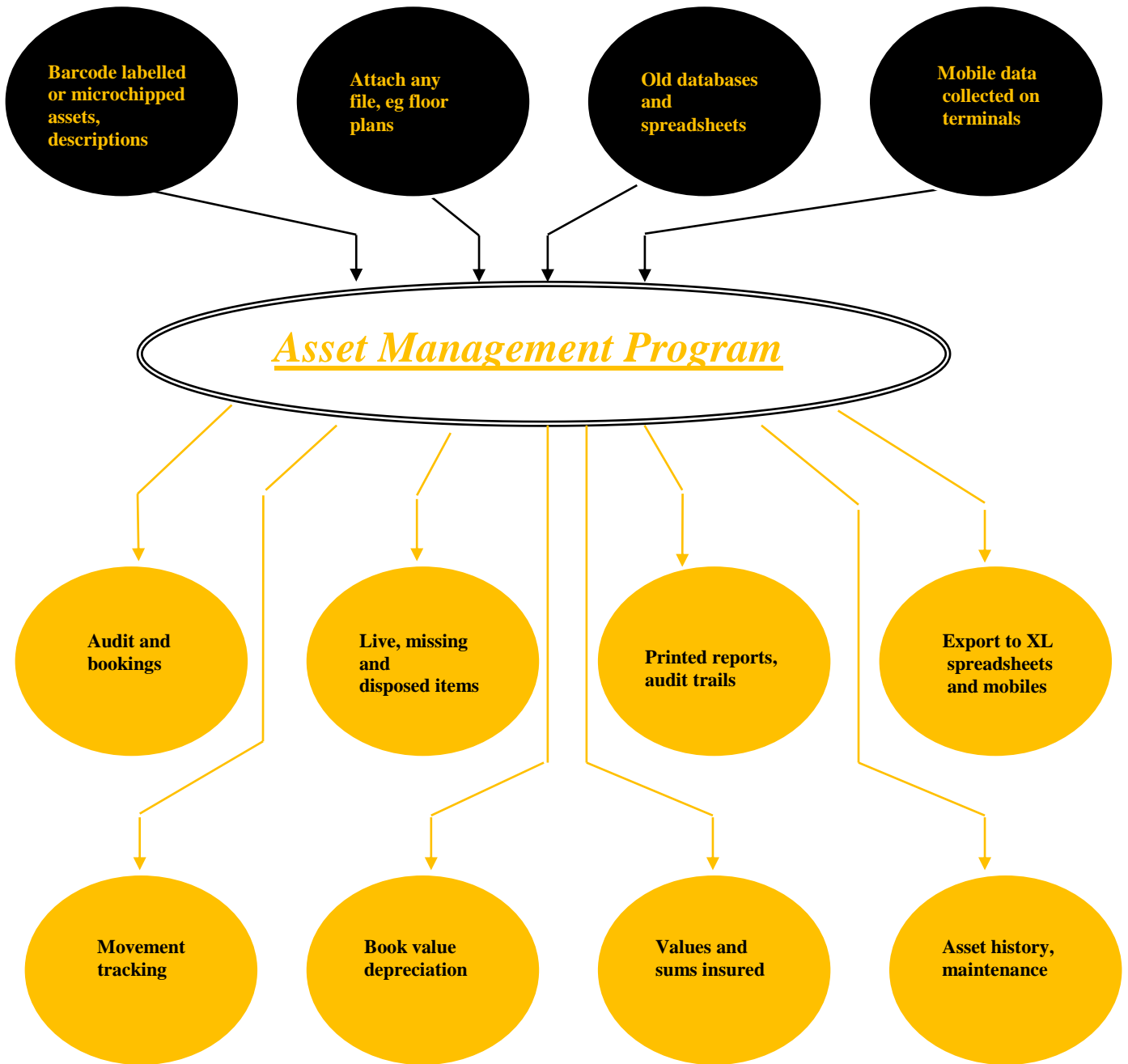
This Mio tablet has the advantage of a larger screen, and which is finger sensitive for data entry and scrollable for review. The machine has an Android o/s and a built in laser scanning and configurable for attaching images to asset files.



SECTION 6. COMPUTER SOFTWARE

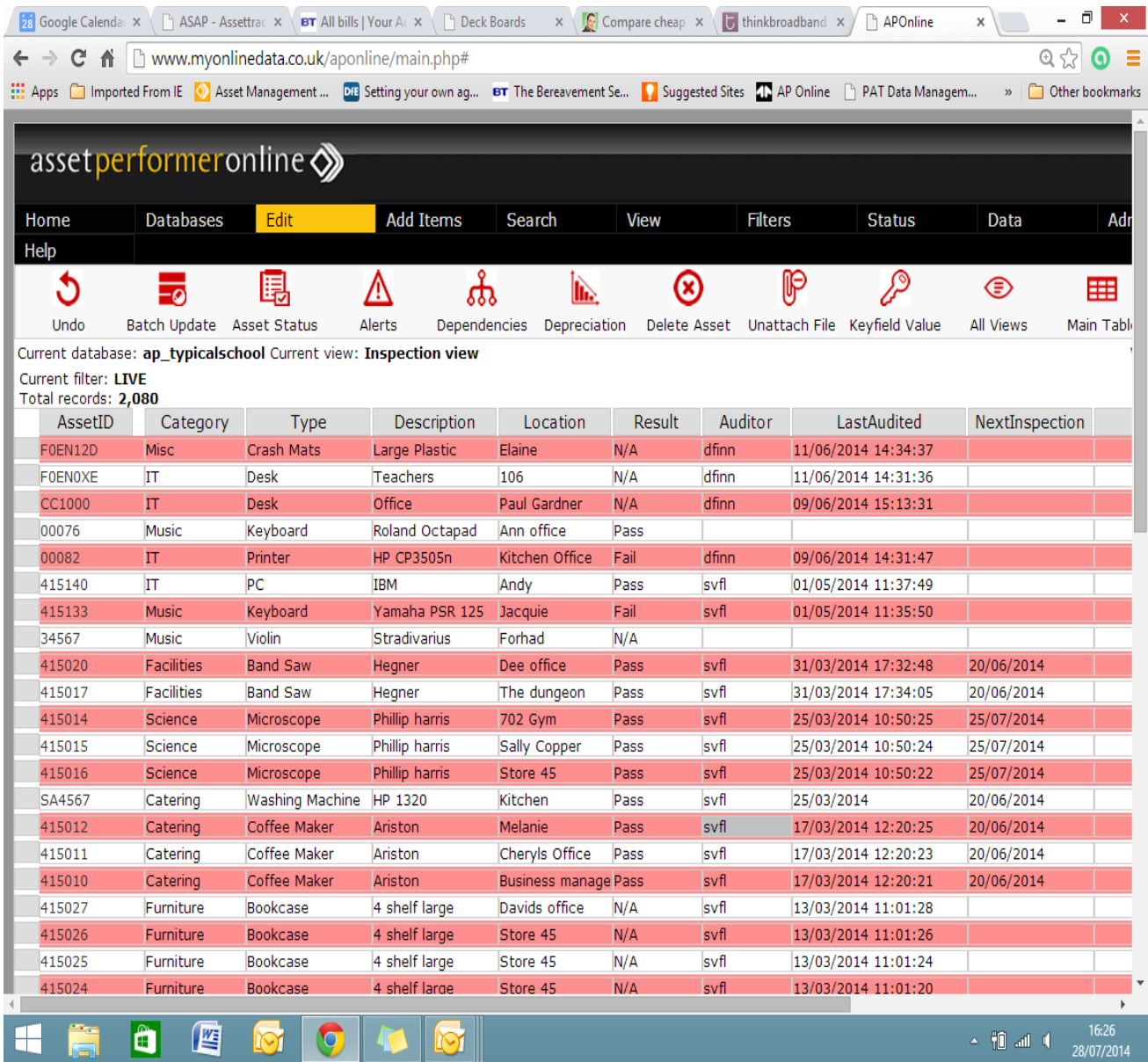
Asset management software should be simple to use on a variety of operating systems, both at PC, network, and online (cloud) level, with fast data entry, and instant status reports. Benefits should include

I N P U T S



O U T P U T S

Any client manager with some computer knowledge can operate most software tracking systems which manage Inventories, Property Tracking, Maintenance Records and Compliance, Sums Insured, Depreciation, Audit, and Proof of Ownership. Programs are either form based or table view as below.



The screenshot shows the 'assetperformeronline' web application. The current database is 'ap_typicalscool' and the view is 'Inspection view'. The current filter is 'LIVE' and there are 2,080 total records. The table below lists various assets with columns for AssetID, Category, Type, Description, Location, Result, Auditor, LastAudited, and NextInspection.

AssetID	Category	Type	Description	Location	Result	Auditor	LastAudited	NextInspection
FOEN12D	Misc	Crash Mats	Large Plastic	Elaine	N/A	dfinn	11/06/2014 14:34:37	
FOEN0XE	IT	Desk	Teachers	106	N/A	dfinn	11/06/2014 14:31:36	
CC1000	IT	Desk	Office	Paul Gardner	N/A	dfinn	09/06/2014 15:13:31	
00076	Music	Keyboard	Roland Octapad	Ann office	Pass			
00082	IT	Printer	HP CP3505n	Kitchen Office	Fail	dfinn	09/06/2014 14:31:47	
415140	IT	PC	IBM	Andy	Pass	svfl	01/05/2014 11:37:49	
415133	Music	Keyboard	Yamaha PSR 125	Jacque	Fail	svfl	01/05/2014 11:35:50	
34567	Music	Violin	Stradivarius	Forhad	N/A			
415020	Facilities	Band Saw	Hegner	Dee office	Pass	svfl	31/03/2014 17:32:48	20/06/2014
415017	Facilities	Band Saw	Hegner	The dungeon	Pass	svfl	31/03/2014 17:34:05	20/06/2014
415014	Science	Microscope	Phillip harris	702 Gym	Pass	svfl	25/03/2014 10:50:25	25/07/2014
415015	Science	Microscope	Phillip harris	Sally Copper	Pass	svfl	25/03/2014 10:50:24	25/07/2014
415016	Science	Microscope	Phillip harris	Store 45	Pass	svfl	25/03/2014 10:50:22	25/07/2014
SA4567	Catering	Washing Machine	HP 1320	Kitchen	Pass	svfl	25/03/2014	20/06/2014
415012	Catering	Coffee Maker	Ariston	Melanie	Pass	svfl	17/03/2014 12:20:25	20/06/2014
415011	Catering	Coffee Maker	Ariston	Cheryls Office	Pass	svfl	17/03/2014 12:20:23	20/06/2014
415010	Catering	Coffee Maker	Ariston	Business manage	Pass	svfl	17/03/2014 12:20:21	20/06/2014
415027	Furniture	Bookcase	4 shelf large	Davids office	N/A	svfl	13/03/2014 11:01:28	
415026	Furniture	Bookcase	4 shelf large	Store 45	N/A	svfl	13/03/2014 11:01:26	
415025	Furniture	Bookcase	4 shelf large	Store 45	N/A	svfl	13/03/2014 11:01:24	
415024	Furniture	Bookcase	4 shelf large	Store 45	N/A	svfl	13/03/2014 11:01:20	

Benefits

The asset manager (business/site/IT manager) may....

- use unique identification to link equipment with maintenance records and testing.
- Sort and filter in any field, run straight line or decreasing balance depreciation routines.
- keep an accurate inventory of what is owned, plus sums insured/year end book values if needed.
- use tags and labels for theft deterrence and proof of ownership

- track equipment between offices, classrooms, people, vehicles, and store rooms to other locations without using a tick sheet
- carry out fast paper free audits of any spaces where assets are stored, plus equipment bookings in/out, eg laptops for home use, cameras for a project, offsite repairs, movements between buildings.
- keep any number of databases for recording different activities, eg room bookings, visitor management.

More tailor made programs are available, and typical features should include:-

1. Improved asset visibility over who has what where, and for how long.
2. Default views and user defined data tables.
3. Track the change history for every field belonging to an asset
4. Fast point and click data entry, multiple database creation.
5. Search and filter capabilities, tracking live, missing, and disposed property.
6. Compatibility with barcode and/or microchip identification hardware
7. Standard or customised reports.
8. Recovery of stolen property through covert proof of ownership
9. Improved audit trails, and asset history
10. Importing existing whole asset registers, and sequential numbering systems
11. Exporting whole or filtered records to other applications
12. Storage of up to date values and accurate sums insured.
13. Maintenance logs, PAT test records, and depreciation management
14. Deliverable via both network, browser based, and smart phone versions
15. Easy to use functionality, and a built-in user guide.

SECTION 7. ASSET AUDITING PROCESSES

Many medium and larger size organisations suffer from a condition that could be described as 'the more we have the less we know'! There is a need to confirm the location of assets for security, insurance, depreciation, efficiency, and maintenance purposes. The traditional approach has been to print the asset register, and ask a member of staff to check what they can find! This is slow, inaccurate, performed infrequently, and wastes precious time converting the results back into the spreadsheet inventory. However it is necessary as no asset tracking system can function properly unless it has been loaded with an accurate inventory in the first place. Collecting this information is best performed on hand held data terminals as so many items are similar and asset descriptions and locations can be selected from look up tables to minimise keyboard entry.

Following training for recognition of any specialist assets or sensitive items and the supply of floor plans, an audit team will attach unique labels to the designated items recording asset description, category, location and extra fields such as condition/serial number/replacement values if required and then the barcode is scanned in to tag that record. Labels and the fixing position should take into account asset lifetime, and the threats of interference, climate, factory conditions and abrasion potential.

This process can apply to much more than the movable inventory. Tagging all the fixtures associated with facilities management such as water tanks, boilers, emergency exit doors and lighting, air handling systems, smoke alarms, call points means a much faster inspection process with automatic recording of who did what when over the entire asset lifetime. Stock or consumables can also be handled this way against a standard barcode number common to each box of the same product and adjustments made to a quantity field on distribution and restocking.

SECTION 8. PRACTICAL APPLICATIONS AND BENEFITS

THEFT DETERRENCE

Warning labels draw attention to marking, and criminal attention is much reduced. For businesses this defence is improved with perimeter warnings, a staff awareness campaign, and liaison with crime prevention officers, the insurance company, and perhaps the local press.

PROOF OF OWNERSHIP

In the absence of a recorded mark, particularly if the object is not one of a kind, the police may have no option but to allow the 'wrongful ownership' to continue, or sell a recovered item. An 'identifier' and a database entry ensure repatriation of recovered or identified property. It should be born in mind that unique items or those of limited production usually travel further from the crime scene before an attempt at cash conversion is made. Mass produced goods can resurface at nearby car boot sales and in the local press.

CENTRAL PURCHASING

Multiple site clients such as academy chains, nationwide depots and branches, hotel groups etc rarely have total visibility of who's using what where. The accuracy of capital expenditure budgets and subsequent purchasing leverage by such groups may be increased substantially through collective purchase consolidated from a group asset register of work station property, meeting room or guest bedroom furniture for example.

PLANNED MAINTENANCE AND RISK ASSESSMENTS

Through unique identification, a specific asset may be linked to accurate safety records. This may be a vital part of demonstrating reasonable care when defending claims for accident compensation, or just ensuring the expected lifespan of the item is reached.

LOANS AND LEASES.

Well protected markings facilitate precisely what is loaned and precisely what is returned, which gives greatly improved asset visibility when stock may be scattered round the county, or in use by a direct labour force. This equally applies when items are sent away for external restoration or maintenance and exposes fraudulent substitution immediately. Some organisations may have leased furnished buildings. Checking the state and whereabouts of the more valuable contents is made easy with unique identification and/or pictures stored on computer. Such images assist in restoration too.

PRODUCT INTEGRITY, COUNTERFEITING, AND WARRANTIES.

Branded products of high value or reputation are often copied. A chip or covert fluid 'certifies' each, and protects both producer and customer as any 'copy' will have no marker. Linked to the date of manufacture or contract terms, a covert microchip can reveal the correct machine to be serviced, and whether it falls outside warranty or extended maintenance agreements.

Section 9 PRACTICAL EXAMPLES

To stimulate ideas for your circumstances here's a list of assets and procedures we've helped clients manage in recent years

1. Office assets, mostly computers and furniture for financial reasons
2. New office assets acquired resulting from moving into new premises, old register out of date
3. Microchips for marking exact positions of grave plots for subsequent burials and exhumations
4. Tracking architectural plans round a design office
5. Tracking the emptying of waste bins, both human and animal.
6. Toy movements from storage to playgroups
7. Medical oxygen cylinder movements to and from hospitals
8. Refrigerant gases tracking from distributor to retailers
9. Audits for hospices, hospitals and local care facilities
10. Tools and equipment to construction sites
11. Theatre inventories
12. Hotel facilities management M&E equipment
13. School asset registers, including SEN equipment
14. Noise and vibration test recording
15. Clinical sample tracking
16. Outdoor leisure safety equipment inspections
17. A London Borough's entire schools inventory audited for insurance purposes
18. TV station broadcasting equipment, move to new premises
19. Tree inspections, safety audit trails
20. Cemetery safety, memorial risk assessments
21. Delegates tracked into elections for public office
22. Time and attendance invoice validation
23. Railway catch pit inspections
24. Tree logs in a timber yard
25. Fork lift truck battery management
26. Film can archive relocation
27. Supermarket branch audits
28. Data storage facilities management
29. Bank fixed assets audit
30. Multiple branch based heating and dehumidifier inventories
31. Multi office audit of AV screens
32. Tracking evidence bags and computer hard drives for criminal proceedings
33. Waste from vehicle manufacturing plants
34. Train wheel sets refurbishment
35. Tote boxes of recycled clothes
36. Landscaping power tools
37. Drainage cameras
38. City CCTV network installations