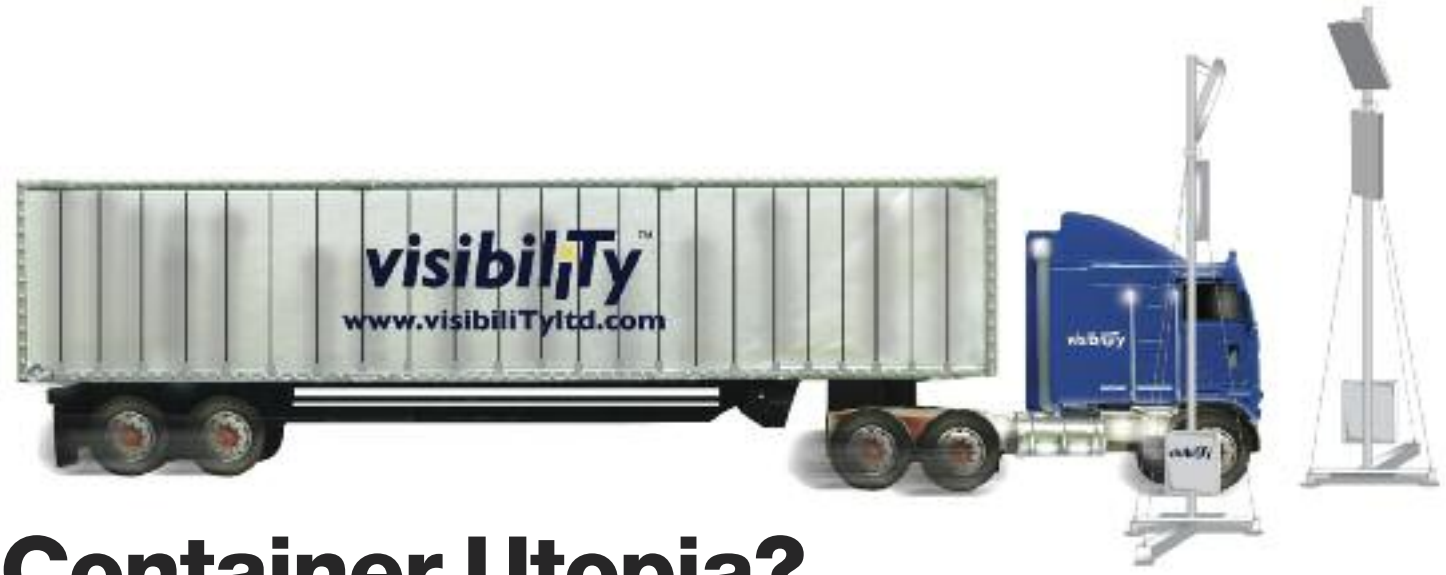


Container Utopia?

Modern RFID UHF tags do not need a line of sight and a long range reader can register all kegs on a curtain sider at once. VisibiliTy is the RFID division of InteliTap.

Picture a world where all container movements for draft beer in the supply chain can be tracked, providing timely and accurate information to key decision makers within a brewery, pub and beyond. And that same infrastructure can be used to provide information to manage other asset resources critical to the profitable and necessary operations of the brewery.

by ***Jon Quinn***
InteliTap Ltd

In this utopia, kegs are individually identified and closely tracked as they move through the supply chain – from the filling line, to the warehouse, to despatch, to wholesaler, to the end customer, and then all the way back again, diverting for preventative maintenance when appropriate. Sounds great, doesn't it.? This article will discuss today's advancements in technology and how this, plus sound supply chain strategy can help brewers to optimise their container processes and impact the entire supply chain from manufacture to consumption. Utopia is possible. Supply chains are innovating and integrating all the time and evolving brewing industry Supply Chain Management (SCM) operations now incorporate tracking technologies.

In the beginning... there was beer!

Historically, we brewed beer, it was delivered directly to the pub by our horses and drays. It is a far cry from the 'sophisticated' supply chains of today and the way alcoholic beverages are now produced, not to mention how we consume it – at a pub, via a bottle or can, or even a home keg. In the case of on-trade, dispense technologies are now so advanced that we can now see exactly when the pint was poured, what temperature it was at and who poured it. Brewing networks have wholesalers of varying levels, third party logistics providers, distributors, brewers selling their beer into other brewers networks, brewers packaging or even contract brewing beer for other brewers and so on. Quite simply, all supply chains are becoming more modular in nature, the relationship between manufacturer and customer is ever extending, yet product and brand must be stronger than ever to succeed in the challenging marketplace.

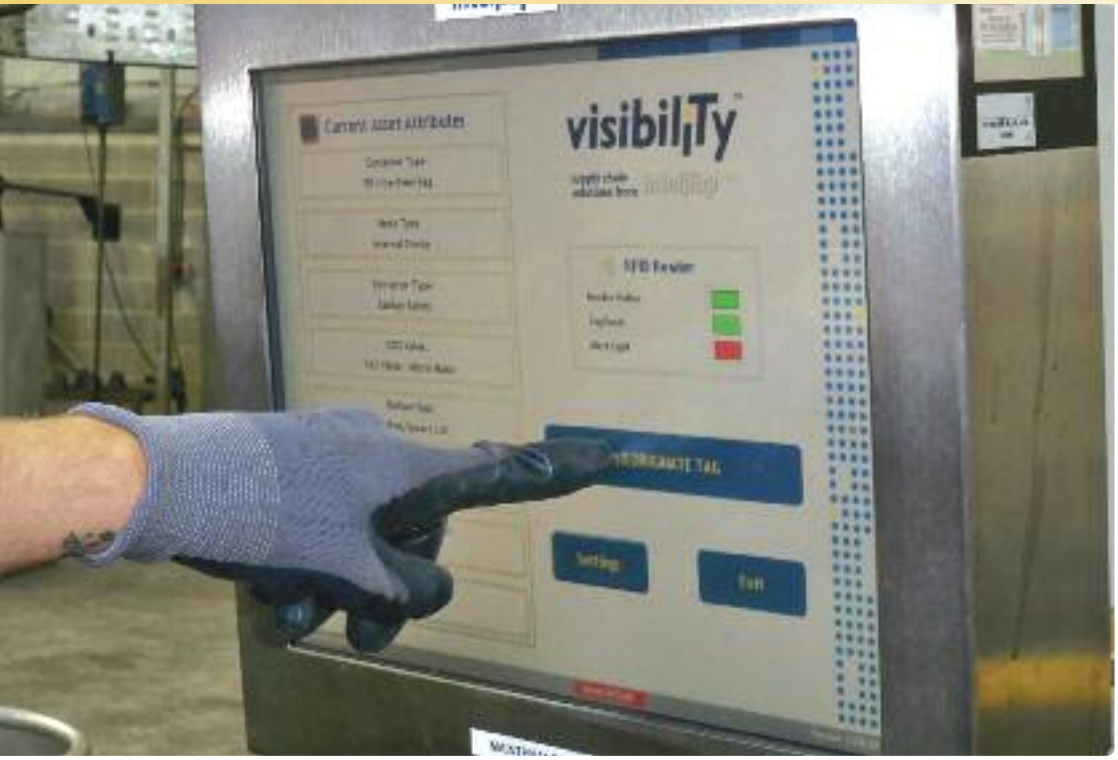
Data, data, everywhere, but not a drop to drink

This increased complexity leads to more and more data points and the way the industry has changed demands continuous evaluation of key performance indicators. Most brewers focus heavily on metrics such as cost per hectolitre and line efficiency so it seems strange that kegs, a capital fleet that has a value of many millions are so often neglected. Quite simply many brewers simply do not know much about their fleet, its size, efficiency, location and true value. Is it because they cannot keep control, have never needed to, do not have the tools or technologies, or because they are not realising the value of doing so. Historically, it was never a crime to have surplus assets. Not so today. Similar industries with high value assets, like gas bottles and pallets are very protective over their assets and the brewing industry is, in most cases lagging behind and missing a cost saving.

Understanding a container supply chain enables brewers to uncover all kinds of behaviour patterns and identify those exception areas that are causing problems, or could offer a large opportunity. As an example, an exception reporting solution enables brewers to drill down by product group, region, country and customer channel, and highlight issues that affect the profitability of certain customers. Traditional measures of a customer's worth like taps on the bar, barrelage and growth potential, can be impacted by hidden factors – for example if the 'asset cost to serve' attached to a particular customer is high, through extended cycle time or non returned kegs, your costs may be high or even

Supply chains are innovating and integrating all the time and evolving brewing industry Supply Chain Management (SCM) operations now incorporate tracking technologies.

Left: A beer keg with VisibliTy configured UHF RFID tag affixed. The UHF RFID tag (inset) is exclusive to VisibiliTy and has been specially designed for metal and high value assets. It is the only one of its type in the world.



The VisibiliTy touch screen technology makes RFID tag origination simple, quick and easy to integrate into existing supply chain operations with extremely easy and quick usability for employees.

unprofitable for that customer and important decisions may need to be made about future business. Tracking and turning that tracking data into intelligent information is the only way – if you cannot measure it, how can you make informed decisions?

Global supply chain issues

There are many common issues for brewers today, a major one being container losses. The British Beer & Pub Association (BBPA) says the cost to UK industry alone is in the region of £50m per year. Even with deposit schemes brewers see commodity prices constantly changing, which raises the issue of the value of an empty keg. Containers are going missing and with the right processes and technologies in place, they do not need to. There are usually two occasions when losses become compelling to a brewer, when they have to buy new ones, or when it is so large that they can't fulfil customer demand. Financial asset loss when neither of these issues occur has been given scant attention. Even in the most basic sense, many brewers do not know how many kegs they actually own, which in terms of the balance sheet and in planning, proves very woolly indeed.

Most industries that use high value assets have a deposit scheme to prevent loss. If kegs are empty, unless there is some scheme of agreed accountability in place, they have no value to the outlet, distributor or wholesaler. Full beer kegs are never neglected, while empties have much less value attached to them once they leave the brewery.

Deposit schemes alone are not a silver bullet, if scrap value rises above the deposit value then the system is open to abuse. Typical deposit schemes do not encourage efficiency – they do not encourage the speeding up cycle times. In many supply chains, a decrease in cycle time of one single day is a more impactful financial benefit than reducing container loss by 1%

For those without deposit schemes, many trading agreements do state that the client will be charged for any imbalances, as containers and contents are not individually accounted for and even balance tracking is rare, and customer retention and relationships are considered key in challenging trading times, in reality this rarely happens.

"Deposit schemes alone are not a silver bullet, if scrap value rises above the deposit value then the system is open to abuse."

A mixed up chain

Globally, there are two common supply chain patterns – brewer to outlet direct and brewer to one or multiple levels of wholesaler. The more complex the supply chain, the longer the cycle time.

It is not common to validate each container to make sure it actually belongs to you, let alone to check whether it is the same container that went out. The checking that is in place is manual, expensive and is error prone, even when managed well. An automated tracking system using a technology such as RFID would supercede this manual process completely and affordably. Technology, such as Ultra High Frequency (UHF) RFID, allows the identification of a full truck load of containers in one simple scan when they reach the depot, again on the forklift truck, individually on the filling line, during maintenance etc - a simple cost effective series of readers installed to track the container each step of the way, including at point of delivery.

Another common problem is foreign containers. With a tracking solution, those containers are flagged as exceptions and event management processes can be modified to make sure they are returned efficiently.

The main burning issue in terms of production and sales is having enough containers to fulfil demand and satisfy the forecasted sales. How many do I have, and how quickly do they return. Unnecessary dwell in pockets of the supply chain is an issue that is surely worth being alerted to.

Rehabilitating the repeat offenders

Product quality and traceability is another common problem. Beer quality and trade failures are both serious issues – production problems could be to blame, as could freshness, or could it be the container? Typically 20% of kegs cause 80% of problems. Avoiding unnecessary redelivery costs can be realised by putting some tracked preventative maintenance programs in place. This is without even discussing the cost to brand damage if a particular beer is notorious for trade failure. Additionally, tracking can show how fresh the beer was when it arrived at the customer, incredibly powerful information for those brand marketers among us.

Traditional planning methodologies

Container planning has been a rudimentary process based on limited science. Common practice uses the production forecast, average cycle time and estimated net fleet size. It is almost as though extended or changing cycle times and losses are ignored when they do not need to be. If a brewer does not have enough containers after producing this plan, they may purchase new ones, when in actual fact, understanding and eliminating inefficiencies and speeding up cycle times whilst eliminating rogue kegs from the fleet can achieve the same results with the existing or a smaller fleet.

Embracing a tracking solution pushes a lot of new data into an organisation; the challenge is how we turn that into information. Gathering more data can sometimes make the job even more challenging. The smart bit comes you can interpret this data

and turns it into real management information that can be used dynamically to solve issues, create new opportunities and optimise business processes to achieve goals and more. For example one brewer cites that they would have to sell 5000 pints to pay for a lost keg – so it's worth asking how many pints you would have to sell to cover your losses.

Technology 101

Technology has not been embraced by the brewing industry quite as deeply elsewhere. The main misconceptions are that it is difficult, labour intensive, or costs too much. The key point is realising the value that can be unlocked versus the small learning curve your organisation faces. Application of proven statistical techniques gives the opportunity for value from sample based tag application at a lower project cost, giving the potential to phase the costs, the learnings and to reap value from such a project in phases linked to return, far earlier than has historically been possible.

The container supply chain has not lent itself well to adopting technology. Assets are stored outside, the environment is arduous (real!) and expensive business assets move outside of the brewers control. There have been a lot of false promises from technology suppliers in the market, combined with a lack of defined standards.

Data carrier choices can vary and it is a case of specifying which one is right for you, from the basic 1D barcode you see on most products, to a very sophisticated UHF tag that can be read from distance (through a closed curtain sided trailer) simultaneously with hundreds of other tags. Multi functional readers are now becoming the norm, it is irrelevant whether 1D barcode, 2D barcode or RFID is selected as the solution can interpret the information, or a simple upgrade or modification can usually do the trick.

Data carrier technologies based on controlled standards can see the adoption of a common reading infrastructure for vehicles, kegs, dispense assets, and inbound and outbound off-trade deliveries. We only have one electrical standard for all the things we use in our homes, why not the same principle in managing our business?

Decisions, decisions.

There is a variety of data carriers that brewers can choose from as regards automatic identification of assets.

Barcoding

Barcodes are synonymous with product packaging, and as a brewer it is the norm to have them printed on pack, or on container assets already. The idea that an asset tracking solution utilising barcoding is obscure and difficult to implement is not true. 95% of applications already have solutions developed for them to overcome the obstacles of reading and applying the data.

Barcodes were born in 1949 when the earliest patents were lodged, attempts to develop the application were not successful as reader electronics were fragile. During the 1960s applications were launched in both grocery and library applications. Solid state electronics were proven and applications were successful. Supermarkets embraced bar coding in the late 60s and saw international acceptance in retailing during the 1970s.

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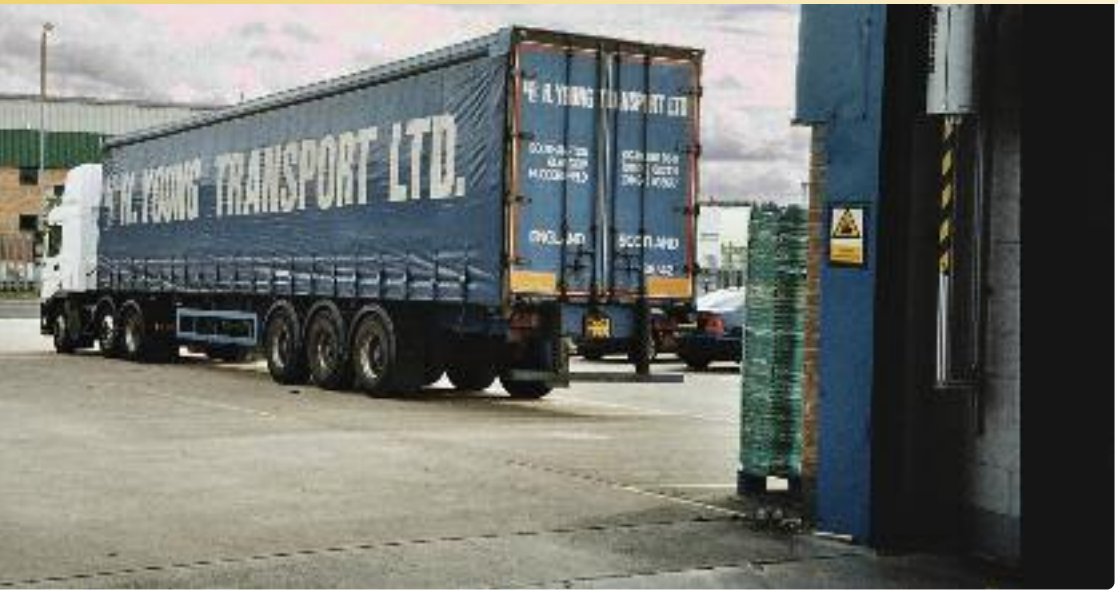

A cost-effective UHF RFID long-range reader is affixed to the brewery door enabling bulk loads of assets to be automatically identified. Readers can also be configured to be portable if organisations need to target or measure problem areas of their supply chain.

International Standards have been developed to ensure that we can apply a unique, unambiguous identity to every item. International numbering, data format and symbology standards mean that we are able to read and correctly interpret the codes all over the world no matter where they were produced.

Radio Frequency Identification(RFID)

RFID is often thought of as a big brother technology that knows exactly where an item or person is at any time. In reality it is just a communication between a reader and tag via radio waves operating at low (LF), high (HF) or ultra high frequency (UHF). The tag/reader combination chosen affects the read range, which can be as little as 8cm or as great as 10 metres. Of the three frequency classes in use for passive RFID tags, LF, HF and the recently adopted UHF each has its own characteristics which makes it more or less suitable for particular applications. Unlike barcodes, RFID does not require line of sight.

RFID itself was developed in the Second World War through the IFF (Identification Friend or Foe) system, it was installed in military aircraft to automatically distinguish whether they were a friend or enemy.

In the 80s applications of RFID were developed in transport applications for tolling and vehicle identification, using active battery based RFID tags. Passive tags, for example the Oyster travel card began to be deployed in the late 80s. Contactless credit and debit cards use RFID to read the cards. Recently we have seen announced low value transaction cards from Barclays– where any purchase under £15 will be automatically debited when you hold it near a reader, no pin number required.

The earliest brewery application of RFID was deployed in 1996, a low frequency passive RFID application developed by Scottish and Newcastle to track kegs. This has served the company well and provides individual container identity. Similar solutions have helped brewers to automate many processes and provide visibility of their containers.

A major breakthrough in brewery applications of RFID has occurred through the use of UHF technology, enabled by the definition of standards. allowing the allocation of appropriate radio frequencies – this is very important, for example if you used a 915 MHZ UHF interrogator in the UK you would interfere with mobile phones.

UHF Utopia

UHF is now the frequency of choice for logistics applications under GS1/EPC standards. The major benefits are long read ranges and the ability to identify multiple assets or items with unique numbers in one simple scan. The passive UHF RFID Tags and reader configurations like those developed by InteliTap work with the metal and liquid in the brewery environment and consistent read rates nearing 100% are achieved. UHF is also cost effective. RFID systems compress the data to fit it into the minimum memory size – you do not get this capability with a linear barcode, and the cost of the chip is proportional to the memory size, making UHF tags cheaper. They are produced in large volumes and are relatively low cost compared to LF and HF. In addition, a passive UHF tag exceeds the life of a keg.

There is considerable industry discussion of 2D barcodes complimenting RFID. It is extremely rare that a tag would malfunction however a physical 2D barcode, (different to the stripey 1D variety) which is very small, is easily read and can carry lots of data, could be backup in the event of tag failure. Barcodes on labels are difficult to maintain as a permanent identification as they are taken off during washing processes and a new one is applied once the keg is filled There are advancements in development in which, plastic rewritable labels incorporating a RFID tag could be permanently fixed to the container, using technology of this type it would be possible to simultaneously rewrite the RFID tag and the bar code or 2D symbol.

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Making the jump from barcode to RFID

In terms of migrating to another symbology or data carrier, if a brewer has an existing barcode or low frequency RFID system in place, the data handling processes are far more important than the data carrier technology. Readers and interrogators are simply accessories to the system and infrastructure. Blue sky thinking also allows us to think of how the integration of all of the existing and future technologies can enable us to develop further applications. Curtain sided trailers for example already have GPS navigation and location and this itself can be linked into the powerful network. On the other hand, the sensor technology for dispensing beer mentioned earlier can be integrated with RFID keg technology, meaning every step of the way is tracked and optimised, right through to the last sip. ■

■ The author acknowledges independent consultant Harry Clark for his input on auto ID history.

■ **The author**

Jon Quinn is responsible for Supply Chain Technologies and International Franchise Development for InteliTap. Prior to that role, Jon served as the VP of Business Development for TrenStar Inc. Intelitap works with brewers and bar and restaurant owners all over the world and help clients optimise their supply chains and profitability. Their blend of Auto ID tracking solutions and the application of smart data, which blends technology and specific supply chain expertise, adds value to a brewer in many ways. You can learn more at *www.intelitap.com* – or visit its stand at Brau Beviale, Hall 4a, Booth 204.