EVALUATING AGV SYSTEM TECHNOLOGY

AGV systems are a proven solution for lowering labor costs, reducing damage, improving safety and control of material movement in a facility. But these benefits are critically dependent the quality of a buyer's evaluation of factors that are both clearly visible and dangerously hidden.

Most buyers choose an AGV supplier primarily based on what they see………. the AGV itself, its navigation, and the system price. That can be a fatal mistake because it may lead to living with what they don't see……. a System Technology that results in an unsatisfactory system operation. System Technology comes with the choice of AGV supplier and if that is not fully evaluated, the rest does not really matter. Would you buy a Ferrari (vehicle) if there were no or poor condition paved roads (technology) to drive on??

Truly successful systems are more dependent on the 'System Technology' employed than the actual AGV (automatic guided vehicle) employed. Yet, most potential buyers of AGV systems fail to appreciate this is the most critical part of an AGV system.

Like any type of automation, AGV 'systems' rely on 'technology'. Without System Technology (paved roads), you just have AGVs (Ferrari's) incapable of performing work efficiently (driving/handing as designed). With the wrong type of System Technology, you end up with a deficient level of system operation and performance or worse, failed project.

AGV System Technology capability/functionality levels of vary greatly with different AGV suppliers so failing to evaluate this is a huge, yet avoidable risk.

IF YOU FAIL TO UNDERSTAND & WEIGHT THE DIFFERENCES IN AGV TECHNOLOGIES BEFORE YOU SELECT A VENDOR….
YOU'LL NEVER STOP PAYING FOR A BAD DECISION

You can't buy AGVs without getting the System Technology that comes with them. ***So, how do you avoid the risk of getting the wrong (i.e. mismatched to your application requirements) System Technology when you can't easily see a big part of what you're buying?***

Your best insurance of a successful AGV system is to 'do your homework' before you select a supplier.

Here's how:

1st <u>Identify</u> the ***functional elements*** of System Technology [Done - <u>See Items 1 – 8 List, below</u>]

2nd <u>Learn</u> how each element functions for each different Supplier's System Technology – [Ask the Supplier to explain]

3rd <u>Create</u> a list of decision factors [throughput rates, ease/cost of changes, expandability, level of control, maintenance, interface functionality, etc.) important to your system's operation.

4th <u>Compare</u> how well the functional elements in different Suppliers' System Technology addresses your list of the important decision factors.

5th <u>Choose</u> the AGV System Technology that is best matched to decision factors

<u>**System Technology is what:**</u>   *(refer to Figure 2)*

1. Allows AGVs to be ***routed*** to specific destinations by taking the shortest paths,

Figure 1: The performance of the Traffic Control function is critical to throughput but, CAUTION: it varies greatly in different AGV System Technologies.

2. Insures AGVs exercise efficient, safe ***traffic control*** to maximize throughput,

3. Enables AGVs to perform the necessary *station cycles* that transfer loads automatically,

4. Provides the capability to *interface* with other automation such as robot cells, conveyors, storage systems, doors, etc.,

5. Supplies the ability to *communicate* with AGVs to monitor their status and remotely dispatch them to carry out load transportation missions.

6. Establishes rules governing *path layout* limitations

7. Determines how *path actions* like change sped, sound horn, activate turn signals, etc. are created.

8. Supports the *networked integration* with higher level control systems (MES, WMS, etc.) allowing the AGVs to be an embedded subsystem of a larger integrated system.
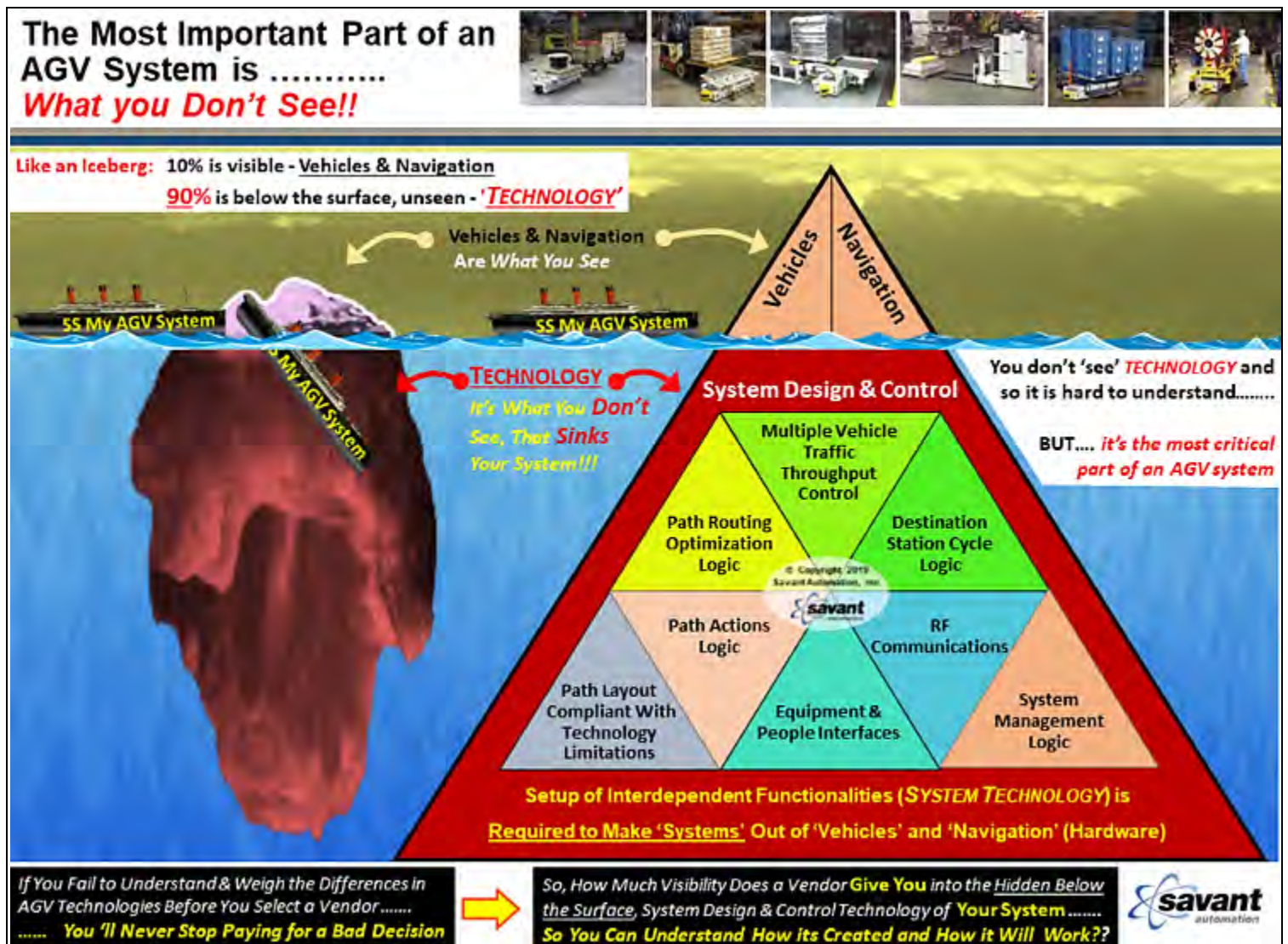

Figure 2: An AGV system is like an iceberg. The AGVs are useless without the 8 'System Technology' functions in the diagram. Each AGV Supplier performs these functions (collectively, the 'System Technology') differently and the wrong combination for your application can 'sink your system'.

All the 'System functions' are handled by the 'System technology' that you don't see. This invisible technology is what allows AGVs to work as a 'system'. Yet, so many buyers know little to nothing about the critical differences in how each AGV supplier's technology executes these 'system' functions and, …….. that is what can sink your system. The Titanic never saw what sank it.

Differences in AGV supplier System Technology affect everything in *your* system from throughput/efficiency, response time, scalability, control & functional capabilities, ease/cost of change, reliability, operator interface, operational cost, to user acceptance & support, etc.

Failing to 'see' (understand) the 'System Technology' (below the iceberg surface) that you will get with your choice of AGV and its type of navigation (pieces you see) is like buying a house based on just seeing the outside and never going in to see if there are rooms, stairs to other levels, wiring, heating or even floors!

Example:

- There has been lots of talk about a new form of navigation called 'Natural navigation'. It uses a Lidar laser scanner at floor level, to see structural (natural) reference objects (walls, racks, etc.). The system area must first be carefully scanned

with the AGV to establish where the natural references are relative to the intended travel path.

- The focus is all about what you 'see' (the vehicle and its navigation) but, it should be on what you don't see (the System Technology below the iceberg surface) because it is seriously deficient compared to the AGV System Technology found in proven forms of 'virtual path' CAD map (Inertial/magnet or Laser/target). In fact, Lidar does not possess the associated System Technology required to handle typical AGV system applications. And, most facilities have open aisles (not walls on either side of the aisles) and so lack the line-of-sight to building structures required by Lidar.

- Failing to question and evaluate what you don't see is a big risk.

'Going inside an AGV system' is hard because most suppliers keep you in the dark. It is your job to make potential AGV suppliers open the door to their System Technology house, turns on the light and walk you through so you see what is what is inside before you choose your AGV system Supplier.

A **System Technology Checklist** will help you do your homework before buying. We can supply you with one upon request.

NOTE SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE BASED ON PRODUCT IMPROVEMENTS OR TECHNICAL REQUIREMENTS. FORM: 0219EVALTECH

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"Tape/Target-Free" AGV Technology Focused on the User

Savant's robust, yet affordable AGVs are attachment-configured for your load transportation application requirements. With zero-maintenance, CAD map navigation system changes are easy, quick and virtually unlimited.

The all-new iQ-CAN™ PC program employs user-focused graphical path configuration tools that eliminate the need for costly software coding. iQ-CAN™ also provides no-cost, visual system modeling allowing customers to fully understand and truly 'see' their system operate in full motion before they buy it!

For over 65 years, we have developed our own technology, built our own vehicles and supplied thousands of systems to all industries. We don't rely on disaffected 3rd parties for our core technology which can jeopardize your long term system support.

Savant is focused on the user's needs making it much easier and affordable to reduce labor costs, improve facility efficiency and enhance safety in every operation. Visit agvstems.com and fill out the AGV Data Form, or text 4AGVS to 474747 on your cell phone for assistance with planning and pricing.

Savant Automation's Graphically-Configured, 'Virtual Path' AGV System Technology:

See How Your Proposed System Operates BEFORE You Buy It!

iQ-CAN™

intelligent, **Q**uick **C**onfigurable **A**utomatio**N**

Reduce Labor Costs with Rugged, Affordable AGVs

| Drive Under Cart | Roller/Lift Deck | Tow Multiple Carts |
| Assembly Line | Tote Handling | Floor Lift |

The Total AGV System Solution:

- **iQ-CAN PC Program...** The visual system design program for path configuration, modeling and control that eliminates the need for costly software coding.

- **Tape/Target-Free AGV 'CAD Map' Navigation** features zero path maintenance that can be deployed in days and changed on the fly.

- **The Same, Universal-Use, Common Chassis Automatic Guided Vehicle** is "attachment-configured" to support a broad range of applications and reconfiguration for true, company-wide AGV standardization.

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