AiRISTA

TOP 6 APPLICATIONS OF HEALTHCARE ASSET TRACKING

Asset Utilization Drives Operational Efficiency

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Chapter 1

What's at Stake?

The United States spends more on health care than any other country, approaching 18% of GDP. According to the Journal of the American Medical Association, "the estimated cost of waste in the US health care system ranged from $760 billion to $935 billion, accounting for approximately 25% of total health care spending."[1] For perspective, this is more than the entire US Defense Department budget.

It's an often-repeated claim that the utilization rate of hospital assets is between 32% to 38%.[2] Considering the average hospital has 35,000 inventory SKUs, there is a potential saving if you can buy/lease supplies to only meet surge demand and avoid unnecessary buffer.

With so much inefficiency in the healthcare system, where do we find the low hanging fruit? The first problem is tracking hospital assets. As Peter Drucker cautioned "you can't manage what you can't measure", hospital assets must be tracked before any measure of utilization can be applied. Real Time Location Services is a powerful tool that helps staff find and track those assets that tend to "disappear" – your mobile assets.

[1]William H. Shrank, MD, MSHS, Teresa L. Rogstad, MPH, Natasha Parekh, MD, MS, "Waste in the US Health Care System", JAMA, October 2019

[2]Electronic Health Reporter, March 2018

Chapter 2

Top 6 Applications of Asset Tracking

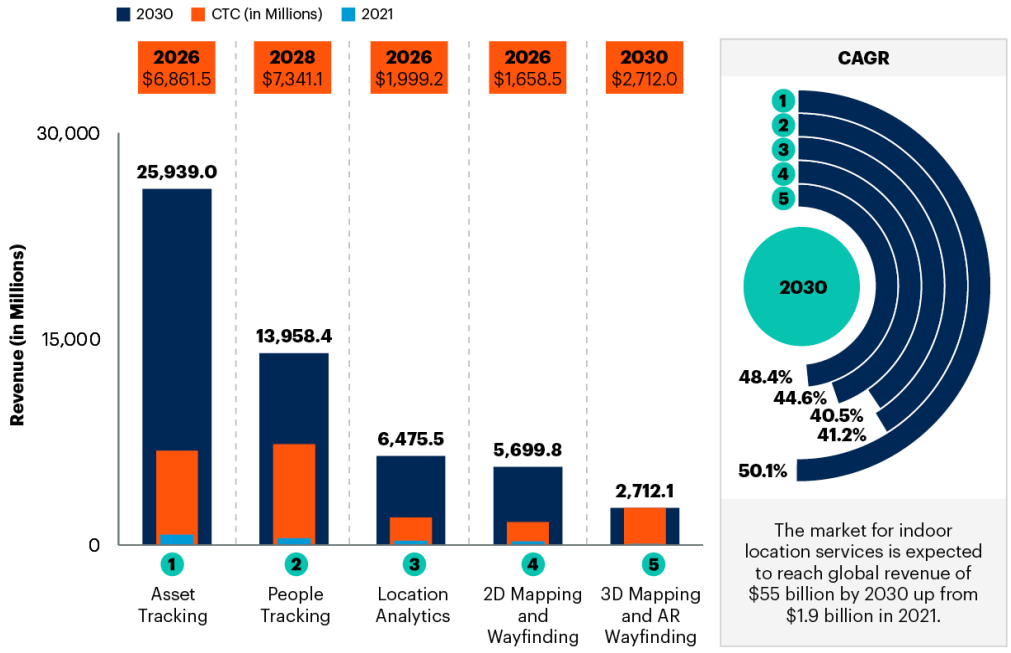
The RTLS market is experiencing a renaissance of sorts. After years of scattered deployments based on wide ranges of technologies, a consolidation is occurring thanks in part to advances in Bluetooth Low Energy® (BLE) and the access point networks that make it ubiquitous.

Also driving the renaissance are the billions of devices in the IoT world coming online and require location information.

According to Gartner® forecast for indoor location tracking, "The market for indoor location services is expected to reach global revenue of $55 billion by 2030 up from $1.9 billion in 2021.

Asset tracking will be the biggest opportunity in terms of near-term growth and total available market (TAM)."[3] This translates to a staggering 50% CAGR. For details see our blog about the Gartner forecast here.

Indoor Location Services Revenue Opportunity Projection



Source: Gartner

2D = two-dimensional; 3D = three-dimensional; AR = augmented reality; CAGR = compound annual growth rate; CTC = Crossing the Chasm

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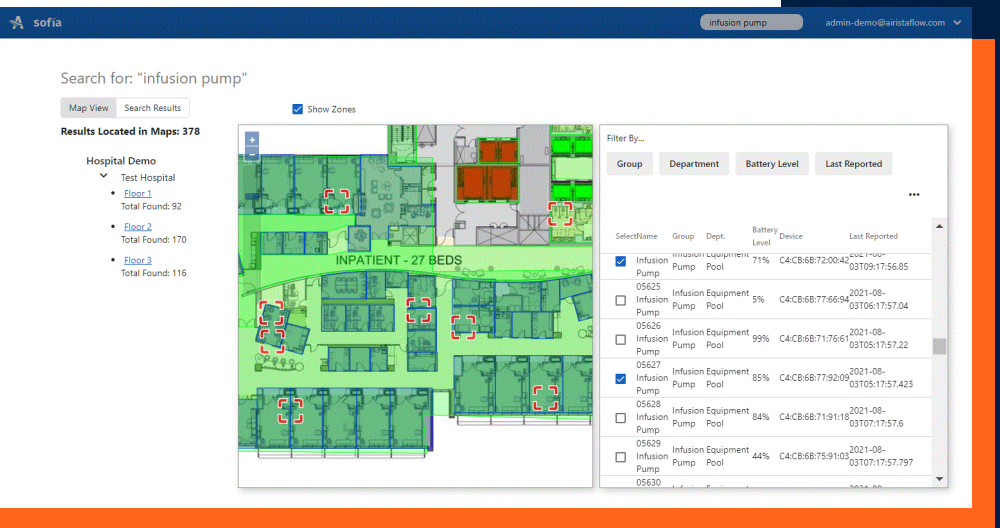
Gartner

[3]Gartner, Emerging Technologies: Revenue Opportunity Projection of Indoor Location Services, Annette Zimmerman, Ranjit Atwal, June 16, 2021

When considering asset tracking in a healthcare setting, the following are the top 6 applications.

1. Locate Needed Equipment

On average, nurses spend 20 minutes per shift searching for equipment. Over the course of a year, this translates to $500,000 in wasted time for the typical hospital.[4] The most common use of an asset tracking solution is to locate the nearest available item in real time. Ideally the solution will position an icon on a floor plan map representing the asset. These searches should also be conditional to combine qualities like "available" or "sterilized". Given the mobile nature of the workforce, support for devices like tablets and smart phones are a requirement. Because this is the most popular use case, a solution should allow quick entry of a desired asset from any interface in the app.



2. Par Level Adherence

Par levels allow users to set min & max inventory levels for a range of equipment. This might be required for regulatory reasons or simply to ensure sufficient quantities are available to meet demand. For example, a particular hospital unit might have 12 wheelchairs allocated to it and a requirement to never drop below 5. In this case user definable par levels would set the max wheelchair count at 12 and min level at 5. Configurable alerts would indicate an oversupply (perhaps other units are now missing wheelchairs) or an under supply (wheelchairs are not being returned fast enough). Alerts should be delivered using common tools such as email or texts. Underlying the idea of par levels is the ability to designate zones on a floor plan to delineate the boundaries of the unit. Ultimately, ensuring sufficient inventory relates directly to improved patient outcomes and higher satisfaction scores.

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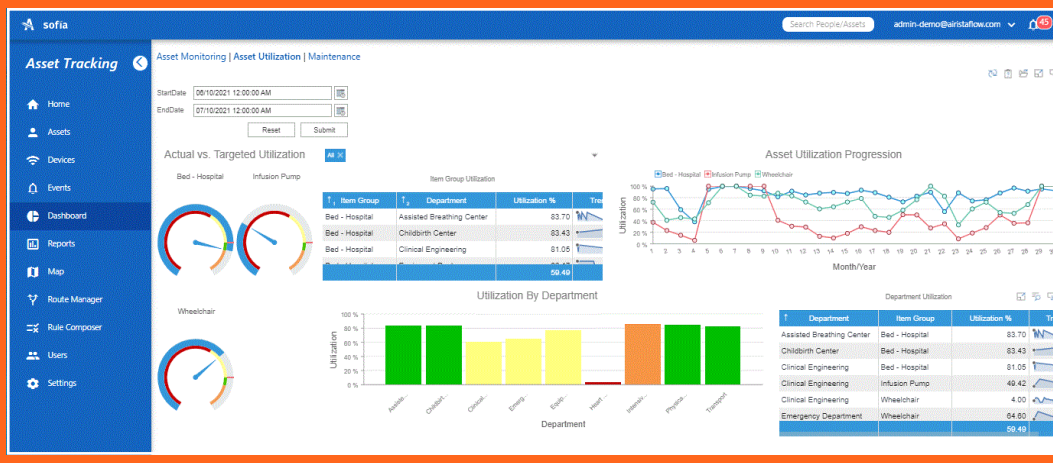
[4]The Importance of Equipment Efficiency for the Healthcare Sector, Kiran Ajaz, Electronic Health Reporter, March 2018

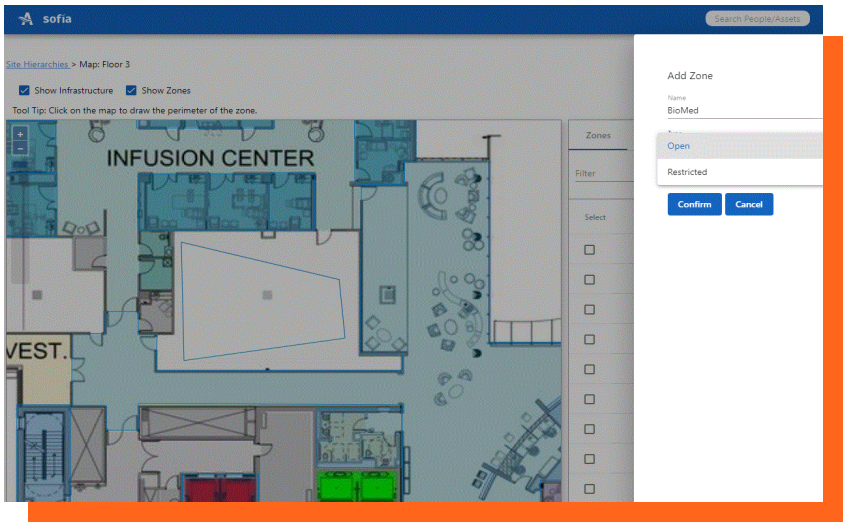
3. Asset Utilization

Utilization rates for hospital assets is roughly 35%. Many assets are underutilized because excess is built into the system to ensure available when needed. Hospitals tend to have 25% more mobile devices than used anywhere else. Considering there are now 14 devices at a patient bedside (up from 8 in 1995), efficient use of that equipment can save millions.[5] RTLS allows utilization patterns to be analyzed using geolocational zone and motion, and combined with data from 3rd party systems. To measure utilization using an RTLS solution requires basic analytics in the platform and the ability to distinguish "use" in a variety of ways based on asset type.



Zone Based Utilization: Assets might be considered in use if they are located in an area such as a patient room. To facilitate this, each patient room is designated as a zone, and all patient rooms in a unit are collected into a zone category. In this case, infusion pumps can be considered in use if they are in the zone category "patient rooms". Applying basic analytics in the form of dashboards allow the user to view utilization by asset type, by zone, over a time period.

Utilization When Outside of a Zone: Some assets might be considered in use if they are outside of a zone. An asset that is not within the zone of a cleaning area or a maintenance room might be considered in use.



> **Considering there are now 14 devices at a patient bedside (up from 8 in 1995), efficient use of that equipment can save millions.[5]**

[5]The Importance of Equipment Efficiency for the Healthcare Sector, Kiran Ajaz, Electronic Health Reporter, March 2018

Motion Based Utilization:
Assets might be considered in use if motion is detected. To detect motion the RTLS asset tag uses a sensor (accelerometer) to detect movement and more precisely specific motion fingerprints. Conversely, lack of motion can indicate equipment not in use.

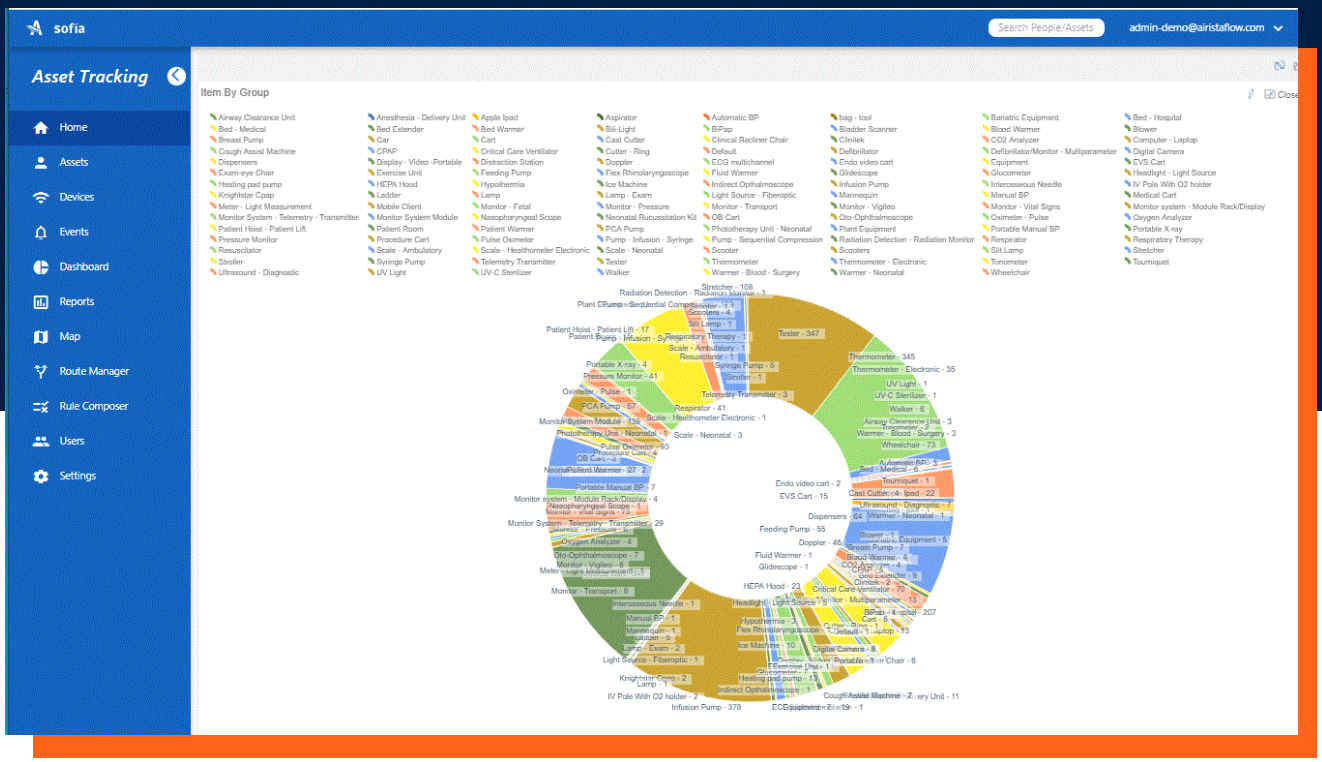
Utilization Derived from Third Party Systems:
Extensibility of RTLS platforms allows integration with other applications for greater insight into asset conditions. For example, when searching for a BD Alaris™ infusion pump the ability to cross correlate for pumps not currently in use helps eliminate those pumps currently in operation.

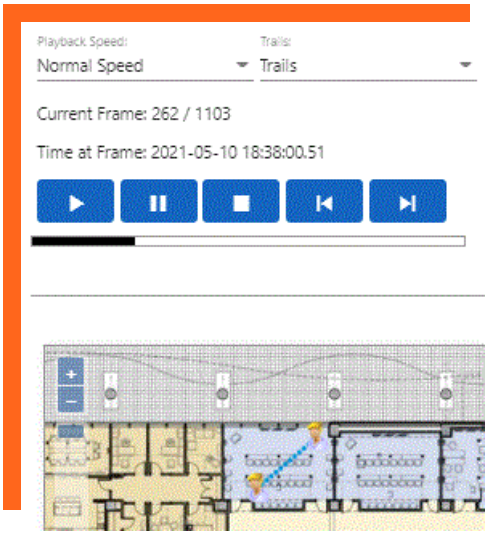
4. Theft Deterrence

Creating alerts when high value assets leave designated areas will deter theft and reduce shrinkage. This can be accomplished by creating virtual zones in the RTLS software platform, or setup proximity detection on either side of exits (referred to as choke points). Consider tamper resistant tags that alert when removed from the asset. Software platforms should be able to integrate with building systems to turn on lights in the exit area and point security cameras for an instantaneous view of suspicious activity.

5. View of Total Inventory and Its Use

As a CNO, CIO, or COO, a view of current inventory across the entire enterprise is challenging. Often inventory is recorded in islands of solutions at department levels. With visibility to all RTLS tagged assets, the RTLS system provides and instant count by asset class, assigned unit, and location. Assets no longer "in view" of the RTLS system provide insight into potential loss or shrinkage. Combined with utilization, inventory accounting provides an immediate view into the efficiency of assets currently deployed. Inventory accounting also provides a practical way to identify and locate all assets of a particular class that must be rounded up due to a product recall or maintenance.





6. Workflow Analysis

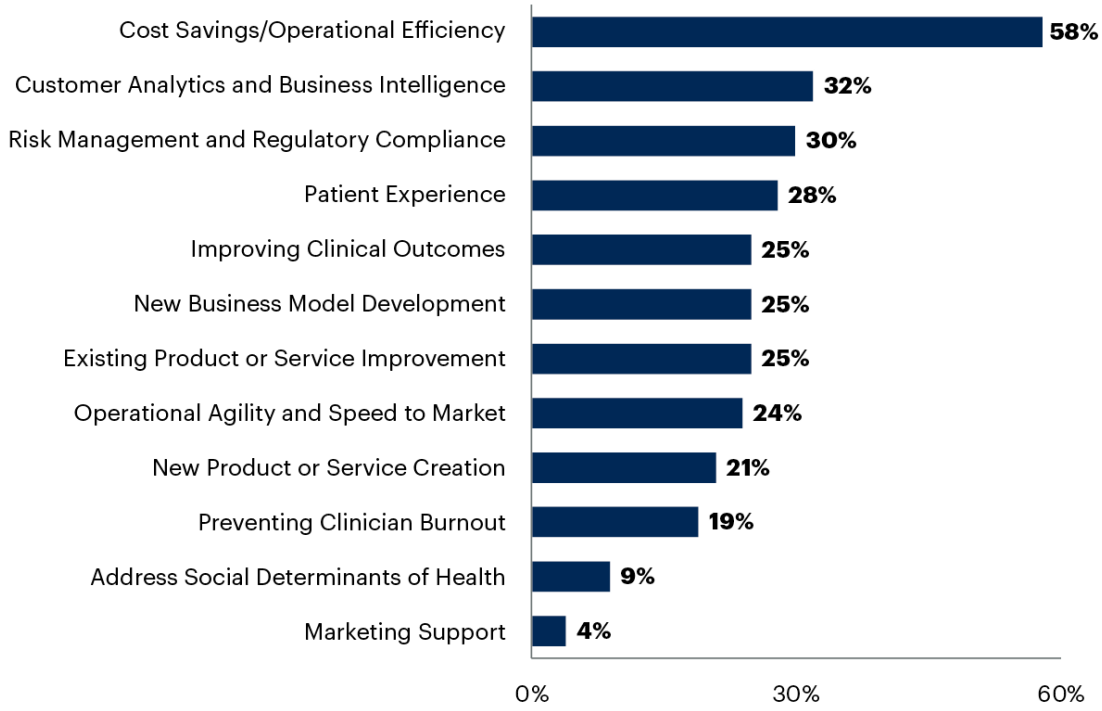
RTLS solutions can track the movement of equipment over time creating a breadcrumb trail. These historic paths can be replayed as a visual tool for movement of assets as well as people. The resulting insights can lead to improvements in workflow and optimization staffs' time spent with patients.. Historic pathing can also be used to identify potential hoarding situations.

Chapter 3
Impact to the Organization

The global pandemic had a significant impact on healthcare providers. Previously, 30% of hospitals operated in the red each year. That figure is expected to jump to 50% in 2021. These new fiscal realities are affecting spending priorities. Surprisingly,

"Almost two-thirds (63%) of healthcare providers surveyed expected an increase in their 2021 technology budget due to COVID-19; this is up from 50% in 2020," according to Gartner®.[6] "As a result, cost optimization is now their top business priority." One of the obvious areas for cost savings is increasing utilization of assets.

Top Areas for Digital Technology Investment
Percentage of Respondents Who Selected the Business Area



n = 100 Healthcare Provider Respondents, Excluding "Unsure/NA" Responses
Q: In response to the COVID-19 pandemic, what are the top three areas of your business that you are looking to impact by investing in these digital business technologies?
Source: 2021 Gartner Innovation in Crisis Survey
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Gartner.

[6]Gartner, Data Insight Healthcare Provider Innovation in Crisis, Sharon Hakkennes, May 13, 2021

Improved asset utilization also has secondary benefits across a number of areas.

Patient outcomes

- A study in Critical Care Medicine found delay in transfer from the emergency department led to increased mortality and length of stay.[7] Emergency department boarding times less than 6 hours saw a 12.9% mortality rate, where boarding times greater then 6 hours resulted in 17.4% mortality. One of the reasons for delayed boarding is coordinating the required equipment needed for boarding.

- Locating equipment in the moment can reduce the average patient stay. A 275-bed hospital that reduces the average stay by 4 hours will accomplish the equivalent of increasing physical capacity by 10 beds.

- Real time tracking of ventilator inventory became a top priority of New York's Governor Andrew Cuomo during the pandemic. To manage the distribution of New York's 30,000 ventilators, Cuomo required an inventory and marshalled the National Guard to distribute them.

Staff Efficiency

- On average a nurse spends 20 minutes per shift trying to find equipment. That translates to $500,000 in non-productive work per year.[8]

- It is common in hospitals to find equipment that hasn't been used in 30 days. This is usually a sign that equipment is being hoarded.[9] This is especially true when equipment is shared between units, however equipment sharing is an opportunity for easy efficiency gain.

Inefficient use of capital

- Poor lease management is usually a symptom of underlying issues with equipment efficiency; equipment is missing or lost, backlog in clinical engineering, the equipment is not patient-ready, and lack of a dedicated centralized process for maintaining equipment.

- A secondary effect of over-purchasing is the cost to maintain the unnecessary equipment. Over a 15-year period, service and maintenance costs associated with mobile medical equipment nearly doubled. That means for a 400-bed hospital that used to spend $662,400, the cost to service and maintain mobile equipment has ballooned to more than $1,257,000 each year.

- Asset tracking systems can help centralize oversight of equipment that needs regular maintenance. For example, a microscope can last 15 years if maintained, but only 8 years if not.[9]

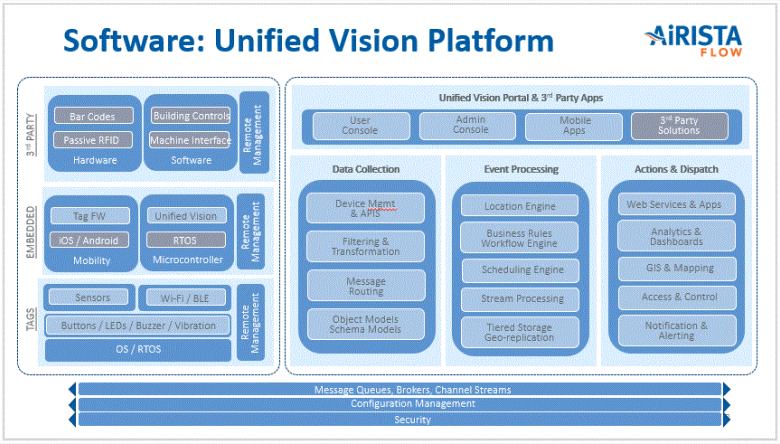
[7]Chalfin D, Trzeciak S, Likourezos A, Baumann BM, Dellinger RP; DELAY-ED study group. Impact of delayed transfer of critically ill patients from the emergency department to the intensive care unit. Critical Care Medicine. 2007;35(6):1477-1483.

[8]Kiran Ajaz, The Importance of Equipment Efficiency for the Healthcare Sector, Electronic Health Reporter, March 2018

About AiRISTA

For several years AiRISTA has been advocating a platform approach to healthcare technology purchases. With the wave of IoT devises coming online in hospitals,"The departmental approach to managing smart devices within an HDO hides the potential enterprisewide benefits of developing an IoT platform approach and implementing a strategy."[9] Investments in IT technology like RTLS platforms yield the biggest return when insights are gathered across the enterprise and are made available to clinicians, operations, facilities, and even security.

AiRISTA's Unified Vision platform has been architected from the inside out for an IoT world. At its core is a broker-based architecture that communicates via data streams. Written in the language Go, it is AI-friendly and ideal for machine-learning scenarios. The architecture provides for distributed computing allowing for cloud delivery or on-prem, and can be stripped down to run the footprint of a small control device like Raspberry Pi.



The core components of the platform provide for:

- Sensor agnostic approach to data collection consumes information from tags developed by AiRISTA or 3rd parties. In fact, AiRISTA partners with 3rd parties to make its tag firmware available on mobile devices.
- Data normalization provides ETL functions on the fly. In fact, protocols like HL7 can be manipulated on the fly to provide protocol translation between incompatible versions are wireline rates.
- 3-tiered data model allows for storage and data migration between tiers depending on the immediacy required.
- At the heart of the system is a workflow rules engine 10 years in the making. Workflows turn insight into actions via events and alerts. Non-programmers can use pull down menus to create rules. More powerful rules that allow for interaction with 3rd party systems like enterprise apps and physical control systems can be scripted.
- Simple to use reports and dashboards are packaged for various use cases. And light weight analytics provide visual tools to help pinpoint areas for potential process and efficiency improvements.

Investments in a platform also imply the ability to address multiple use cases from a centralized system. AiRISTA's Unified Vision solution can be licensed for asset tracking, staff safety, patient flow, hand hygiene, wander management, contact tracing, and temperature monitoring.

With over 10 years of experience helping healthcare providers architect and deploy location-based solutions, AiRISTA is ready to understand each customer's unique challenges and offer suggestions and best practice sharing to add location insights to the thousands of "things" in your work environment. salesinfo@airista.com

[9]Gartner, Healthcare Provider's Unique IoT Challenges Demand a Platform Strategy, Gregg Pessin, December 1, 2020