How Field Service Solution Providers and Data Tools Future-Proof Our Industry for Change Before It Changes Us

A thought leadership white paper published by XOi in collaboration with Harris

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Published by XOi in collaboration with Harris. *All client names, locations, and proprietary project details have been anonymized in accordance with data center confidentiality requirements.*

Executive summary

The foundation was built before the boom

The data center industry is in the midst of an arms race. Hyperscale projects are being delivered at a pace and scale that would have been unimaginable a decade ago, and the pressure is not letting up. As artificial intelligence accelerates demand for infrastructure; operators, contractors, and service providers are all being asked to do more, faster, without sacrificing quality, safety, or sustainability.

This moment has exposed an infrastructure gap: for arguably the first time in history, demand has outpaced the construction and service industries' capacity to meet them without extreme fatigue.

Like most manufacturers, Harris saw this coming. They understood the deeper forces already reshaping critical facility construction: speed-to-market pressure, a narrowing skilled labor pool, and clients demanding outcomes that traditional delivery models could not provide at scale. Following a continuous mission to support their customers strategically, Harris made a deliberate, strategic shift toward industrialized construction.

Among the lynchpins that make a shift to an industrialized construction model self-improving is the involvement of carefully curated data intelligence. For example, on the service side of Harris' business, a partnership with XOi helps close the loop between what is built and how field maintenance techs need to administer service to those systems once they are operationally online. By accumulating a network of support that feeds real-world intelligence into actionable project data, Harris can strengthen service operations today and inform future project design and manufacturing decisions across the organization, regardless of the region being served.

Applied at scale and on the construction side of things, this can include (but is not limited to) the use of telematics software, IoT and Agentic solutions, and, of course, effective BIM and VDC modeling. The more data is accumulated, especially early in the process, the better Harris is able to secure schedules for clients that do not run into interruptions and stalls further down the line.

Together, Harris and the data intelligence tools they use represent something the industry has not yet widely built: an integrated system that learns from every asset and service event today, improves with every service call, and compounds its advantage with every asset it touches. This paper makes the case that the model they have built is the future of how critical facilities are designed, built, and maintained across every vertical, at any scale.

Part

01

Why industrialized construction? The market demands it

The scale of what is being asked

Consider one example of what Harris is being asked to deliver right now: upwards of 20 active hyperscale projects with a single client on the East Coast. These projects are not standard builds. They utilize evaporative cooling in lieu of closed-loop chilled water systems, using outside air and exhaust to manage heat at a scale that demands precision engineering from day one. Higher density AI servers on some of those builds require technology that is evolving faster than traditional delivery timelines can accommodate.

This is the new normal for data center construction. It is not a peak or temporary surge. It is the baseline against which every MEP contractor in this space is now being measured.

The question is not whether the industry can meet this moment. The question is how. And the answer, as Harris has demonstrated, is not to work harder inside a broken model. It is to change the model.

> **The answer isn't luck or heroics. It's a deliberate, years-long shift in how Harris thinks about building.**

The collision of market pressures

The demand for unprecedented speed to market in critical facility construction comes from three compounding forces.

Speed to market is the primary pressure. Data centers are revenue-generating infrastructure. Every day a facility is not operational, revenue is lost, making faster delivery a business requirement for clients. In a market where the difference between first and second can mean losing a location to a competitor, timeline compression is existential.

Scalability is the second force. The era of the one-off custom build is likely over for hyperscale clients. The task is no longer "build us a data center." It is, "build us a repeatable system we can deploy across dozens of sites simultaneously." That is a fundamentally different problem which demands a different approach to how MEP systems are designed, specified, and manufactured.

The third force is the labor shortage, and it is the one the industry is least equipped to solve through traditional means. Experienced tradespeople are retiring faster than they can train the next generation. The pipeline of skilled field labor is shrinking precisely as demand for it is expanding. Any delivery model that assumes abundant, highly skilled field labor is a delivery model that is already failing.

The traditional approach and why it breaks down

Traditional MEP construction was designed for an era where timelines allowed for one-by-one project work; sometimes involving custom systems, designed from scratch for each project. Sequential workflows where design had to be complete before procurement could start, and procurement complete before fabrication could begin. Field crews fabricating and assembling on site, with all the variability that comes with doing complex work in uncontrolled conditions.

The complexity of timelines and delivery requirements now outweighs the complexity of the systems themselves. The hard part is now building it on a compressed timeline, at scale, while simultaneously building twenty others like it. À la carte, custom-everything approaches mean reinventing the wheel on every project. That is not a sustainable position when clients are asking for multiple units over the course of many years.

The insight that changed everything

Harris's realization was philosophical. The data center model demands a mindset that begins at manufacturing and asks, "how do we build this repeatably, faster, and without compromising quality?"

Planning and pre-construction phases had to move significantly earlier. Teams needed far more lead time to create the models and define the modular products before any field work began. The investment moved upstream and the payback compounded with every subsequent project.

The future-state of XOi's partnership with Harris points toward how the model could become genuinely self-improving.

Field data is extremely important for this shift. Every service call, maintenance pattern, and operational issue that surfaces in the field is a signal. As XOi's capabilities expand, installation and construction-site data can become part of that signal as well. The question is whether that signal gets captured, routed to the people who can act on it, and used today to strengthen service intelligence and, over time, fed back into the next generation of product design, manufacturing and QA, and even supply chain decisions. XOi's proprietary collection and enrichment of field data gives Harris a stronger intelligence layer for today's service environments and for the next phases of data-driven construction workflows.

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Building smarter: how modular construction works for a new era

A deliberate foundation, not a reactive pivot

Industrialized construction is not unique to Harris. Large contractors across the MEP space are pursuing modular approaches, prefabrication, and standardized product libraries. What is unique to Harris is the depth of their implementation across the full project lifecycle of design, manufacturing, installation, service, and back again; and the intelligence layer that makes their products and service continuously better with every iteration.

Harris's path to industrialized construction was deliberate, not reactive. The foundation was laid as part of a strategic plan that identified productization, supply chain, and advanced manufacturing as the capabilities needed to move Harris from a medium-to-large contractor into the top tier nationally. The 2030 plan is built off the core company value proposition of "We Deliver Certainty." Harris is building directly on that foundation, with industrialized construction, data-driven processes, and standardization now taking center stage.

The competitive difference for Harris is how the physical investment and data intelligence investment move together. Each Harris team feeds off the data from the other. This connective tissue allows them to move swiftly and directly—not lurching between reactive project demands, but building toward a defined standard that gets stronger with each project deployed.

The proof of the strength of this pre-construction design and prefabrication approach is in the company's growth. Harris has grown exponentially in roughly six and a half years. The team has won three NFL stadiums in five years, which is a concrete example of how this capability creates market differentiation well beyond data centers.

What 'modular' actually means

Modular does not mean generic. It means moving from custom, one-off systems designed from scratch each time toward defined, repeatable components that can be configured for specific use cases. Think of it as a sophisticated kit of parts. The components are proven and standardized, but how they are assembled and programmed can be tailored to what a specific facility actually needs.

This approach delivers something that sounds contradictory: outcomes that feel purpose-built for the client, produced at the speed and consistency the market demands. The client receives a system built from components that have been engineered, tested, and refined across dozens of prior deployments.

Harris is developing what they call their Basis for Industrialized Construction. This system is a structured library of standardized components and sub-assemblies, categorized by size and complexity. At one end of the spectrum: basic commodities and materials. At the other: complex, multi-discipline modular assemblies integrating mechanical, plumbing, electrical, and controls. Every Harris solution draws from this library. The building blocks are repeatable. The configuration is customized. The result is the best of both.

Planning moves significantly earlier in the process. Teams must define and model the modular products in detail before field work begins. This requires more upfront investment and data, but pays back exponentially in delivery speed and quality. The discipline required is as cultural as it is technical: once a standard is agreed upon and signed off by all stakeholders, the team commits to it. John Gregory Williams, Senior Vice President of the Harris Design Studio put it simply: if you do not write it down, you will forever be fiddling.

> **Signals from the field are a primary input into the design-to-product process. The failure modes that only emerge after installation directly inform how the next product is designed.**

Those signals are arriving. A contact at a major data center group recently shared that they were weighing whether to return nearly 200 packaged units because real-world maintenance was difficult, vendor support was inadequate, and the supply chain for proprietary components had broken down. The manufacturer prioritized selling new units over supporting existing ones. That kind of intelligence in understanding the failure mode that only surfaces after months of operation is exactly what shapes how Harris designs its own products: open architecture, multi-vendor component compatibility, and serviceability engineered in from day one.

Speed without sacrifice

Compressing construction timelines without sacrificing quality or safety requires moving work off-site. Complex assembly happens in controlled environments before materials ever arrive at the job. Pre-fabricated, pre-certified components arrive ready to connect. Field teams are integrating and commissioning. The hard work is already done. Employing hub-and-spoke manufacturing, the facilities do an enormous amount of work, and ship to assembly locations closer to the jobsite for the “last mile” of work in the supply chain.

The supply chain is managed with the same rigor as the construction itself. Materials are forecasted, sourced, and delivered strategically so field teams are never waiting and on-site footprint stays lean. The net effect: dramatically faster project delivery, lower on-site labor requirements, and less variability in quality. This model increases the ability to perform rigorous certifications, verifications, and quality checks early and often—QA well in advance of work arriving on site. It’s how Harris is able to secure high quality work and even safer job sites

Tight timelines are met without compromising safety or quality because the model removes the conditions that create both problems. Fast and safe are not a trade-off when the work is designed to be that way from the start. The risk that traditionally accompanies compressed timelines is systematically reduced when the system itself does the heavy lifting before crews arrive on site.

When the full lifecycle is under one roof, products are built to last

Harris's model spans the full lifecycle: from initial design through long-term service and maintenance. This strategic advantage is a construction arm and a service arm that are actively learning from each other.

Being involved from design means serviceability is engineered from day one. Modular systems are inherently easier to service: when something fails, it can be swapped quickly without taking down surrounding systems. Downtime is minimized. Revenue-critical facilities stay operational.

This long-term relationship of design, construction, service, repeat is also where the most valuable intelligence is generated. Every service call, every maintenance pattern, every field observation is a data point that feeds back into the next iteration of product design. The lifecycle does not end at installation. It is a continuous loop.

The intelligence engine: how XOi and data intelligence tools turn field experience into better products

The modular solutions Harris builds are only as good as the information that informs them. Industrialized construction is the operating model, and data intelligence tools are increasingly positioned to enable a continuous feedback loop of equipment and system data upstream into estimating, design, and manufacturing. XOi is integrated into Harris' broader technology stack on the service side of the business, where field intelligence is captured from technicians directly. By furthering their understanding of Harris' entire business model, XOi can expand its capabilities and tailor them to the use cases Harris teams encounter in construction and megaproject work, unlocking new opportunities for both companies as their partnership evolves. This is where the operational model becomes capable of continuous self-improvement.

Construction sites are vital sources of intelligence, and, as seen on XOi supported service environments, the data captured from these sources quickly becomes critical to continuous learning and improvement. Field teams are the key for the same reason service technicians are today. These are the professionals who encountering real-world conditions, one-off cases, and operational issues that never appear in design documents. Historically, that knowledge lived in people's heads and in informal conversations, and then it retired with them. The pattern was observed, handled in the moment, and lost.

By capturing structured data such as documentation, patterns, and outcomes directly from field technicians, and associating that to an accurate asset and location, it creates a continuous stream of real-world intelligence that can flow back to the teams servicing, designing and manufacturing the next generation of modular products. The field is no longer a black box. It is a data source.

The result: contractor products and services become more agile and fluid. They are informed by what is actually happening across every project, every installation, every service visit. Each iteration is smarter than the last because it is built on evidence, not assumption. This is particularly powerful in the data center environment, where conditions are extreme and fast-evolving. What a technician observes on a hyperscale site today can influence how the next modular system is designed.

There is another dimension to this that is worth naming directly. For contractors operating in this space, design goals include building modular products where internal components can be sourced through multiple vendors. This avoids the many pitfalls of proprietary lock-ins common in traditional operating models, not the least of which being manufacturers limiting or ceasing to support existing installations. If XOi can embed asset and service data into products–tracking not just what is installed, but how it performs, what fails, what gets replaced, and with what–that knowledge can travel with the asset. Whoever maintains the facility has access to that history. The intelligence is transferable, and that transferability is what makes a product truly serviceable.

The feedback loop closes the gap between what gets designed and what is actually needed. It is the difference between a product line that is educated by the market and one that is perpetually catching up to it.

Why this loop is a competitive moat

Most MEP contractors do not have a service arm generating field intelligence. Most service organizations do not have the manufacturing capability to act on it. XOi is a key part of the connective tissue.

Competitors pursuing industrialized construction can replicate the modular approach. They cannot easily replicate years of clean, strong, field-sourced intelligence already baked into products and processes. The product library is replicable in theory. The accumulated learning behind it is not.

Historically, strict data capture restrictions at data center sites limited what could flow through this loop. The industry is beginning to recognize that limiting a service provider's ability to capture field data limits their own ability to improve. The future of high-performance facilities depends on opening that pipeline securely and intentionally. The organizations that allow trusted partners full visibility into what is happening in their facilities are the ones that will receive better, more reliable, and continuously improving products in return.

The core truth: The data capture restrictions that once felt like prudent security are increasingly a tax on future performance. Every observation that does not get captured is an improvement that does not get made.

Part

03

Why data centers are the canary in the coal mine

The skilled trades gap: the industry's other crisis

The data center construction surge is happening against a backdrop that is making it harder to deliver on traditional timelines. The skilled trades are losing experienced tradespeople at an accelerating rate. Retirements are outpacing new apprenticeships,[1] and the knowledge that walks out the door with a retiring journeyman is not easily replaced.

1 NCCER / AGC 2025 Workforce Survey; NCCER workforce fact sheets (**nccer.org**). 41% of the construction workforce is projected to retire by 2031 (NCCER). 92% of firms report difficulty finding qualified workers (AGC/NCCER 2025 Workforce Survey).

Industrialized construction directly addresses this. By moving from purely custom system designs to productized systems, from last minute material procurement to well managed supply chains, from traditional prefabrication to advanced manufacturing, and from heroic efforts to a sustainable IC process that's supported by good operational data, field work is simplified and the training requirements for new workers are reduced. Faster onboarding becomes possible when the field crew's job is connecting pre-assembled, pre-certified units informed by field data rather than custom-fabricating systems from raw materials.

Beyond installation, service and maintenance challenges are increasing post-construction. Quality management programs are a high priority in this market because customers are seeing issues with systems that weren't properly tested or validated prior to installation and turnover. Future-state, the data loop supported by XOi's data intelligence layer will be part of the remedy to this problem. When accurate service and asset data capture informs continuous maintenance and begins feeding manufacturing and QA feedback loops over time, assets can be tested and validated before the equipment ever hits the floor. This is a major improvement compared to traditional methods.

Building automation training programs are already placing significant numbers of new workers into the data center space due to demand that is overwhelming conventional hiring pipelines. The gap is real and growing.

Data centers as a forcing function for the whole industry

Harris predicts that what is required for data centers today will soon be standard across all critical facilities. It is the logical trajectory of client expectations in a world where every building type is being asked to do more with less, faster.

Data centers are not an isolated use case. They are the proving ground for approaches that will spread to mission-critical facilities like hospitals and pharmaceutical manufacturing. The demands of extreme speed, modular delivery, built-in serviceability, and continuous improvement through field data are not unique to facilities that house servers. They are the demands of any owner who cannot afford downtime and cannot wait years for a fully custom solution.

Client expectations are increasing across all verticals. The demands that seem extreme in data center construction today will be table stakes industry-wide in five to ten years. The contractors who will be positioned to meet those demands are the ones building that capability now; not when the market forces them to.

Harris is winning data center work and at the same time developing the operating model, the muscle memory, and the manufacturing infrastructure that will serve the whole business as this shift accelerates. The data center is the pressure test. The lessons apply everywhere.

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04

What the future looks like: industrialized construction at scale and beyond

A model that scales because the components do

The feedback loop from data center projects is already feeding back into Harris's organization-wide operating model. Lessons learned in the most demanding environment flow into every vertical. As modular products become more refined and the supply chain matures, the approach becomes faster and more efficient with each project cycle.

The key insight from a design engineering perspective is deceptively simple: if you understand what a system is pumping and how it is pumping, it can fit into any building. A pump skid designed for a data center application, once standardized, can go to a hospital, a pharmaceutical facility, or a stadium.

Addressing regulatory and environmental needs through design

Commercial pressure drives everything to be built faster, quicker, and at lower cost. Environmental pressure, while real and growing, has so far been a secondary force in the data center market. But the two are not in opposition and Harris's approach addresses both simultaneously.

On the regulatory side, Harris is developing approaches where a fully constructed facility can activate in stages. A data center built to full capacity but permitted to operate at thirty percent today can come fully online in phases as those constraints lift. This turns a regulatory barrier into a revenue strategy. Clients generate income from the operational portion while working toward full activation. The facility does not sit idle waiting for conditions that have not yet materialized.

On the environmental side, the most tangible benefit of industrialized construction for local communities is a reduction in construction disruption. Prefabricated components arrive and are installed quickly, reducing the duration and intensity of on-site activity.

Less noise, less traffic, and less neighborhood friction for an overall shorter period of time. As scrutiny of large-scale data center development increases, the ability to build quickly and quietly becomes a community relations asset, not just an operational one.

There is a longer arc here that the industry has not yet fully reckoned with. MEP scope can represent forty to fifty percent of the cost of a building, and yet no one is systematically tracking the carbon footprint of MEP installation. Harris, in collaboration with UC Berkeley's Center for the Built Environment, presented a carbon footprint comparison study at ASHRAE in 2025 examining a stick-built mechanical room against a fully prefabricated one.

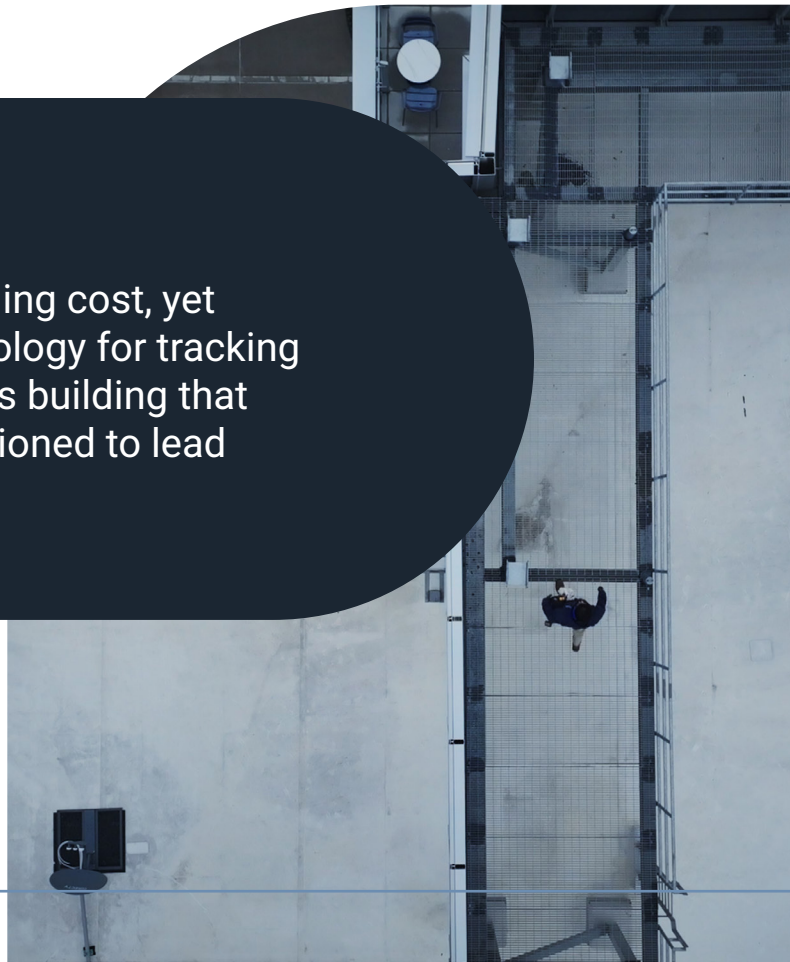
The methodology they established is groundbreaking precisely because nobody else is doing it yet. As embodied carbon reporting requirements tighten, the contractors and clients who have already built the data collection infrastructure to answer those questions will have a significant advantage over those who have not.

That is where enhanced capacity to eventually support live construction and planning through XOi will become especially important. Structured, consistent, and asset-level data collection from the field is what will ultimately yield the information needed to understand the true environmental impact of MEP assets. The industry cannot improve what it cannot measure. The growing partnership with XOi and vendors including Harris is a space where building that measurement infrastructure can happen.

Beyond data centers: the model comes full circle

Hospitals, pharmaceutical facilities, stadiums, and other mission-critical environments have requirements that are, in many ways, as demanding as data centers. Clients across every critical facility vertical are not becoming less demanding. The model that wins in data centers will define the standard across the board.

Delivering data centers at scale is future-proofing the business. The capabilities, relationships, and manufacturing infrastructure built for the most demanding environment in the industry create competitive moats that extend to every vertical Harris serves. The modular, industrialized approach is inherently adaptable: as requirements like cooling technology, regulations and chip architecture evolve, the framework accommodates change without starting from scratch.



THE EMERGING OPPORTUNITY

MEP represents up to 40-50% of building cost, yet the industry has no standard methodology for tracking its carbon footprint. The organizations building that data infrastructure today will be positioned to lead when reporting requirements arrive.

Data as the engine of continuous improvement

Consultative solution providers like Harris, combined with field intelligence tools like XOi, represent how the industry future-proofs itself. This is a story about modeling operations where the intelligence generated by the work is systematically captured and returned to the people who can act on it.

In the future, XOi will enable data capture on projects across markets and at any scale of complexity to make the feedback loop real: field observations, service patterns, and performance data that strengthen service intelligence have the potential to inform design and manufacturing decisions tomorrow.

Historically, strict data capture restrictions at data center sites limited this intelligence pipeline. The future requires allowing full, secure capture of what is happening in these facilities. Operators who restrict this limit their own ability to improve and future-proof what they have built. The organizations that open that pipeline to trusted partners are the ones whose facilities will keep getting better long after the construction crews have left.

The modular expertise of forward-looking contractors like Harris, in combination with developing data collection and infrastructure providers like XOi, are in a position to lead the next phase of work on not just data centers, but all projects in the built environment of the future. Industrialized construction without comprehensive data, which must include accurate and up-to-date field intelligence, is at a considerable disadvantage. With it, companies are poised to blow past their competition. Industrialized construction without field intelligence is a one-time optimization. Industrialized construction with field intelligence is a compounding advantage.

Conclusion

Ready before the world knew it needed this

Strategic partnerships between contractors and data intelligence providers, like what exists between Harris and XOi, will be the driving force building data intelligence processes before the industry needs them, so they're ready when it calls.

The data center build cycle has compressed from years to months. The skilled labor pool is shrinking. Clients in every vertical are asking for outcomes that the traditional delivery model cannot provide at the pace or scale they require. These are not temporary pressures. They are the new conditions of the industry.

Harris is leading this shift. They continue to invest in productization, supply chain, advanced manufacturing, and operations to support it.

XOi is building a data intelligence layer with potential to compound those investments for Harris and contractors like them. By capturing field data at the source, routing it to the people who can act on it, and, as capabilities expand, feeding those insights back into products, work improves with each deployment.

> **The call to the industry is not to simply to adopt more prefabrication. It is to embrace an industrialized operating model that can deliver the scale, speed, quality, and resilience the built environment demands. Powered by operational data and insights, this model continuously improves performance across every phase of an asset's lifecycle.**

Design. Manufacturing. Installation. Service. And back again. This is a vision for a future where every job site becomes a data source, every technician is an intelligence node, and every service call provides input for improvement.

The facilities and organizations that will lead the next decade are the ones making this investment now because they understand that the value of any asset is only as great as the intelligence it produces in its lifespan. The data foundation is the real competitive advantage.

XOi sees potential to build on this vision with partners like Harris, and the rest of the industry should open their eyes to it as well.