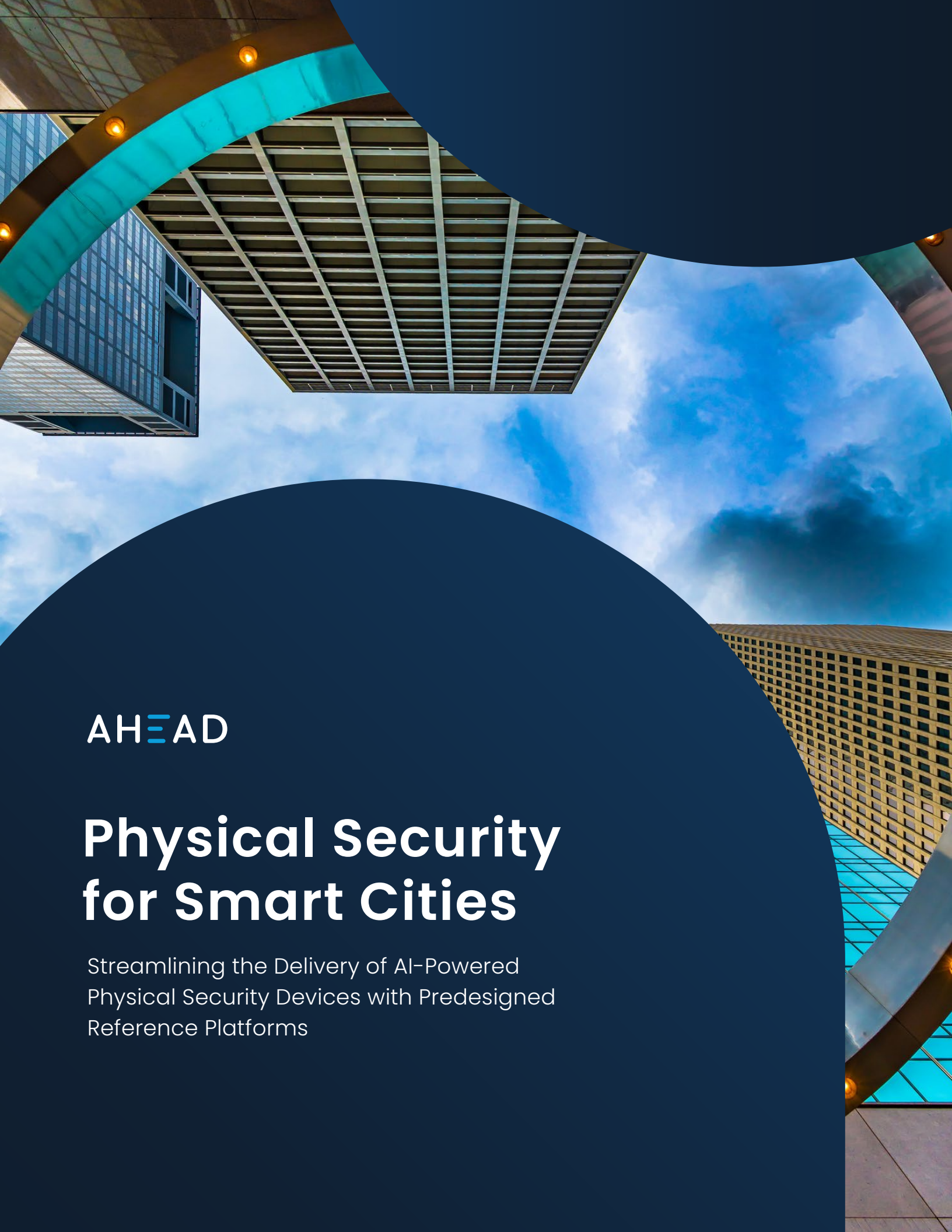




AH=AD

Physical Security for Smart Cities

Streamlining the Delivery of AI-Powered
Physical Security Devices with Predesigned
Reference Platforms

There has been steady growth of smart cities technologies

and physical security systems that integrate AI capabilities — especially access control and video surveillance solutions. In fact, [integrated surveillance systems have a forecasted compound annual growth rate \(CAGR\) of 12.7% by 2026](#). As part of this steady upward trend, edge AI cameras account for over 40% of all network cameras shipped globally.

Physical security systems are already collecting enormous amounts of data, and now technology is ready to harness that data for behavioral and predictive analytics. This means AI and security software vendors are in a great position to take advantage of this increased demand for smart physical security solutions.

In this whitepaper, we'll discuss the growing adoption of AI-enabled physical security devices, the challenges AI and security software vendors face, and how AHEAD can help overcome these obstacles.

Smart Cities: Integrating AI into Physical Security Systems

Cities, municipalities, stadiums, airports, campuses, and other public and private organizations have always faced challenges when it comes to safety and security. These organizations are under enormous pressure to prevent security incidents with limited resources, and new technologies are providing opportunities to greatly enhance their efforts.

As cameras and other physical security devices are deployed on a larger scale, human personnel can't monitor all of the data they collect on their own. This means many of these traditional security systems are limited to investigating incidents that have already occurred rather than preventing them in the first place.

In turn, many organizations are adopting AI/ML to improve the effectiveness and efficiency of their physical security systems. This is helping smart cities take a more proactive approach to safety and security.

Here are some ways AI is being applied to physical security systems today:

- **IP Video Surveillance:** There's an ongoing shift from traditional IP video surveillance systems that simply record video streams and require manual surveillance by security personnel to smart solutions. The next generation of IP video surveillance solutions include automated facial recognition and vehicle detection capabilities using AI and computer vision to augment the efforts of security personnel.
- **Physical Access Control:** Traditional access control systems allow or restrict access to certain areas by verifying credentials with methods like keycards or key fobs. An intelligent physical access control system could include mantrap capabilities that automatically lock certain zones to stop a perpetrator. These AI-driven solutions often work in conjunction with existing video management systems (VMS) to track the perpetrator's location.



The Challenges with Delivering AI-Driven Physical Security Devices

While adoption of smart physical security devices is steadily growing, it's still challenging for many AI and security software vendors to deliver these devices to market. Here are some of the obstacles these companies face:

01.

KEEPING UP WITH THE SPEED OF INNOVATION

Hardware technologies like graphics cards and processors are evolving at a rapid pace, with deep learning inference processing increasing by **14x per generation**. Many AI and software security vendors lack the hardware expertise to select the right components for optimal performance and extended lifecycles. This makes it difficult to keep pace with the speed of innovation and deliver physical security products that avoid obsolescence.

02.

PROVIDING A PLUG-AND-PLAY SOLUTION

The AI and security companies developing innovative software often lack the expertise to build fully integrated physical devices. However, seamlessly combining the logical software and physical hardware is crucial for making a positive first impression on potential customers. That means providing a simple plug-and-play solution is the key to a positive customer experience and the long-term success of a new physical security device.

03.

INTEGRATING WITH BROADER SECURITY ECOSYSTEM

Today's physical safety and security landscape is an interconnected ecosystem of specialized systems and sensors that continues to grow each year. That means modern physical security solutions need to integrate seamlessly with other systems from leading VMS and access control vendors to enable a comprehensive security solution for their customers. This ensures the adoption of physical security systems that can be more easily customized and upgraded as new technologies emerge.

04.

DELIVERING DEVICES TO MARKET

Once a final device is ready, it can take a long time to ramp up production for the new product before it can go to market. The problem is that many AI and software security companies lack the physical logistics infrastructure to roll out new devices quickly. This delay in the launch of a device can make the difference between widespread adoption and falling behind competitors.



Leveraging Reference Platforms for Streamlined Physical Security Device Development and Deployment

Many AI and security software vendors choose to build custom smart physical security devices from scratch, but this approach can be complicated, time-consuming, and expensive. Instead, software vendors should consider using predesigned reference platforms as a starting point for their new physical security solutions.

AHEAD offers over 30 predesigned reference platforms for a variety of physical security devices, including IP video recording servers, access control servers, analytics and AI servers, compute servers, client viewing workstations, and video storage arrays. This core reference platform portfolio is researched, tested, validated, lifecycle managed, and standardized for optimal performance.

BCO-2000

1-BAY FANLESS SERVER



Varion G1-MT8-ID

**HIGH-POWER SERVER WITH
BEST-IN-CLASS STORAGE**



More importantly, AHEAD's reference platforms are optimized for machine learning platforms like [NVIDIA Metropolis](#). This platform helps software companies extract valuable insights from video and sensor data by providing pretrained models, the NVIDIA TAO toolkit for transfer learning, the DeepStream SDK to deploy AI applications, and many other capabilities.

AHEAD's reference platforms combined with predefined software like NVIDIA Metropolis can greatly accelerate the time-to-market for AI-powered physical security devices. Since the reference platforms are pre-certified, pre-tested, and optimized for specific ML frameworks, security software vendors can quickly deploy their applications on compatible hardware.

AHEAD has turnkey security platforms that fit most physical security use cases. Additionally, the in-house engineering team can also design and meet custom security and safety requirements. This includes implementing the [Trusted Platform Module \(TPM\)](#), SED/FIPS Drives, Microsoft Secured-core, along with other layers of a cyber resilient architecture. Security built into the hardware itself, the BIOS / firmware, and software offers a multi-layer approach that instantly provides benefits after a breach or threat is identified.

Optio L150

**HIGH-PERFORMANCE SERVER
FOR COMPLEX EDGE AI**



Optio M150

**NEXT-LEVEL AI PERFORMANCE FOR
EMBEDDED EDGE DEVICES**



Consider a Trusted Partner for Developing Smart Physical Security Solutions



AHEAD is a specialist in hardware engineering solutions, offering advice and strategic guidance for designing, building, and integrating complex devices. Our services can simplify the entire hardware program for security software vendors. Here's how:

- **Hardware:** AHEAD can design physical security solutions that are optimized for AI applications, whether it's based on one of our predesigned reference platforms or a fully custom device. We invest heavily in staying future-proof with the components we select so that the device can achieve reliable performance over an extended usable life. [Our solutions](#) combine best-of-breed hardware from Dell, Intel, NVIDIA, and other leading manufacturers.
- **Infrastructure:** AHEAD can make it easier to deploy physical security devices to data centers and the edge. For example, we can help select and configure the right network switch to enable a better out-of-the-box experience for customers. AHEAD can also design and build a [fully-integrated rack solution](#) for a true plug-and-play deployment approach.
- **Ecosystem:** AHEAD can help integrate physical security devices with the broader security ecosystem. Our partnerships with Dell, NVIDIA, Advantech, Premio, and other leading hardware, AI, and security companies ensure your physical security solution is compatible with a wide range of existing security systems.
- **Logistics:** AHEAD is an expert in both logistics and reverse logistics for international distribution. Our trusted partnerships with manufacturers ensures a reliable supply chain is available for security software vendors and their customers. For software vendors targeting border patrol, law enforcement, and other Federal customers, we also help with [Trade Agreements Act \(TAA\) compliance](#) when sourcing components.
- **Visibility:** [Hatch, Powered by AHEAD](#) is our proprietary orchestration platform that provides end-to-end visibility into the product lifecycle and reduces the complexity of hardware and component management. No other distribution provider has the capability to offer this level of transparency throughout the entire supply chain in real time. [Hatch Connect](#) also adds a layer of transparency to the end user, providing the ability to manage customer order fulfillment expectations and deliver on these promises.



Altogether, AHEAD's capabilities allow software companies to fully offload their hardware program so that they can focus on developing innovative AI applications for security and safety. We're a one-stop-shop that saves time and effort, reduces customer friction, and gives you a competitive edge when launching a new physical security device for the smart cities market.

WHY AHEAD?

AHEAD provides purpose-built and deployment-ready hardware platforms on a foundation of customized services and interactive software tools for technology companies that deliver complex products as integrated hardware/software solutions. Building on 25+ years of experience and product deployments in 185 countries, the AHEAD ecosystem features AHEAD Hatch™, the industry's most advanced toolset for orchestrating hardware program data and action. Hardware solutions are manufactured in ISO 9001:2015 and ISO 13485:2016 certified facilities using the award-winning Forge™ infrastructure developed by AHEAD to automate customers' high variability manufacturing requirements for faster time to market. For more information, visit www.AHEAD.com.

AHEAD

Combining cloud-native capabilities in software and data engineering with an unparalleled track record of modernizing infrastructure, we're uniquely positioned to help accelerate the promise of digital transformation.

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