Coexistence in the Age of Smart Conservation: How a Finnish Research Infrastructure and a Dutch Innovator Built a New Wildlife Technology from the Ground Up

Impact story: Wild Animal Phenotyping Infrastructure

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Table of contents

Coexistence in the Age of Smart Conservation: How a Finnish Research Infrastructure and a Dutch Innovator Built a New Wildlife Technology from theGround Up 1
Impact story: Wild Animal Phenotyping Infrastructure........ 1
Introduction 3
From Concept to Collaboration........ 3
Belgium: The First Real Test........ 4
A Vision Begins to Take Shape........ 5
Ripple Effects Across Society 6
The Beginning of a New Approach 7

Introduction

In biodiversity conservation, revolutions rarely announce themselves. They tend to begin quietly—in forum threads, scattered emails, unexpected alliances, and long conversations shaped as much by curiosity as by the shared frustration of watching old tools struggle with new realities. The story of the AMMI system, and the collaboration that built it, starts in precisely such a place: an online message board called Wildlabs.net, where ecologists, engineers, and technological tinkerers from around the world meet to solve problems that are both urgently local and globally shared.

For Dr. John Loehr, coordinator of the University of Helsinki's **Wild Animal Phenotyping Infrastructure (WildAP)**, Wildlabs had long been a useful place to exchange ideas. But over time, one voice in the forum stood out—clearer, more inventive, and often several steps ahead of the rest. That voice belonged to **Kim Hendrikse**, an entrepreneur from the Netherlands and founder of a young tech startup focused on wildlife applications. His posts—detailed, analytical, and often sprinkled with humble wit—revealed a deep understanding of both hardware and biology, a rare combination in the world of conservation technology.

"I kept seeing his responses pop up," Loehr recalls. "He was answering the questions that others tiptoed around, and he explained things in a way that made you think he had already built half the future in his garage."

What began as a simple exchange between two forum members soon expanded into a working relationship. Hendrikse already had early ideas for a modular wildlife detection system. WildAP, meanwhile, was developing Finland's infrastructure for wildlife research to meet the needs of the digital age, seeking new tools that could expand experimental possibilities for studying large carnivores, ecosystem dynamics, and interspecies communication. Their interests aligned neatly, and before long, the collaboration moved from message boards to real prototypes.

From Concept to Collaboration

The early conversations focused on feasibility. Could Hendrikse's edge-based hardware be adapted for ecological field studies? Could it withstand harsh Nordic winters? Could it detect animals not just sometimes, but reliably? And crucially, could it do more than detect?

One question from Loehr's team pushed the project in a distinctly new direction. A PhD student wanted to explore how carnivores respond to the human voice broadcast in the wild. The question was deceptively simple: Could the system be designed to trigger a speaker automatically when it detected a wolf, bear, or lynx?

The answer was yes—but it opened the door to something far more profound. Instead of just watching animals, the system could now **interact** with them. It could become an experimental platform for field biology, testing hypotheses in real time, in real landscapes, with wild animals going about their lives.

"It was a turning point," Loehr says. "We realized that what Kim was building wasn't just another camera trap. It was an instrument for field experimentation."

But for the system to reach this level, it needed something current wildlife technologies rarely had: accuracy. All ecologists know the frustration of false positives—moving branches triggering alerts or dogs flagged as wolves. Such mistakes erode trust in the technology and frustrate landowners who depend on accurate information. Hendrikse, familiar with these limitations, proposed using compact, low power **thermal cameras** alongside visible light sensors. This pairing allowed the system to confirm detections across different wavelengths, dramatically reducing false positives.

It was an elegant solution, fitting neatly with WildAP's research priorities. Together, they refined hardware, trained early-stage AI models, and built the capacity to trigger speakers or lights based on realtime detections. The system grew more sophisticated with each iteration, and a new name emerged: the **Automated Multispecies Monitoring and Interaction (AMMI) system.**

Belgium: The First Real Test

The collaboration reached its first major milestone in **autumn 2025** in a farm FIeld in Belgium—a landscape where wolves frequently pass through but occasionally lingernear horses, causing concern for local farmers. The team installed an AMMI prototype overlooking the pasture. It was the first real-world field test, the moment when theory, code, and hardware had to perform under real ecological conditions.

One evening, long after dusk, AMMI sent its first fully validated alert. The thermal camera picked up the silhouette of a wolf; then AI confirmed the identification; and Hendrikse's phone vibrated gently in his pocket. What mattered, however, was notjust the detection—it was the context. The wolves were simply passing by, playing no interest in the horses. No action was needed. No farmer had to be woken. No tension. No overreaction.

On another night, when wolves did linger near the animals, AMMI's timely alert allowed a calm, measured response—turning on lights, stepping outside, or monitoring movement remotely. It prevented conflict not through force, but through **information**—raising the alarm only when the situation truly required it.

For Loehr and Hendrikse, this was the moment the system came alive. The Belgium field test demonstrated that AMMI could support coexistence in exactly the way conservationists have long hoped: by delivering information precisely when it matters.

A Vision Begins to Take Shape

As the system matured, its wider potential began to reveal itself. Even at this early stage, with the technology still young and many technical hurdles remaining, it became clear that AMMI was not simply a tool. It was the beginning of a **new model of wildlife monitoring**, one that blends biology, engineering, artificial intelligence, and fieldwork in ways that could reverberate across research, conservation, and land management.

AMMI is envisioned as a modular, evolving platform—one that grows more capable as battery technology advances, as solar integration improves, and as its AI learns to recognize an expanding array of species. Its combination of thermal and RGB imaging opens the door to far greater accuracy than traditional camera traps, but fully realizing this potential requires a vast library of species images. At present, the dataset is modest: a growing archive of thermal signatures from target carnivores and a few non-target species. But building a comprehensive library—encompassing many species and many sources of false positives—is essential, and this is only beginning.

As deployments increase across different landscapes, AMMI's species recognition will advance rapidly. Each new detection becomes a data point; each field season adds depth; each collaboration contributes nuance. The system grows because people use it. Just as autonomous cars learned to navigate cities by collecting millions of hours of driving data, AMMI learns the about the natural world through repeated encounters with wildlife.

Even now, the system's trajectory extends far beyond large carnivores. One possible application lies in controlling **invasive predators** such as the raccoon and raccoon dog—species that disrupt ecosystems by preying on ground-nesting birds. AMMI could detect these species with high specificity and deploy targeted deterrents that deter them from sensitive habitats with a goal of causing minimal disturbance to native wildlife. This approach offers a far more refined alternative to broad-scale interventions that can inadvertently harm entire ecosystems.

At the same time, AMMI is poised to transform wildlife research itself. In the future, scientists can detect a species in real time and immediately broadcast a context specific vocalization, observing the animal's behavioural response as it unfolds. This makes the landscape itself an experimental arena. Researchers gain unprecedented opportunities to study how animals interpret alarm calls, territorial calls, mating sounds, or even human voices. Instead of bringing animals into artificial environments, AMMI brings the experiment to the animal—quietly, respectfully, and ethically.

Ripple Effects Across Society

The implications of such technology extend well beyond biology. Reliable real-time information has the power to change how communities think about wildlife. When farmers know which animals are present and when, fear gives way to preparedness. When municipalities understand where animals move, infrastructure planning becomes more harmonious with ecological needs. When conservation agencies gain continuous monitoring of sensitive habitats, their interventions become more effective and less disruptive.

AMMI supports multiple dimensions of sustainable growth. Ecologically, it helps reduce conflicts that often lead to lethal management of carnivores, supports efforts to control invasive species, and promotes ethical deterrence rather than force. Economically, it reduces losses from livestock predation, agricultural damage, and invasive species impacts. Socially, it supports coexistence by fostering trust and offering communities tools that make living alongside wildlife less stressful and more predictable.

As the system spreads, it invites collaboration across borders. A farmer in the Netherlands, a conservation NGO in Romania, and a wildlife researcher in Finland may all contribute to the same growing dataset. The system's success depends on this kind of cooperation—a network of users feeding the data that makes AMMI increasingly robust.

But for all its promise, AMMI remains at the beginning of its development arc. Energy demands still limit deployment length; battery and solar advancements are essential for long-term autonomy. The species-recognition AI still has much to learn, requiring a vastly expanded thermal image library. Field durability—withstanding weather, animals, and tampering—must continue to improve through iterative testing. And even the behavioural experiments must be refined to ensure that playback remains ethical, non-invasive, and ecologically appropriate.

The Beginning of a New Approach

Despite these challenges, the direction is unmistakable. AMMI shows how technology can illuminate the shadows between human and wildlife activity, providing a basis for coexistence rooted in understanding rather than conflict. What began as a chance exchange on an online forum has become a cross-border collaboration that is shaping the future of conservation technology—one careful field test, one dataset, and one wolf detection at a time.

The system is young, but its vision is expansive. As AMMI grows—through research, collaboration, and steady refinement—it promises to help societies navigate a world where humans and wildlife increasingly share space. It is a tool built not to dominate nature, but to listen to it. And in listening, it offers the possibility of a future where coexistence feels not like an aspiration, but like a practiced and sustainable reality.