SambaNova SYSTEMS

SOLUTION BRIEF

# C4ISR Through Next Generation Artificial Intelligence

## More Efficient Data Utilization for Improved Insights

### Challenge

- Modern ISR collection uses a variety of disparate data sources across multiple domains including high-resolution images or other large files
- Data has a shelf life – insights must be derived from the most recent data available
- The sheer volume of data collected makes it challenging to find the most relevant information
- Speed to answer is critical to achieving information advantage

### Solution

- Computer vision that can accommodate full resolution images
- High-performance NLP to help identify the most relevant information
- Greater performance with larger data for improved accuracy
- Balance between compute, data, and networking improves performance and outcomes

### Key Benefits

- Make better decisions faster
- Utilize true resolution image content – greater than 4k by 4k with no downsizing or tiling
- 3D image and sensor data analysis
- Improved accuracy and better outcomes
- Deep learning optimizes the utility of unstructured data
- Accelerates NLP to help find the right information
- Mitigates the challenges presented by agency-specific jargon or lexicons
- Avoid out-of-memory errors from GPU infrastructure
- Coexists with and compliments your existing AI infrastructure

Intelligence, Surveillance, and Reconnaissance (ISR) is a critical component to global vigilance, and a technological advantage to the US and its allies. ISR enables greater situational awareness, accelerates decision making, and improves the likelihood of mission success. This capability has become even more critical in the new Joint All Domain Command and Control (JADC2) framework the DoD is implementing. Key to winning in this environment is the ability to gather, process, and exploit information faster to enable better decision making.

Successful utilization of ISR data in this new great power conflict will come from several aspects:

1. The ability to process enormous datasets and run complex models at speeds that optimize the value of the information gathered
2. Fully utilizing this data by maintaining high resolution integrity and elements such as 3D imagery that enable proximity calculations for precision tactical analysis
3. Improving the process of information classification and the ability to share it across all operators

Artificial Intelligence is key to achieving information dominance, especially when high resolution ISR is a component. However, conventional AI architectural components, such as CPU and GPUs, were simply not engineered to manage the challenge presented by the next generation of sensor data collection

for applications such as High-Resolution Computer Vision/Object Detection. Generation-to-generation performance gains for multi-core processors have tapered off. As a result, developers can no longer depend on traditional performance improvements to power more complex and sophisticated applications.

## Rapid Management of Large Data Sets

SambaNova DataScale™ is revolutionizing how AI Models utilize data. Built on SambaNova Systems, DataScale is an integrated AI software and hardware accelerator, purpose-built for AI, that delivers unrivaled performance, accuracy, scale, and ease of use. DataScale delivers efficiency with a software-defined-hardware approach and a highly flexible modular architecture. DataScale can scale seamlessly from one to hundreds of systems to meet the demands of modern AI computing.

## Increased Utility of Data Via High Resolution/3D Visibility

Higher-resolution image processing requires significant computational capabilities. So much so, in fact, that training models to use these high-resolution images has rendered current state-of-the-art technologies unusable. Today, many conventional AI architectures attempt to find a balance between the requirements for speed and the volume of data by lowering resolution, converting images to independent tiles which deliver less accurate results, or trying to meet it with sheer GPU volume. These tradeoffs result in lower resolution images, reduced details, and a loss of context.

In contrast, the SambaNova solution creates custom processing pipelines that allow data to flow through the complete computation graph. It uses a spatial programming model to optimize compute layout and minimize data movement to achieve high hardware utilization. The Sambanova DataScale solution, with petaflops of performance and terabytes of memory can handle true resolution data, which is critical to accuracy in object detection, segmentation problems, and image classification, from 4k up to 50k.

**SambaNova High Performance AI**

**Conventional GPU Systems**

## SambaNova DataScale® Solution:

- Delivers computer vision that supports ultra-high resolution image content—greater than 4K by 4K with no downsizing or tiling
- Enhances your existing AI/ML Deep Learning infrastructure
- Accelerates Natural Language Processing (NLP) to help find the right information
- Large memory enables much larger deep learning models than GPUs

## Ability to Utilize Actionable Insights Across Domains, Branches and Allies.

In addition to managing large datasets and optimizing the value of sensor data collected, the next generation of ISR capability will need to factor in the human/machine interface for maximum utility. NLP enables simplified data and input queries, by adding a level of intelligent interpretation to human language requests and directives. NLP will be critical in cross-domain operations to interpret agency specific jargon, user sentiment or multi-lingual input. SambaNova enables organizations to use some of the largest language models, which can be deployed in weeks, not months or years. Using the latest models provides greater accuracy, ultimately allowing analysts to focus on activities requiring higher-level reasoning and judgment.

## Surpassing the Limits of Conventional AI Architectures.

The future fight is going to happen at AI speed and will require new tools and capabilities. SambaNova Systems uniquely optimizes data computations, memory and communications resulting in higher performance at optimal efficiency across models of all sizes and forms, and for any batch size. SambaNova can help the warfighter maintain our information advantage by overcoming challenges in collecting, analyzing, and sharing an exponential growth in data at machine speed.

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## SambaNova is Accelerating and Transforming AI

To learn more about how SambaNova's Dataflow-as-a-Service can help you achieve custom, next-generation AI solutions, **schedule a meeting.**

## Learn more at SambaNova.ai

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AI is here. With SambaNova, customers are deploying the power of AI and deep learning in weeks rather than years to meet the demands of the AI-enabled world. SambaNova's flagship offering, Dataflow-as-a-Service™, is a complete solution purpose-built for AI and deep learning that overcomes the limitations of legacy technology to power the large and complex models that enable customers to discover new opportunities, unlock new revenue and boost operational efficiency. Headquartered in Palo Alto, California, SambaNova Systems was founded in 2017 by industry luminaries, and hardware and software design experts from Sun/Oracle and Stanford University. Investors include SoftBank Vision Fund 2, funds and accounts managed by BlackRock, Intel Capital, GV, Walden International, Temasek, GIC, Redline Capital, Atlantic Bridge Ventures, Celesta, and several others. For more information, please visit us at sambanova.ai or contact us at info@sambanova.ai. Follow SambaNova Systems on LinkedIn.