# Live Neural IT Delivers Advanced Performance

BCM Industries Inc.

**“…delivering rapid, low-cost system design to mission deployment.”**

February 2023

# ACT Mission – Reduce Costs and Shorten Development Times

The transition of advanced research results from the lab to operational service is often inhibited by high costs and lengthy development and deployment schedules.

In 2013, DARPA sponsored the ACT Project. The purpose was to establish methods to reduce costs and shorten times for new systems and major modifications to RF, and microwave systems that support radar, communications, signal intelligence (SIGINT), and electronic warfare (EW) systems.

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BCM Industries (BCM) is developing stand-alone Live Neural IT devices, with simple adaptable IT and programmable Neuroware application fulfillment capabilities. These Neural devices will dramatically reduce the costs and time to design, develop and deploy new systems and integrate major changes to existing IT and electronic systems.

Reference Briefing: “Advances in AI and Natural Neural Intelligence, Using Live Neural IT Devices.” See https://www.bcmindustries.com/tod. Select the link “Advances in AI and Natural Neural Intelligence.”

BCM-developed Live Neural IT devices are known as Tissue Operating Devices (TOD™). Associated Neuroware provides direct digital access to millions of addressable, trainable, programable, and manageable live neurons.

TOD™ systems include modified, non-human, animal neurons with customized DNA powers that collect and accumulate knowledge (AK), perform application-tailored adaptive thinking (AT), and deliver individual neuron addressable and directable real-time Natural Neural Intelligence (NNI) capabilities.

# Sensor and Non-sensor TOD™ Systems

TOD™ systems are available in two configurations. The basic TOD™ uses customized live general neurons. The TOD™-DSP configuration utilizes both general and sensor neurons to address many direct analog signal processing (DSP) applications.

By eliminating the need for A-to-D data conversion TOD™-DSP offers enhanced speed and superior accuracy to many sensor-based data collection and processing applications.

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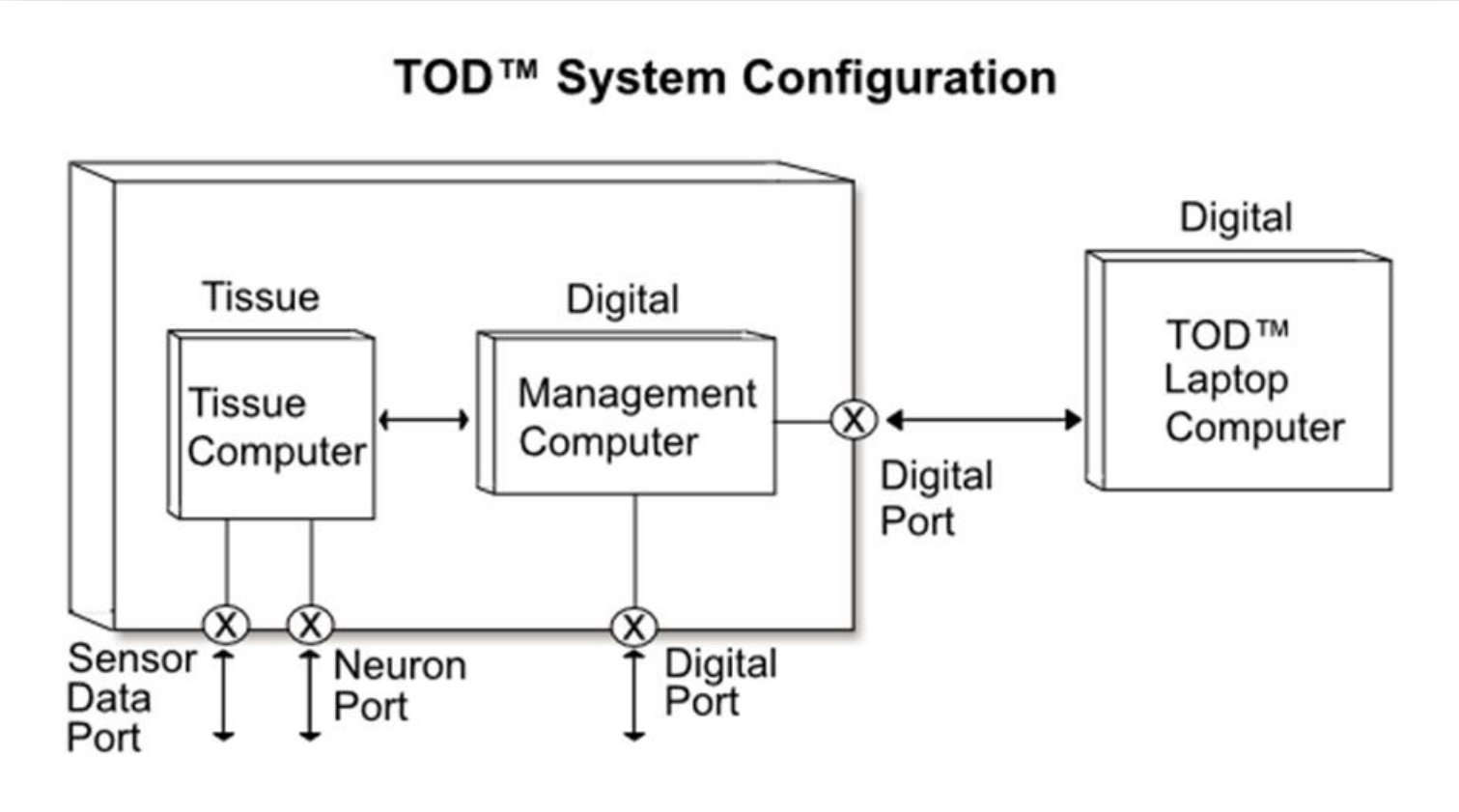
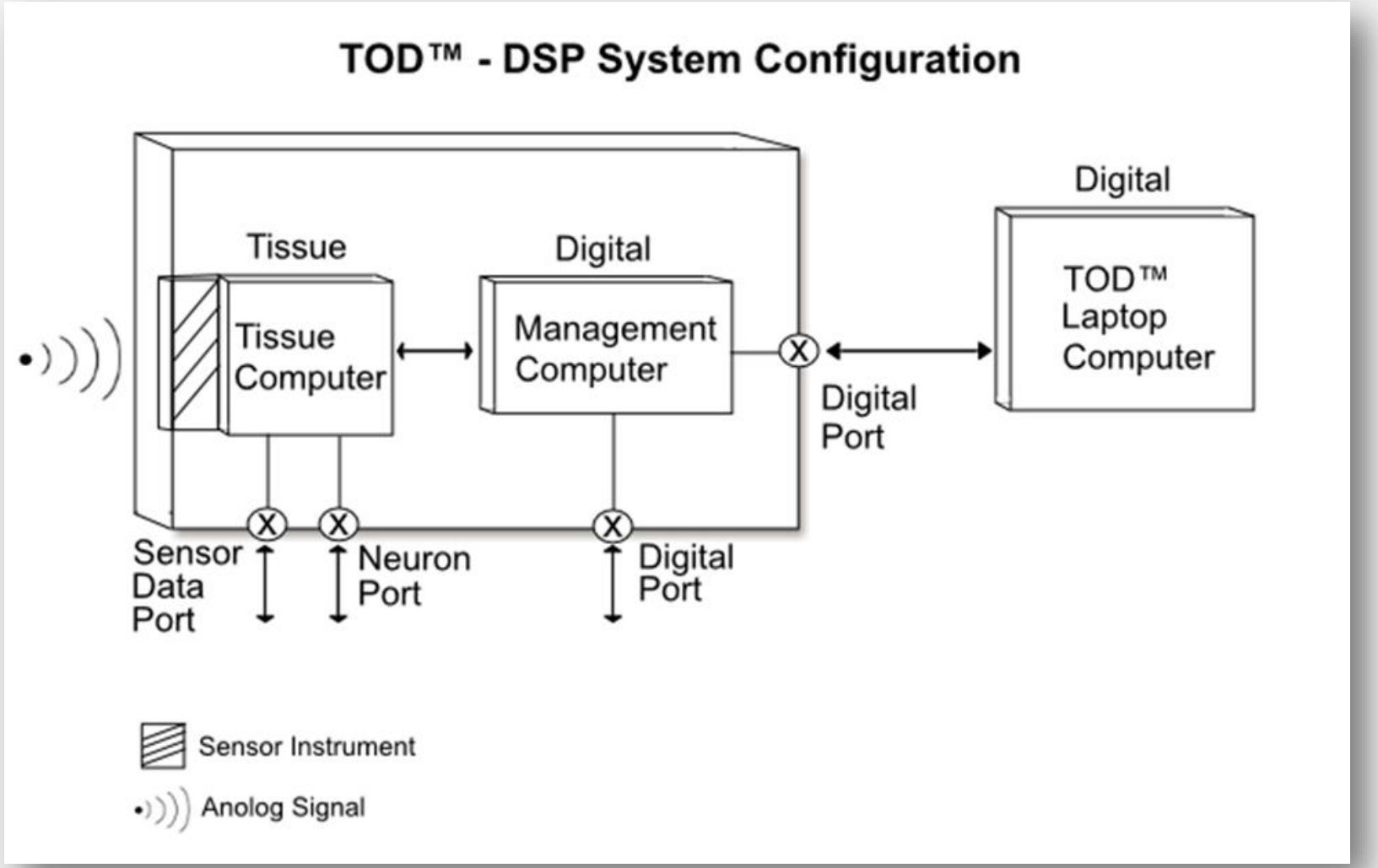
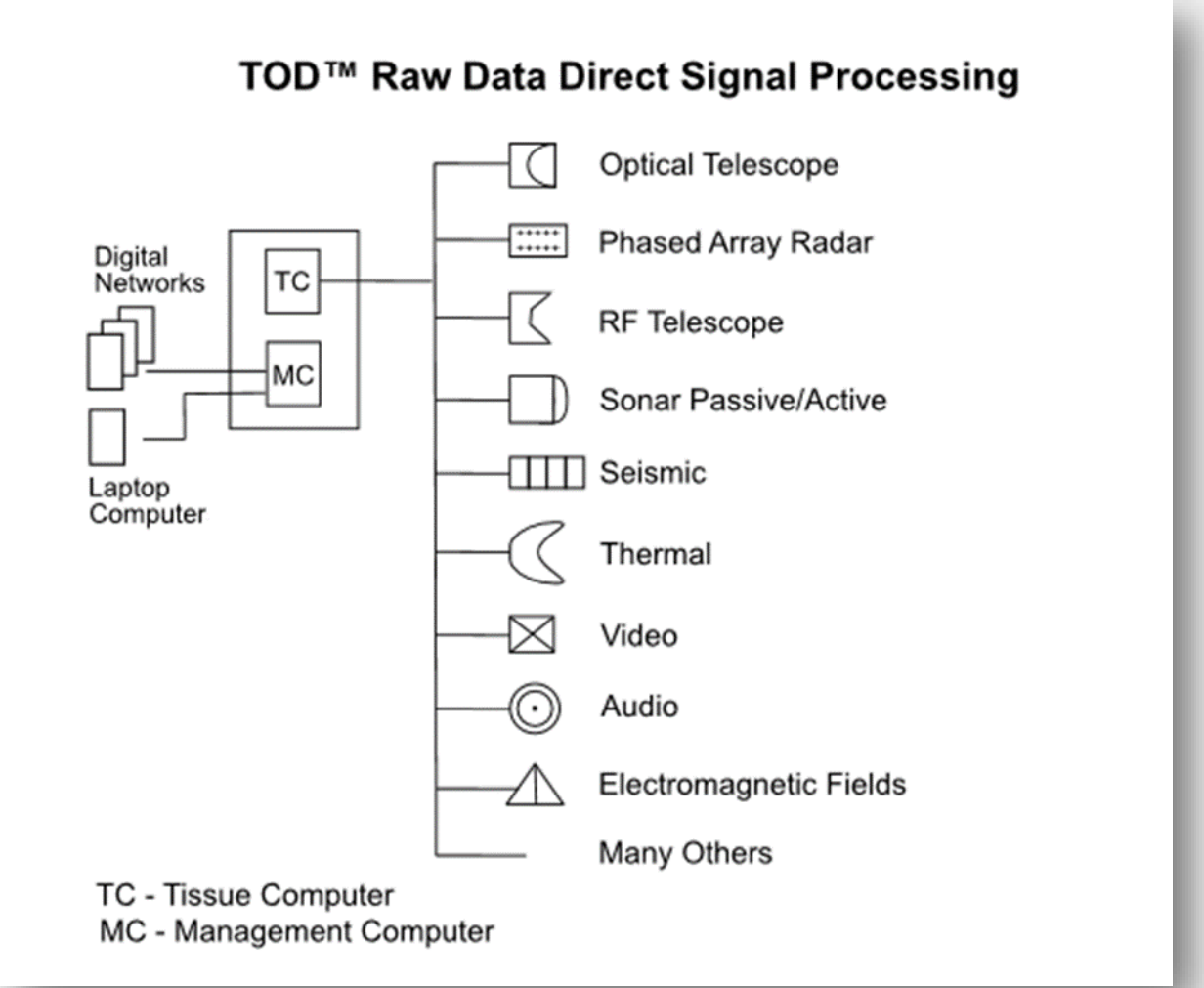

TOD™ System Configuration
Tissue
Digital
Digital
Tissue Computer
Management Computer
TOD™ Laptop Computer
Digital Port
Sensor Data Port
Neuron Port
Digital Port


TOD™ - DSP System Configuration
Tissue
Digital
Digital
Tissue Computer
Management Computer
TOD™ Laptop Computer
Digital Port
Sensor Data Port
Neuron Port
Digital Port
Sensor Instrument
Anolog Signal

# TOD™-DSP and Raw Data Direct Signal Processing

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# Adaptability of TOD™ Systems

TOD™ systems reduce development costs and shorten development and deployment times by offering four adaptable design and programmable elements.

[1] Selection and DNA customizable general and sensor neurons
[2] Application Programmable Neuroware
[3] Tailored Neuron-to-Digital Interface (NDI)
[4] Customized Sensor-to-TC Interface (STCI)

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# Selecting and Customizing Neurons

There are thousands of types of non-human, living neurons that can be utilized to create general-purpose, and application-specific Live Neural IT devices. Selected live natural neurons can be modified, including their DNA, to address specific applications. Assembled TOD™ neurons are trainable, and manageable using highly diverse programable Neuroware.

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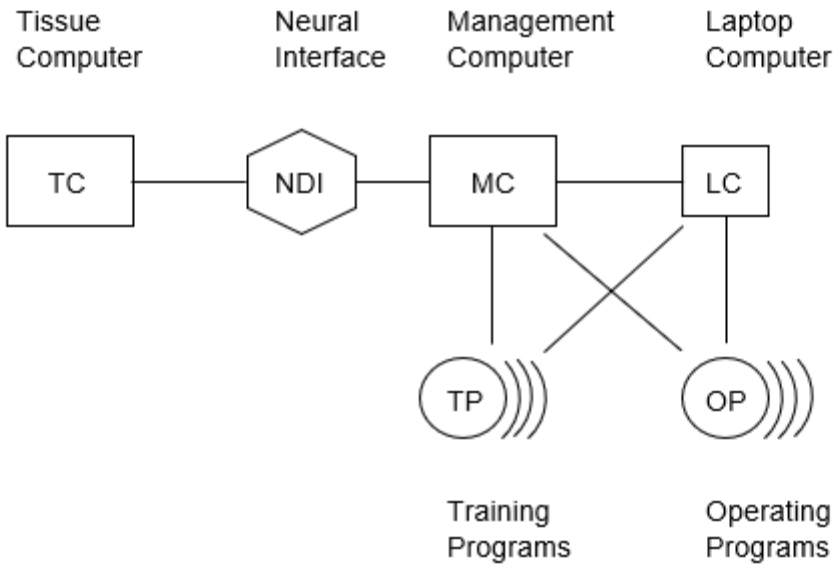
Neuroware is the TOD™ programing language that unifies digital software and hardware with the NDI, TC, STCI, and the operating process allowing for digital and analog management, training, and operational control of live neurons operating within both TOD™ and TOD™-DSP systems. Neuroware activities will be supported by OpenNNI and development tools and libraries available from Neuroware development communities.

# Programmable Neuroware Elements

## TOD™ Programmable Neuroware Segment




Code:

TC – Tissue Computer
NDI - Neuron-to-Digital Interface
MC – Management Computer
LC – Laptop Computer
TP - Training Programs
OP – Operating Programs

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# Neuron-to-Digital Interface (NDI)

The NDI is a TOD™ unique customized digital-to-tissue computer interface device. It is limited to receiving and transmitting intelligence between addressable TC neurons and digital devices. It is dynamically programmable using Neruoware. NDI units can be physically exchanged for maintenance and to address service upgrades. Each NDI is solely a TOD™ unique operating device and is not able to operate as a Brian-to-Computer Interface (BCI) device.

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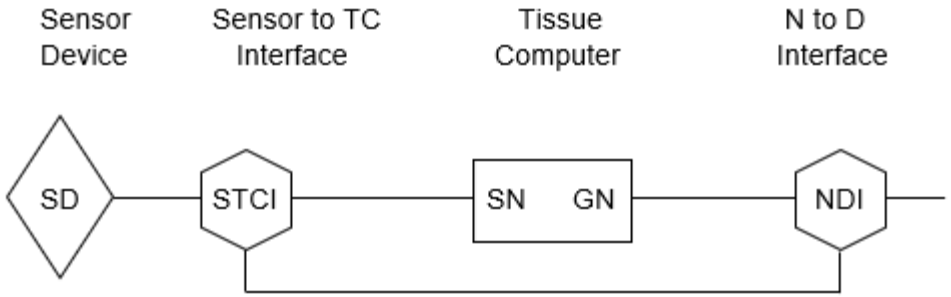
All TOD™-DSP system configurations include millions of both sensor neurons (SN) and general neurons (GN). They jointly operate as a unified Tissue Computer (TC). The GN side is linked directly to the NDI, and the SN side is directly linked to a Sensor-to-TC Interface (STCI) element. The function of the STCI is to receive and transmit intelligence between addressable TC neurons and raw analog sensor data from the sensor device. It can be designed to be managed with Neroware and be physically exchanged for maintenance and to address service upgrades.

## TOD™-DSP Sensor Package Segment




Code:

SD – Sensor Device
STCI - Sensor-to-TC Interface
TC – Tissue Computer
SN – Live Sensor Neurons
GN – Live General Neurons
NDI - Neuron-to-Digital Interface

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BCM Labs continues to pursue the development of Live Neural IT devices, and pathways to apply TOD™ systems to thousands of applications that can benefit from reduced development costs and the shortening of new or modified systems development times.

Research facilities, universities, governments, businesses, and individuals with potential applications or a desire to participate in these TOD™ enhanced activities are encouraged to contact a BCM representative.