



THE POLARIS FAMILY OF PRODUCTS

Continuing a tradition of proven technology



⁺
POLARIS
SPECTRA

⁺
POLARIS
VICON

MEASUREMENT YOU CAN TRUST

CONTINUING A TRADITION OF PROVEN TECHNOLOGY

The NDI family of renowned real-time 3D measurement systems continues the tradition of accurate and versatile technology with the introduction of Polaris Spectra® and Polaris Vicra®.

Trusted by medical device manufacturers worldwide, more than 11,000 Polaris Systems are used in a variety of surgical applications, delivering accurate, flexible and reliable measurement solutions that are easily customized to specific applications. NDI also has a long history of serving the needs of leading-edge research institutions and innovators around the world. The Polaris accessories and utilities enable researchers to easily create their own application-specific tools, with passive and active markers.

As with the original Polaris System, the Polaris Spectra and Polaris Vicra continue to set the standard of optical tracking systems by offering advanced features, making the Polaris family of optical systems ideal for virtually any application requiring real-time, 3D/6D measurements.

Polaris...the core technology inside the world's leading computer-assisted surgery and therapy systems.

POLARIS - A PROVEN TECHNOLOGY

Building on a 25 year tradition of innovation, Polaris Spectra and Polaris Vicra are paving the way for new applications within ever-expanding markets.

- Neurosurgery
- Orthopaedics
- Ear, nose and throat (ENT) surgery
- Transcranial Magnetic Stimulation (TMS)
- Patient positioning
- Spinal surgery
- Maxillo-facial surgery
- Dental surgery
- Medical training systems
- Radiation therapy

CHOOSING A SYSTEM FOR YOUR APPLICATION

The Polaris Spectra and Polaris Vicra are based on the same core technology. When determining which system is best for your application, consider these factors:

- size of measurement volume needed
- update rate required for measurements
- number and type of tools to be tracked
- space restrictions and mounting location of system
- integration/compatibility with current system



POLARIS - THE NEXT GENERATION



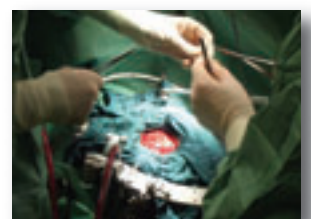
POLARIS⁺ SPECTRA™

With its many advanced features, the Polaris Spectra continues to raise the standard of optical tracking systems. The flexibility and reliability of this system make it ideal for cross-platform applications and applications requiring a very large measurement volume.

POLARIS⁺ VICRA™

With its exceptional accuracy and small footprint, Polaris Vicra opens the door to address requirements for existing and new computer assisted surgery and therapy applications requiring a small measurement volume.

PRODUCT FEATURES	POLARIS SPECTRA	POLARIS VICRA
• exceptional accuracy	✓	✓
• bump detection capabilities	✓	✓
• robust	✓	✓
• short warm-up time	✓	✓
• maintenance and diagnostic utilities	✓	✓
• accurate within wide temperature range	✓	✓
• large measurement volume	✓	
• integrated positioning laser	✓	
• small and lightweight		✓
• mount almost anywhere		✓
Tool Types		
• passive	✓	✓
• active	✓	
• active wireless	✓	✓

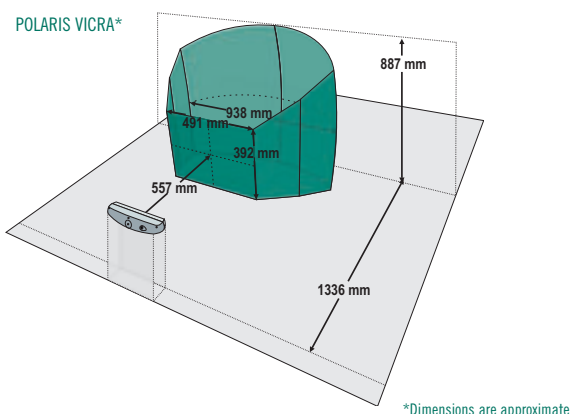
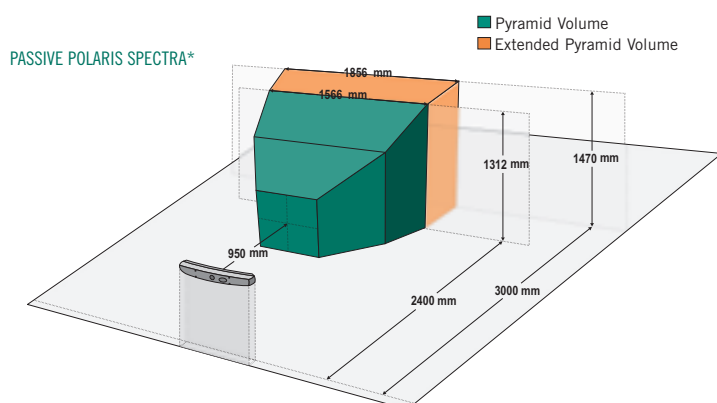


NEW DIMENSIONS

A NEW DIMENSION IN USABILITY

Multiple measurement volumes

The measurement volume is the area in which the tool is tracked (within the NDI accuracy specifications). The Polaris Spectra System comes equipped with the Pyramid Volume or Extended Pyramid Volume. The Polaris Vicra System comes equipped with the Vicra Volume.



Short warm-up time

With a maximum warm-up time of only ten minutes, the Polaris Spectra and Polaris Vicra systems are quickly ready for use. This quick warm-up time reduces risk of misuse.

Wide temperature operating range

Measure reliably and accurately in an ambient temperature range of +10°C to +40°C for Polaris Spectra and +10°C to +30°C for Polaris Vicra.

Positioning laser

The Polaris Spectra is equipped with an optional integrated positioning laser to assist the user in aligning the Position Sensor with the area of interest of the procedure.

High technology in compact format

The Polaris Vicra Position Sensor is small and lightweight. This allows the user to fix it directly to the patient table or integrate it into the hardware system. The integration and setup of the whole measurement system can be done quickly and easily.

The new generation of tools are also small and lightweight. The Polaris Vicra is able to track tools that are smaller compared to the current Polaris System, allowing lighter surgical instruments.

A NEW DIMENSION IN ACCURACY

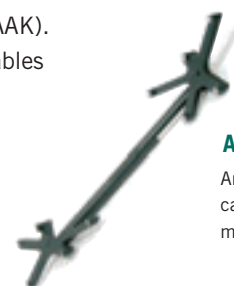
Confidence in accuracy

In computer-assisted surgery applications, having confidence in the accuracy of its measurement system is essential. The Polaris Spectra and Polaris Vicra Position Sensors are designed to withstand a high level of shock, and still produce reliable and accurate measurement data. If a shock occurs of a magnitude that may compromise accuracy, a bump sensor triggers and alerts the user.

Additional confidence in accuracy is provided with the Accuracy Assessment Kit (AAK).

The AAK consists of an accuracy assessment tool and associated software that enables quick and easy in-field accuracy assessment of the Position Sensor.


The combined hardware and software solution guides you through the entire measurement volume and provides you with a pass or fail report.



Accuracy Assessment Kit

An accuracy assessment procedure can be performed in under 15 minutes.

COMPARISON OF POLARIS SYSTEM SPECIFICATIONS

	PASSIVE POLARIS SPECTRA	HYBRID POLARIS SPECTRA	POLARIS VICRA
PERFORMANCE			
Accuracy			
Volumetric^{1,2}	Pyramid: 0.25 mm RMS Extended Pyramid: 0.30 mm RMS ²	Pyramid: 0.25 mm RMS Extended Pyramid: 0.30 mm RMS ²	0.25 mm RMS
95% Confidence Interval^{1,2}	Pyramid: 0.5 mm Extended Pyramid: 0.6 mm	Pyramid: 0.5 mm Extended Pyramid: 0.6 mm	0.5 mm
AAK	0.35 mm RMS	0.35 mm RMS	0.35 mm RMS
Maximum update rate³	60 Hz	60 Hz	20 Hz
Operating temperature⁴	10°C to 40°C	10°C to 40°C	10°C to 30°C
Measurement volume	Pyramid and Extended Pyramid volume	Pyramid and Extended Pyramid volume	Vicra Volume
DATA COMMUNICATION INTERFACE			
Interface	USB 1.1 and 2.0 compatible	USB 1.1 and 2.0 compatible, RS-232 or RS-422 with SCU	USB 1.1 and 2.0 compatible
Maximum data rate	1.2 Mb per second	1.2 Mb per second	1.2 Mb per second
TOOLS			
Tool types	passive, active wireless	passive, active, active wireless	passive, active wireless
Maximum number of tools	Up to 15 wireless tools (maximum 6 active wireless) with a maximum of 32 passive and 32 active markers in view	Up to 15 wireless tools (maximum 6 active wireless) with a maximum of 32 passive and 32 active markers in view and up to 9 additional active tools	Up to 6 wireless tools (maximum 1 active wireless)
Maximum number of markers per tool	6 single-face/20 multi-face for passive or active wireless tools	6 single-face/20 multi-face for passive or active wireless tools; 20 for active tools	6 single-face/20 multi-face for passive or active wireless tools
Tool change	Software controlled	Automatic for active; Software controlled for passive and active wireless	Software controlled
POWER REQUIREMENTS			
	100 - 250 V AC, ~50/60 Hz, 1 A	100/120/220/240 V AC, ~50/60 Hz, 0.5 A	100 - 250 V AC, ~50/60 Hz, 1 A
OPTIONAL POSITIONING LASER			
	Class 2 laser Wavelength - 635 nm Maximum output - 1 mW	 Class 2 laser Wavelength - 635 nm Maximum output - 1 mW	Not available
MECHANICAL SPECIFICATIONS			
POSITION SENSOR			
Dimensions (LxWxH)	613 mm x 104 mm x 86	613 mm x 104 mm x 86	273 mm x 69 mm x 69 mm
Weight	1.9 kg	1.9 kg	0.80 kg
Mounting	1/4" thread tripod mount or secured via three M3 x 0.5 mm pitch x 6.5 mm deep threaded holes, rear mount	1/4" thread tripod mount or secured via three M3 x 0.5 mm pitch x 6.5 mm deep threaded holes, rear mount	1/4" thread tripod mount or secured via three M3 x 0.5 mm pitch x 6.5 mm deep threaded holes, rear mount
HOST USB CONVERTER			
Dimensions (LxWxH)	88 mm x 57 mm x 39 mm	—	88 mm x 57 mm x 39 mm
Weight	0.35 kg	—	0.35 kg
Mounting	Free standing or secured via three M6 x 1 mm pitch x 3 mm deep threaded holes, located in the mounting feet	—	Free standing or secured via three M6 x 1 mm pitch x 3 mm deep threaded holes, located in the mounting feet
SYSTEM CONTROL UNIT			
Dimensions (LxWxH)	—	231 mm x 220 mm x 88 mm	—
Weight	—	3.5 kg	—
Mounting	—	Free standing or mounted via four M4 x 10 mm deep threaded inserts on bottom or sides. Rubber feet on bottom of SCU may be moved to the thread inserts on the side of the SCU	—
TOOL STROBER			
Dimensions (LxWxH)	—	182 mm x 102 mm x 35 mm	—
Weight	—	0.4 kg	—
Mounting	—	Free standing or mounted via two M3 x 0.5 mm pitch x 5 mm deep threaded inserts on bottom	—

¹ Based on a single marker stepped through more than 900 positions throughout the measurement volume using the mean of 30 samples at each position at 20°C.

² Accuracy stated based on overall volume.

³ Varies according to tool combinations with a maximum rate of 60 Hz.

⁴ If the Host USB Converter (HUC) is located within the patient vicinity where it may be touched by the patient, the operating ambient temperature range is +10°C to +30°C. If the HUC is located outside this patient vicinity, the operating ambient temperature range permitted for the system is +10°C to +40°C. The power supply unit must be located outside the patient vicinity under all operating conditions.

HARDWARE

POSITION SENSOR

Emits IR light for passive tracking and also detects marker positions and calculates transformations of tools and 3D position of individual markers.



HOST USB CONVERTER

The Host USB converter is common to both the passive Polaris Spectra and Polaris Vicra Systems. The Host USB converter provides a communication link and power for the Position Sensor.



SYSTEM CONTROL UNIT (SCU)

The SCU is used with the hybrid Polaris Spectra. It provides the interface between the Position Sensor, strobers and tools and the host computer. Three tools can be connected at any one time. There is also a GPIO port for connecting other devices such as a foot switch. An expansion port allows for connection of a strober.



STROBER



An optional accessory for the hybrid Polaris Spectra which allows you to connect three additional active tools plus a GPIO port. Its portability enables tools to be connected closer to the working environment. The hybrid Polaris Spectra can support up to two strobers.

SOFTWARE

The NDI Polaris Spectra and Polaris Vicra Systems come complete with NDI ToolBox software and an application program interface (API).

NDI TOOLBOX

NDI ToolBox is a suite of utilities for diagnostics, maintenance, testing and development support for the Polaris Spectra and Polaris Vicra Systems.

APPLICATION PROGRAM INTERFACE (API)

The API follows the proven and well accepted Polaris API and is fully compatible with Polaris Firmware Rev 2X. The API enables easy system integration into your specific applications.

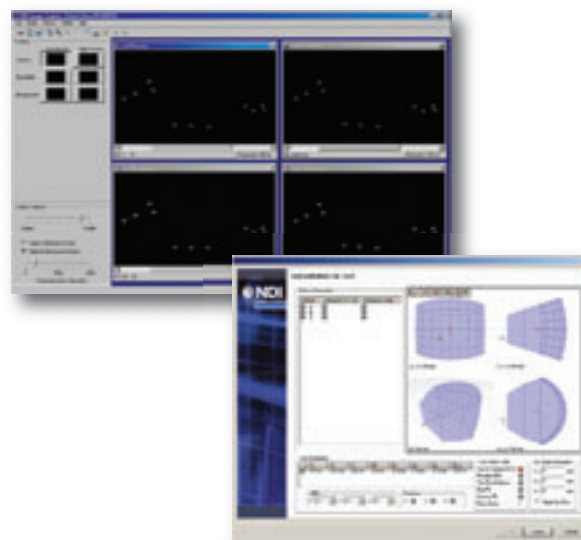
NDI 6D ARCHITECT

NDI 6D Architect is a software tool that simplifies the tool characterization process and the creation of tool definition files.

The program makes it easy to transform and manipulate information, including the view, orientation and renaming of the markers within the 6D Architect main window.

TOOL DEVELOPER KIT

NDI offers an optional passive Tool Developer Kit containing the software, hardware and documentation you need to design your own tools.



To run NDI software, you will need:

PLATFORM

- Windows 2000/XP
- Linux 2.6.8 or greater (ToolBox only)
- Mac OS X 10.4.8 or greater (ToolBox only)

HARDWARE and MEMORY

- Intel or Power PC G5 Processor
- 100 MB free disk space
- 512 MB RAM
- Screen resolution 1024 x 768 (1280 x 1024 recommended)

ACCESSORIES

Both the Polaris Spectra and Polaris Vicra Systems produce measurement and location data based on the design and placement of markers on a tool. Development tools and accessories are offered for both systems as part of a tool kit or as individual parts. Call NDI for more details or for a full product catalogue.



PASSIVE 4-MARKER PROBE

Single-faced probe tool designed to investigate cavities and narrow passages



ACTIVE 4-MARKER PLANAR RIGID BODY

- Four active markers mounted on a planar rigid body
- 65 mm x 65 mm
- Two elongated holes for mounting



PASSIVE RIGID BODIES

Single-faced rigid body available with minimum marker spacing of 30 mm or 50 mm



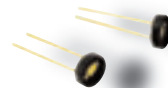
ACTIVE 4-MARKER PROBE

- Four active markers mounted on a planar rigid body with an attached probe
- Probe length: 105 mm



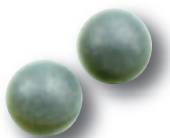
CLAMPS

For mounting rigid bodies to cylindrical tools with a diameter of 2 mm - 8 mm or 8 mm - 16 mm



ACTIVE MARKERS

Autoclavable IRED markers with a 5 mm ceramic base for creating active rigid bodies.



NDI PASSIVE MARKERS (Sterile¹ and Non-sterile)

- Spherical retro-reflective markers
- 11.5 mm diameter
- Designed for single use
- Snap-on connection to NDI passive marker mounting post



PASSIVE MARKER MOUNTING POST

- Stainless steel
- High marker placement repeatability
- 14 mm total length

¹ Single-use sterile NDI Passive Spheres™ are available from Scanlan International in packages of 1, 3 or 4 units to eliminate waste, costs and degradation associated with re-processing. (www.scanlaninternational.com)

THE COMPANY

Established over 25 years ago, NDI is trusted by international leaders in medicine, industry and research for the accuracy and reliability of its measurement technology. NDI systems are used in applications from computer-assisted therapy to aeronautics; from quality inspection to human motion research. Today, the company is a world leader in advanced 3D measurement technology with product installations in more than 30 countries around the world.

For more information, contact us at the office closest to you.



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