

## Human KINARM Exoskeleton Lab™

A versatile research facility to study sensory, motor and cognitive function

### Complete Research Lab

Designed by neuroscientists for neuroscientists, the human KINARM Exoskeleton Lab lets you start collecting data right out of the box. BKIN's standard system includes:

- One or two KINARM Exoskeleton robots for the upper limbs
- 2D virtual/augmented reality display
- Dexterit-E™ experimental control software and hardware

### Dual Function Robots

Each KINARM robot can be used as an exoskeleton for the shoulder and elbow (leaving the hand free to interact with objects in the environment) or converted to a hand-based end-point robot.

### Study Both Arms Simultaneously

The use of two KINARM Exoskeleton robots enables comparison of inter-limb performance as well as the study of bimanual coordination.

### 2D Virtual/Augmented Reality

Standard system includes 47" 2D virtual/augmented reality display for natural, intuitive presentation of visual stimuli.

### Easy To Use and Powerful

System includes Dexterit-E™ behavioural control and data acquisition software, which combines the power of a real-time operating system with the ease of a Windows™-based interface. Demonstration tasks can be used immediately for data collection. Custom Task Programs can be created using high-level graphical programming tools. KINARM Standard Tests™ optionally available.



### Quick Facts

- Sophisticated platform to monitor and manipulate the upper limb
- Broadest range of hand and joint-based kinesiological information
- 2-dimensional paradigm provides balance between behavioural complexity and measurement simplicity
- Integrated VR-AR aligns visual and mechanical environments

## Components of Human KINARM Exoskeleton Lab

- Two motorized KINARM Exoskeleton robots for simultaneous right and left-handed investigation; unilateral robot optional
- Workstation and visual display for presentation of 2D virtual targets in the actual plane of limb motion
- System-integrated chair with wheelchair-style seating (including removable foot, arm and head rests)
- Data acquisition hardware, including up to 32 channels of analog input
- Dexterit-E data acquisition and experimental control software
- Computer systems to run Dexterit-E (including a real-time computer for precise and safe action)
- A library of Simulink® blocks to assist with rapid custom Task Program creation (MatLab® and Simulink® must be purchased separately)
- Optional KINARM Standard Tests™
- Optional Visual3D™ data analysis software

## System Specifications

- Real-time control and data acquisition at 1kHz
- Peak torque pulse of 12Nm (~35N at the hand)
- Feedback resolution of 0.0006° (~4 microns at the hand) with optional 2° encoders (0.0045° and ~30 microns without)
- End-point stiffness of ~3000 N/m
- 47" visual display
- Fits children as young as 5 or 6 years old and adults up to approximately 6'6"
- Minimum suggested lab size 10'x10'

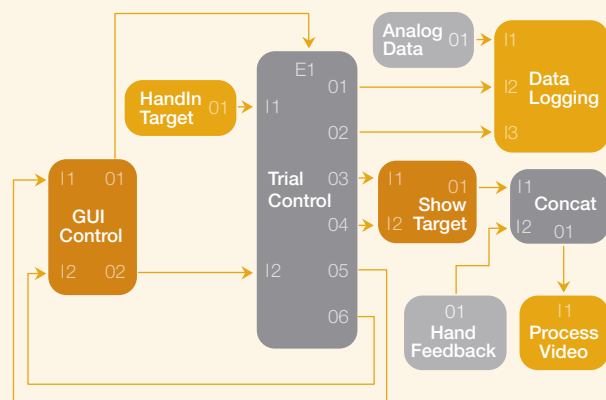
## Controlling KINARM Lab with Dexterit-E™

Dexterit-E provides a friendly, easy-to-use user interface for controlling a KINARM Lab.

**Custom Tasks** can be created and implemented with a KINARM Lab to probe a broad range of sensory, motor and cognitive functions. To create a custom task, users program their task using Simulink® and Stateflow® high level graphical programming tools.

**KINARM Standard Tests™** is a battery of automated standardized sensory, motor and cognitive tasks that allow you to start assessing subjects "right out of the box".

## Task Programming in Simulink®



Graphical programming language ensures easy task programming

## Parameter Control

Task parameters can be modified in tables (e.g. size, color, location of targets, number of trials in the task, order and repetition of trials, etc.)

	X	Y	Visual Radius	Logical Radius
Target 1	0.000	0.000	1.000	1.000
Target 2	0.000	-10.000	1.000	1.000
Target 3	10.000	0.000	1.000	1.000
Target 4	0.000	10.000	1.000	1.000
Target 5	10.000	0.000	1.000	1.000
Target 6	0.000	0.000	1.000	1.000
Target 7	0.000	0.000	1.000	1.000
Target 8	0.000	0.000	1.000	1.000
Target 9	0.000	0.000	1.000	1.000

User-specified tables permit customization of behavioural tasks

KINARM™ is a trademark of BKIN Technologies Ltd., developers of next-generation, objective assessment systems to quantify sensory, motor and cognitive performance.