INNOVATIVE

TEST PLATFORMS

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i-bodi Technology Ltd

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TEST PLATFORMS

- / ACCURATE PROGRAMMABLE SWEAT RATES
- / ARTICULATED TEST PLATFORMS
- / RUNNING, WALKING MANNEQUINS
- / DESIGNED USING ANTHROPOMETRIC DATA
- / BREATHING, SWEATING, MOVING HEAD FORMS
- / SOFT POLYMER SKIN-LIKE SURFACE
- / DIGITAL BREATHING MACHINES
- / SOFTWARE DESIGN
- / 3D CAD DESIGN
- / LASER SCANNING
- / RAPID PROTOTYPING

MoD/DGA CBRN Defence Centre
DGA Maîtrise NRBC
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i-bodi – provide intelligent solutions for military, industry, first responders & government organisations

LEADING WITH INNOVATION
ADVANCING THROUGH TECHNOLOGY

i-bodi is an innovative leader in project research, development and manufacture.

With over 20 years of industry experience, we specialise in providing intelligent solutions. i-bodi can be employed at any stage of the project lifecycle to aid the customer in the development of their product, from initial concepts through to prototyping and manufacture.

We are specialists in developing products from customer defined specifications, with particular experience in computer controlled test platforms for evaluating respirator and protective clothing in chemically challenging environments.

As project managers and developers we can take your fundamental concepts and develop them into a finalised working prototype or finished product.

As a contractor we can enhance your project with expertise in 3D CAD design, 3D laser scanning, rapid prototyping, mechatronics and software design, product documentation and customer support services.

FARSS

FOGGING & RESPIRATORY SIMULATION SYSTEM

FARSS is a computer controlled, sweating, heated head form that has been developed by i-bodi for a UK research agency to evaluate fogging and ice propagation in air crew, military and first responder respirators.

The head form is split into three individually heated zones and accommodates twenty-two independently dosed sweat zones mapped across the face and scalp. The system includes an environmental chamber with an internal grid light-box screen. Visual feedback from a camera in each eye socket of the head is captured and analysed by the control program. The system is capable of monitoring over 300 independent zones. Based on this, it gives each eye an obscurity rating of 0-100% along with temperature, humidity and visual images at a rate of up to 10 frames a second. This data is available for later analysis enabling the user to get a comprehensive report of when fogging occurred and under what conditions it formed.

Improvements over current systems:

- / ACCURATE PROGRAMMABLE SWEAT RATES
- / PURPOSE DEVELOPED ACUITY SCREEN TO MAXIMISE ANALYSED AREA
- / SELECTABLE SWEAT ZONES
- / HUMIDIFIED BREATHING MACHINE
- / INTENSITY AND AREA OF MISTING ANALYSED
- / HIGHLY ACCURATE REPEATABLE TESTING
- / VARIABLE BREATHING RATES
- / INTEGRATED ENVIRONMENTAL CHAMBER

FARS System uses patented i-bodi technology.

AHFC

AUTOMATED HEAD FORM CBPLUS

i-bodi developed the articulated, carbon composite head form and upper torso, as part of the CBplus Mannequin Technology System on request from a Canadian Government agency.

The head form was adapted to run as a portable stand alone system for use in smaller test chambers and temporary environmental analysis tents.

The system provides the user with full computer controlled head articulation and manually adjustable limbs. Highly flexible soft polymer skins have been developed for the head to provide a realistic skin-like locus point for respirators. The head has four axis of movement that provide turn, tilt, nod and jaw motions. The head-form can be used in conjunction with a Digital Breathing Machine and software, the DBM–01.

DBM 01

DIGITAL BREATHING MACHINE

The DBM-01 has been developed as a stand alone unit with a USB connection to a PC and for use in conjunction with head forms or mannequins to simulate live participant breathing in respirator and head-wear evaluation studies and similar applications.

The breathing machine has been specifically developed to withstand use in chemically aggressive applications, being purpose built from components to allow external exposure to harsh environments and internal exposure to contaminated air supplies.

RTHF V2

RESPIRATOR TESTING HEAD FORM - V2

This Respirator Testing Head Form has been designed as a test platform for simulating the realistic movements and breathing routines of combat field operatives. It has been developed to provide fully controllable and repeatable trials with the clear objective of analysing the functionality of respirators.

The unit comprises of two main elements: the mechanical head form and DBM-01, (digital breathing machine), which can be run as a stand alone unit.

The system has been designed to emulate the human lip, jaw, and neck movements as realistically as possible in order to provide qualitative test data. The head form is covered in a skin-like polymer layer to provide realistic locus point for the headwear seals. A breathing tube attaches to the soft polymer skin and passes through the chassis below - connecting to the DBM-01 mounted to the bottom of the unit.

The unit can be purchased as either a stand-alone unit which uses a 10.1 inch touch screen display, or as a remote unit which requires a connection to a PC via USB. The intuitive software allows the user to configure movements to a required degree of rotation, and breathing patterns to a required tidal volume, number of breaths per minute, and maximum flow rate. Any combination of movements and breathing patterns can be used, giving the user complete control of any test configuration.

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CRAM

CHEMICALLY RESISTANT AUTOMATED MANNEQUIN & HEAD FORM CBPLUS

The CBplus Mannequin Technology System was developed by i-bodi to a specification provided by Defence Research and Development Canada as part of the wider CBplus project.

A light weight, chemically resistant, articulated mannequin capable of performing a list of specified movement protocols was required. In addition to this the only means of support allowed could be at the hands, feet and face.

The mannequin is a full size, articulated, carbon composite body form manufactured to a reasonable approximation of human anthropometry. The mannequin is mounted into a drive frame via quick release connections in the head and hands. The feet are strapped into bindings on footplates. The drive frame supports the external actuator which provides ten axes of motion; two light weight actuators are internally mounted in the mannequin to produce simulated head motions. The system is capable of performing test sequences comprising of any combination of ten pre-programmed moves for periods of up to six hours in chemically challenging environments.

Also included in the mannequin system was an interchangeable carbon composite torso for use in testing upper body clothing, headwear and respirators. This has been constructed to the same exacting dimensions as the mannequin and is directly interchangeable in the drive frame, although the head form is supported at the base rather than the face, providing a test platform for unmodified head wear and upper body EOD wear. Four internal actuators provide axis to the head to produce turn, tilt, nod and jaw motions which can be combined with arm actions driven by the frame.

Both the head form and mannequin have a soft polymer skins at garment locus points, covering the entire head and neck, wrists and waist on the mannequin. The material was specifically developed by i-bodi for this application. Additionally both the mannequin and head form house dosimeter holders sited at user specified locations. These enable passive chemical dosimeters to be used as a method of evaluating the integrity of the test garments.

FASTMAN

FULLY ARTICULATED, ANTHROPOMETRICALLY CORRECT, SWEATING, THERMO-REGULATED, MANNEQUIN

FASTman is an anthropometrically designed carbon composite mannequin that has a heated surface and the ability to sweat. The mannequin is computer controlled and when attached to its' drive frame it can be made to:

/ RUN AT DIFFERENT SPEEDS (2M/S, 2.25M/S, 2.5M/S, 2.75M/S, 3M/S)

/ WALK AT DIFFERENT SPEEDS (0.5M/S & 1M/S)

SIMULATE POSITIONS INCLUDING:

/ SIT; STRETCH; KNEEL; REACH

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The torso of the mannequin can twist to simulate body motion as the arms move back and forth during the run and walk cycles.

The heated areas comprise of eleven wirelessly controlled heated body zones.
These are:-
Head; Torso front, upper & lower; Torso back, upper & lower sides & centre; Left upper arm; Right upper arm; Pelvis; Left thigh; Right thigh

Each heated zone can be independently controlled in temperature from ambient +5 to 40°C.
The body contains 62 sweat points which are individually supplied with distilled water from a network of pumps. Total simulated sweat rate is controlled via a wireless signal, and can dose between 0 and 3.5 litres/hour (+-10%). Individual sweat points can be controlled to deliver between 0 and 60ml an hour (+-10%).

The body has 60 dosimeter ports (passive sampler ports) and can be supplied with modified passive samplers. FASTman has quick release mechanisms on the feet, hands and head and can be easily dressed.

The Mannequin, Drive Frame and Transport Trolley have been constructed from a range of materials chosen for their resistance to common threats both simulated and real as well as cleaning agents.

The Mannequin has a height of 1786mm
The weight of the mannequin is 33.20Kg

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