

**Minutes of the meeting of the Technical Evaluation Committee for procurement of 3D
Conceptual Design System held on 3rd March 2010.**

Present

- Dr B Chandrasekaran, Head, CHORD- Chairman of the Committee
- Dr BN Das, Head, SDDC, Member of the Committee
- Shri Gautham G, Scientist, Member of the Committee
- Shri K Krishnaraj, Scientist, Member of the Committee
- Shri N Govindarajan, T.O, Indentor and Convenor of the Committee

The above committee was helped and guided by Shri Dulip Kumar, COSP and Shri KPS Ganapathy, S.O. (S&P).

The vendors were called for a pre-bid meeting on 3rd March 2010.

After a brief introduction by Shri Dulip Kumar, COSP, there was a detailed presentation of the Objectives and the specifications of the CAD systems by Shri N Govindarajan, Technical Officer and Indentor.

This was followed by presentations by representatives of the following vendors:

1. M/s Apsom Infotex Ltd.
2. M/s Torielli Ltd.
3. M/s Keith Electronics

The presentations covered the state-of-the art in CAD solutions for the footwear industry.

The Technical Committee then met and prescribed the following specifications for the various CAD hardwares and Softwares to be procured:

I. EDUCATIONAL Institute license for 5 seats each [I (a) to (d)] of the software comprising :

(a) 3 D Conceptual Design System

The conceptual design system should comprise creative tools that allow shoe designers to sketch, trace or create new shoe designs, generating 3D data for presentation. The powerful suite of tools would enable the designers to produce the latest footwear designs quickly and easily by increasing their creativity by drawing the style lines they

want. It should be easy to use, help you simulate and offer to clients a multitude of increasingly original footwear models.

FEATURES

The Conceptual Design Software should be capable of:

- Importing existing and new last designs from existing last database
- Scanning lasts (3D)
- 3D last modification
- Models and last comparison
- Fast, flexible design straight into 3D
- Drawing style lines directly onto the last
- Digitise style lines from last picture or last silhouette drawing
- Flattening
- Creating and identifying individual panels with different materials and textures
- Visualise style lines on last and shell on the same window
- Incorporating labels and logos as 2D labels or 3D textures quickly and easily
- Automatically transferring designs between different lasts quickly and simply
- Providing Advanced material & texture libraries
- Textures input via scanner
- Units and heels 3D modelling directly from the last on the screen
- Patterns collection for virtual prototype creation
- Different shoe components archives (heels, soles, textures, ornaments, colours, etc.)
- Comprehensive rendering allowing sample designs to be evaluated on the screen
- Creation of 3D virtual prototype of the shoe
- Model transfer from last to last
- Art program for colour creation
- Advanced functions for macro commands creation
- VRML files for 3D visualisation on the internet
- VRML file import (soles, accessories, etc.)
- VRML file export for digital viewing on internet browser
- Integrated heel and standard sole design
- Transfer designs directly for advanced Pattern Engineering
- Free 3D viewer allows finished 3D designs to be communicated to clients worldwide at no additional cost
- Predisposed to data transfer to CAD-CAM systems for lasts, heels and soles, through IGES, STL, DXF 3D file formats

SOLE DESIGN and SOLE MOULD DATA OUTPUT

- The software should also be able to Design complex sole shapes and tread patterns and create data for mould manufacturing of the modelled soles.

- It should have a library for tread shapes and should help in the automatic generation of 2D engineering drawings from 3D models.
- It should be able to create detailed 2D technical drawings as well as rapid prototyping templates.
- **Automatic Scanning INPUT DEVICE for 3 D data capture – 1 No.**

Specifications for the Input Device for 3D Data Capture:

- Totally Automatic
- Density of Cloud Points should be definable
- Closeness of scanning should be controllable
- Colour Scan should be allowed
- Geometry Capture should be accurate
- Editing of 3D model should be possible
- Editing of Cross-sections should be possible
- Smoothing of 3D surface should be possible
- E data generation is essential
- Calibration procedure essential
- Scanning Volume: Dia: 180 mm and Height 320 mm (min)
- Accuracy: 0.1 mm
- Scanning technology: Laser/optical
- Scanning Speed: Plate rotation- 10 rpm (min.)
- Speed (head): 50mm/sec(min.)
- USB 2.0 Interface
- Output Formats: DXF, STL, IGES, AVI, ASCII, BMP

(b) 2 D PATTERN ENGINEERING

The 2D Pattern Engineering software should help you to quickly create patterns, grade and output for sample cutting, costing and manufacture by **simplifying** pattern operations. It should start from existing shoe standards, produce quality patterns, engineer then grade them. It should emulate complex manual procedures and allow the transfer of styles and production patterns from one standard to another, significantly reducing development time.

FEATURES

- Multi-point transformation, transform existing patterns onto new forms with Model transfer from shell to shell with self-adjustments

- Digitize shells or pieces (2D)
 - Line filtering and display functionality
 - Digitize style lines from shell
 - Patterns and Pieces engineering (texts, notches, stabs, markers, etc.)
 - Fully customisable shell-based grading, using arithmetic or geometric rules, with any number of sizes and fittings.
 - Special functions for boots and moccasin
 - Automatic boundary assessment and automatic assessment of parts
 - Advanced functions for macro commands creation for customized applications
 - Punches and ornaments creation
 - Ability to transfer data to management systems and integrate with the database
 - Communicate data to other CAD Systems i.e Data import and export functionality for IGES,PDF,TIF and DXF neutral file formats
 - Engineered patterns and parts to be viewed, printed, plotted and cut on any HP-GL/GP-GL compatible plotter/cutter
- **Input device for 2 D software - 3 Nos.**

Specifications for Input Device for 2D software:

- Size: Quote for both 20inch x 24 inch and also for 24 inch x 36 inch.
- Accuracy: ± 0.01 inch
- Resolution: upto 12000 lines per inch
- Corded/Cordless: give both options
- Baud Rate: upto 38400
- Data Rate: upto 200 coordinate pairs per second
- Cursor: 16 button/4 button: give options
- Emulations : CalComp 3400, GTCO T5A, Summagraphics Microgrid
- Operating Modes Point, line, run, track, incremental, prompt
- Power Requirements 5 Volts, DC, 100 mA current draw (USB)
- 9 Volts, DC, 200 mA current draw (with Power Supply)
- Output Formats 32 industry-standard formats

(c) 3 D LAST MODELLING AND GRADING

The software should be a precise, easy to use 3D footwear styling tool, incorporating an extremely accurate 3D flattening module. Styles should be created directly on the last, ready to flatten and engineer the patterns in 2D.

The modeling software should specifically meet the modern shoemaking needs by using simultaneous 3D/2D design and pattern engineering. Digital e-Lasts should be capable of being downloaded directly from the last makers and graded. 3D lasts are

to be translated into 2D using a comprehensive flattening algorithm. Designs are needed to be imported from 3D Conceptual design software or created directly on the 3D Last or 2D Shell. The styles are then to be fully engineered for production using powerful 3D/2D pattern and styling functions.

FEATURES

- Last data import and conversion for STL and IGES
- Digitise lasts (3D)/ shells or pieces (2D)
- AUTO DIGITISE (import of the e-last from last maker)
- LAST MODIFICATION (Custom Last Designing & Modification)
- Last ankle/leg extension
- Last surface area modification tool
- 3D style line creation directly on the last surface, with line and point editing tools
- Copy style lines from a 2D drawing using Image Tracing tools
- Digitise style lines from last picture or last silhouette drawing
- 3D flattening (shells and bottom) with customisable adjustments
- Patterns and Pieces engineering (texts, notches, stabs, markers, etc.)
- Net area and perimeter of pieces
- Advanced functions for lines modification
- Model transfer from last to last with self-adjustments
- Last and shell grading
- Advanced functions for co-ordinate grading
- Special functions for tubular moccasin with automatic flattening
- Special functions for boots
- Basic specification sheet
- Last sections templates for measure control
- Advanced functions for macro commands creation
- Interface for cutting and plotting systems via manual or automatic nesting
- Predisposed for data transfer to Consumption Calculation program and MIS systems
- Standard outputs for IGES, VRML, STL, DirectX, 3DM,
Input scanning device for 3D software

Specifications for the Input Device for 3D Data Capture:

- Totally Automatic
- Density of Cloud Points should be definable
- Closeness of scanning should be controllable
- Colour Scan should be allowed
- Geometry Capture should be accurate
- Editing of 3D model should be possible
- Editing of Cross-sections should be possible

- Smoothing of 3D surface should be possible
- E data generation is essential
- Calibration procedure essential
- Scanning Volume: Dia: 180 mm and Height 320 mm (min)
- Accuracy: 0.1 mm
- Scanning technology: Laser/optical
- Scanning Speed: Plate rotation- 10 rpm (min.)
- Speed (head): 50mm/sec(min.)
- USB 2.0 Interface
- Output Formats: DXF, STL, IGES, AVI, ASCII. BMP

(d) PRODUCT DATA MANAGEMENT

The PDM software is a suite of programs that manages the flow of information between local or remote production facilities. It takes control of the designing and manufacturing processes and achieves major improvements in production quality, cost and time.

The software should consist of the following modules:

<ul style="list-style-type: none"> • Base Module • Bill of Material • Cutting Specification • Stitching Specification • Making Specification • Materials & Components 	<ul style="list-style-type: none"> • Materials Consumption • Cutting Automation • Costing • Working Cycle • MIS interfaces • Catalogue
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II. CUSTOMISED FOOTWEAR SOFTWARE FOR ORTHOPAEDIC/THERAPEUTIC FOOTWEAR APPLICATIONS (ONE LICENSE)

The customised footwear software package analyses the dimensions and shapes of 3D foot Data and 3 D Lasts. In addition, Last Shapes can be sculpted and adjusted to a users requirement and exported to CNC milling machine. It captures the foot data and creates a foot envelope which through the software then models the last apt for that foot. The last is machined out and a footwear conforming to the exact dimensions of the foot is then fabricated.

FEATURES

- Last data import and conversion for STL and IGES
- Last ankle/leg extension
- Basic last surface area modification tool

- 3D style line creation directly on the last surface with line and point editing tools
- Interactive 2D/3D windows and views
- 3D-2D flattening, with customisable adjustments
- Design definitions for material thickness, padding and edge treatments.
- Standard outputs for IGES, VRML, STL

Input foot scanning device where scanned foot data is imported as an STL template and a new last is then created from the foot envelope. – 1 No.

Specifications of the Hardware and software for Foot Scanning Device:

- Accurate Capture of 3D Foot envelope
- Capable of capturing the foot of Length = 400mm, Width = 200 mm and Height = 250 mm (all min).
- Software for size estimation
- Data export of foot in VRML, DXF, STL and ASCII formats
- Accuracy: +/- 1 mm
- Scanning time: 30mm/sec.
- Software capable of converting foot scan data into an equivalent Last data
- Last modelling and last library creation
- Conversion to 2D data for pattern engineering
- E data generation for lasts
- Sculpting tools for editing last shapes and modification according to foot dimensions after input from foot scanner

III. FLAT BED CUTTER – 1 No.

The flat bed cutter should be capable of cutting cardboard and plastic boards and should have a vacuum hold-down arrangement. It should also be provided with a Tool head for cutting and plotting with tangentially controlled knife and pen module, for cutting and plotting cutting of paper and cardboard.

The cutter must adhere to the following specifications:

- Speed of cutting: Up to 950 mm/s
- Max. Cutting depth: 3 mm
- Material of cutting: All kinds of hard cardboard and plastic board, fibrous cardboard etc.
- Drawing tool: Multi-functional set including pen and knife
- Pens & knives: Ordinary signature pen, oil pen, ball pen / special tungsten steel knife

- Material Hold-down: Double Channel Vacuum absorption
- Mechanical resolution: 0.007mm
- Software resolution: 0.025mm
- Interface: Serial port and parallel port
- Buffer capacity: Min. 2 MB
- Instruction repertoire: HP-GL / GP-GL compatible format
- Control Panel: Liquid crystal panel and touch button.
- Transmitting material: Synchronous belt
- Working voltage: AC 220V ±10%, 50HZ
- Fuse: 2A
- Motor: Step motor, servo motor
- Max. Cutting Area : 1220mm × 920 mm

OPTIONS: Please also quote for the following cutters:

Punch Cutter for cutting of Footwear Patterns and Insoles – 1 No.

Specifications:

The Punch Cutter should be a “Stand-Alone” system operating independent of the CAD system. It should be able to cut patterns on thick insole sheets and hard-boards which can be used as marking patterns in the footwear industry.

The Punch Cutter system should have the following specifications:

- INDEPENDENT SOFTWARE

The Cutter system should have a software capable of importing Pattern Data in DXF format and handle the cutting job as well as the nesting optimization independent of the CAD system being used for pattern Engineering.

- MATERIALS for Cutting

The Cutter should handle the materials to be cut in single or multiple layers. The range of materials that can be used for cutting should include cardboard, insole board, fibreboard, various types of plastic materials and other rigid materials. The thickness of materials to be cut should be about 8mm to 10mm.

- MULTI-TOOL HEAD

The Cutter should have the option of multiple tools with both big as well as micro-punches available to cut even the smallest details. The tool change options should be fast and easy. A pen for writing text and for markings is also a must.

- CAD LINKAGE

The system should be able to facilitate the direct transfer of patterns from various CAD systems (in DXF or HPGL exchange format). The system should have flexibility for communication by means of data support through local area network (LAN) or internet.

TECHNICAL SPECIFICATIONS

Material width	800 mm
Material length	Unlimited
Thickness of Material to be cut	8 to 10 mm
Cutting head	Multi tool with Big and Micro-punches
Cutting speed	6600 mm/min
Power supply (Single-phase)	240 V - 50Hz

Dieless Cutting System for cutting of Leather and Synthetic Materials – 1 No.

Specifications:

The Cutting System should ably manage the flow of operations from piece nesting, nested piece cutting and cut piece removal.

The Cutting system should have the following specifications:

- CONTINUOUS NESTING

Operator should be able to nest without change of workplace

- CUTTING HEADS

The vendor should quote for both the options of **a)** Single Cutting Head as well as **b)** Two Cutting Heads.

The cutting heads should be fully rotatable for easy tool change between the Oscillating Knife, Marking Pen, Cutting Dies and the Punch rotater.

- Facility for REMOVAL of Cut Patterns with ease.

- WORK AREA

The Cutting Table should accommodate skins as wide as 1.5m and of unlimited length. The working area should be well lit and the pattern shapes projected onto the skins by the laser beam should be sharp, irrespective of the colour of the leather being used.

- SYNTHETIC MATERIALS

The cutting system should be able to handle synthetic materials in multi-layers and should be able to perform automatic nesting of pattern shapes. This operation of piece positioning should be easy and fast.

- CAD LINKAGE

The system should be able to facilitate the direct transfer of patterns from various CAD systems (in DXF or HPGL exchange format). The system should have flexibility for communication by means of data support through local area network (LAN) or internet.

TECHNICAL SPECIFICATIONS

Work area width	1500 mm
Work area length	Unlimited
Number of cutting heads	Please quote for both Single and Two Heads
Cutting speed	2 x 50 m/min
Punching frequency	2 x 300 holes/min
Resolution	0,025 mm
Power supply (three-phase+neutral)	400 V - 50Hz
Power consumption (max)	10 KW
Pneumatic supply	7 bar

The Committee recommended the following:

1. Vendor may quote part or all the items listed above (I (a) to (d), II and III). However, items marked I (a) to (d) will be procured from the single vendor.
2. **TRAINING** : AT CLRI-CHENNAI for all the items. Separate training program should be organized for Item I, II and III. At least three personnel will attend each program. Program duration should be at least for five working days.
3. **LICENSE**: Permanent License for all software to be provided. Free updates from the date of installation for a period of three years without annual renewal fee for the software.
4. **WARRANTY**: A 3 year comprehensive warranty for the hardware and software.

The committee recommended the following criteria and their respective weightages which could be used to evaluate the Technical bid:

Sl. No.	CRITERIA	WEIGHTAGE (%)
1.	Meeting Specifications prescribed in the Indent	45
2.	Number of Installations in India	10
3.	Service Backup with qualified personnel	15
4.	Training Details – both H/W and S/W	5
5.	Software License offer	10
6.	3 year Warranty and offer of Spares	5
7.	Software version updates	5
8.	Manuals & Documentation	5
		100

The threshold for qualification of the bid into the next level of commercial bid is to be fixed at 80 marks.

The committee also recommends that the EMD be retained at Rs. 1,50,000/- inspite of increase in the estimated cost due to addition of Dieless and Punch cutters.

Dr BN Das
Member

Shri Gautham G
Member

Shri K Krishnaraj
Member

Dr B Chandrasekaran
Chairman of the Committee

Shri N Govindarajan
Indentor and Convenor of Technical Committee