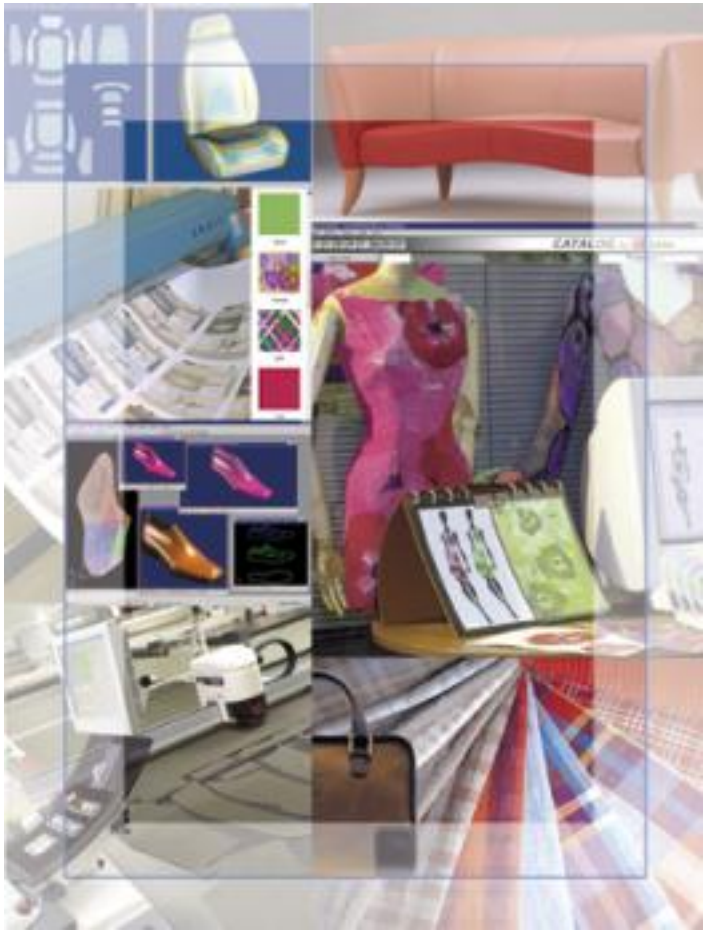


Success through Mass-customization in the apparel industry

Author: K. Schiller
Projects Mass-customization

Size survey - Measurement of a population to review the size system and obtain new size charts

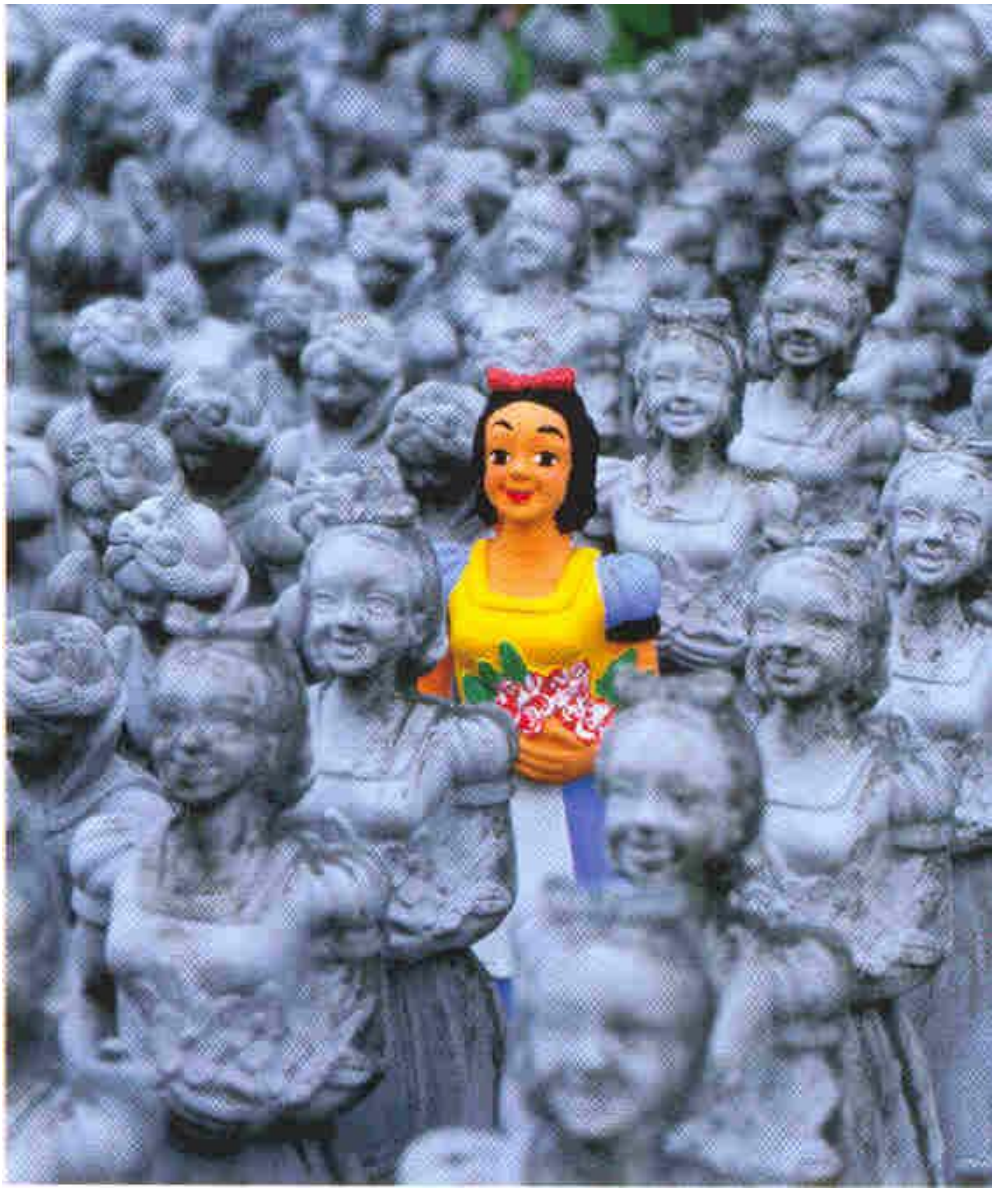
Why do we need to get new body measures?

- Every industry in relation with the human body requires statistics about the human body morphology: apparel, furniture, workstations & ergonomics,...
- Because consumer expectations are changing
  - **77,9% Good Fit**
  - **39,1% Quality**
  - **37,1% Personalization**
- Competitive advantages
- The population is changing
  - **XXL phenomena**
- Miss-fit problems cost a lot :
  - **9.7 billions € per year in Germany, source Zitex**
  - **28 billions $ per year in USA, source Store Online**

Fitting - Customized garment based on the consumer morphology

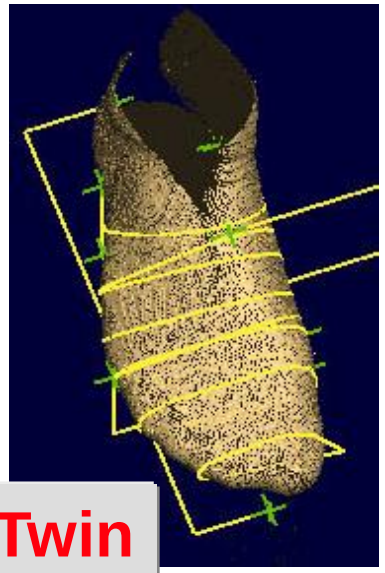
Fitting - Customized garment based on the consumer morphology

Individuality – configuration of cloth (fabrics, color, modules,..)



Size fit – for retailors and army (search for the best fitting size)

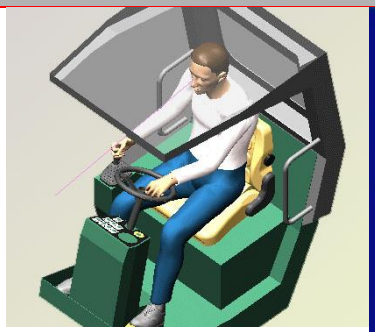
3D BODY SCANNER: A REVOLUTIONARY TECHNOLOGY

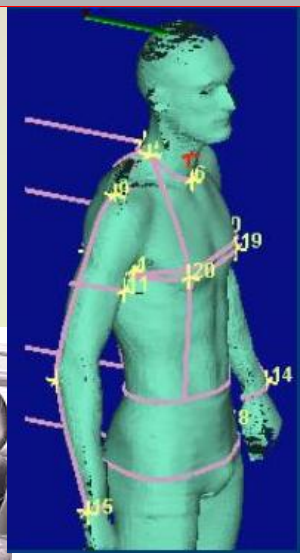


Virtual Double Twin

Size	Body Height	Chest Girth	Waist Girth	Bottom Girth	Jacket Length	Arm Length	Waist Band Girth	Inseam
44	168	88	80	96	74,5	59	76	76
46	171	92	84	100	76	60,5	80	78
48	174	96	88	104	77,5	62	84	80
50	177	100	92	108	79	63,5	88	81
52	180	104	96	112	80,5	65	92	83
54	182	108	100	116	82	66,5	96	84
56	184	112	106	120	83,5	68	102	85
58	186	116	110	124	84,5	69	106	86
60	187	120	116	128	85,5	70	112	87
62	188	124	122	132	86,5	71	118	88
64	189	128	126	136	87,5	72	122	89
66	190	132	130	140	88	72,5	126	89
68	191	136	134	144	88,5	73	130	89

How to prepare a protocol of scan?





- Definition of the expected measurements list
  - **Depends of the sectors associated to the campaign**
    - Apparel, automotive, Ergonomics…
  - **Do we need several postures (sitting posture)?**

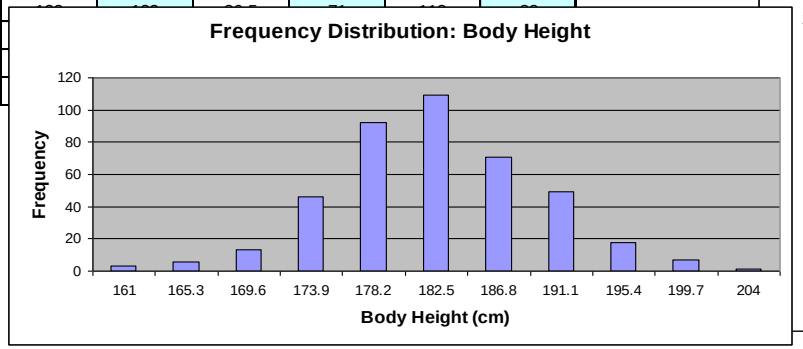
- Process of scanning
  - **How to measure the stature (heigh gauge or hair caps)?**
  - **How to correct the feet spread?**
  - **Which measurements have to be re-positionned during the scan?**
  - **Which measurements are obtained automatically (from the 97 existing)?**
  - **Which measurements are obtained interactively?**
  - **Which measurements are obtained manualy? (foot and head measurement)**

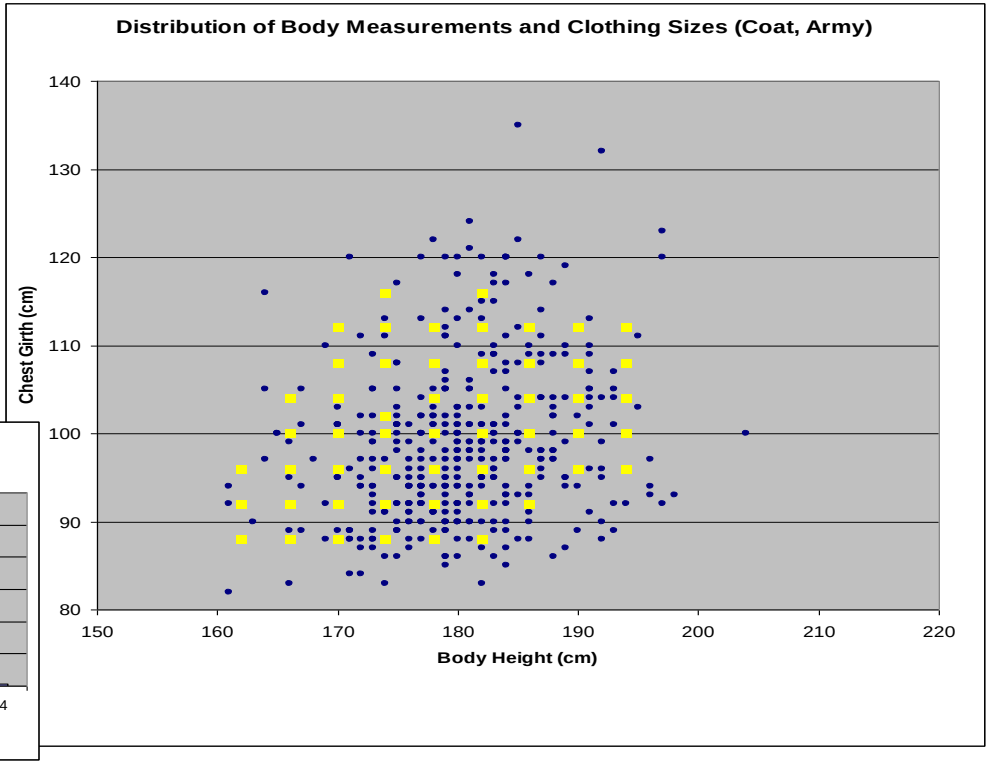
- With these figures we know how long time do we need for 1 person

How to prepare a protocol of scan?

- Definition of the back office process
  - **How to consolidate the results of the scan session?**
  - **How are the data exchanged (CD, network,…)?**
  - **Excel file or Database?**

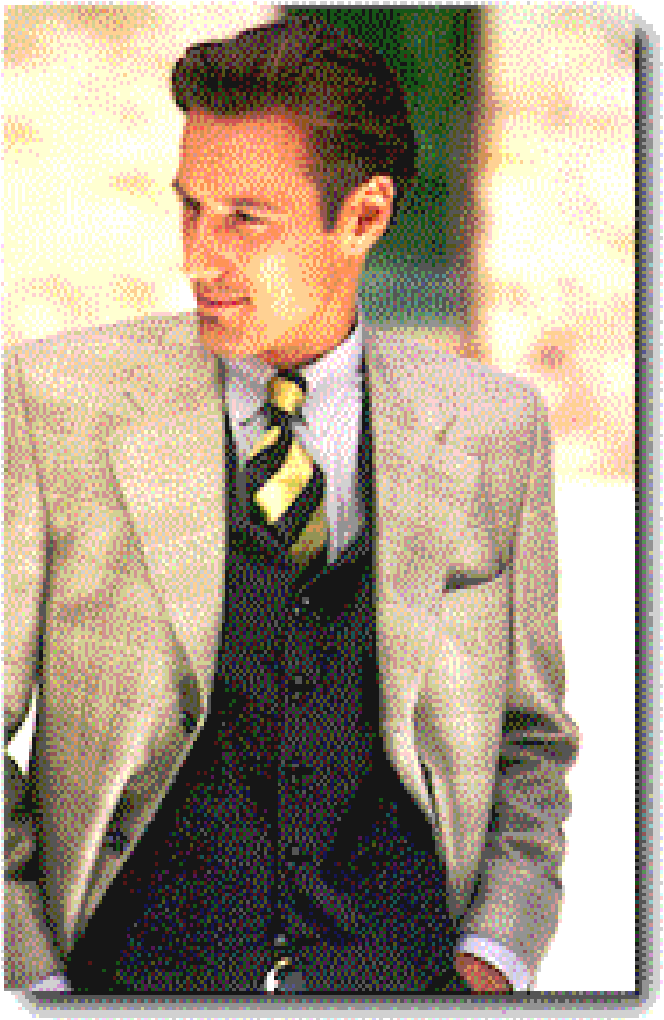
Size	Body Height	Chest Girth	Waist Girth	Bottom Girth	Jacket Length	Arm Length	Waist Band Girth	Inseam
44	168	88	80	96	74,5	59	76	76
46	171	92	84	100	76	60,5	80	78
48	174	96	88	104	77,5	62	84	80
50	177	100	92	108	79	63,5	88	81
52	180	104	96	112	80,5	65	92	83
54	182	108	100	116	82	66,5	96	84
56	184	112	106	120	83,5	68	102	85
58	186	116	110	124	84,5	69	106	86
60	187	120	116	128	85,5	70	112	87
62	188	124						
64	189	128						
66	190	132						
68	191	136						





MASS-CUSTOMIZATION / MADE TO MEASURE
Retail & Manufacturing

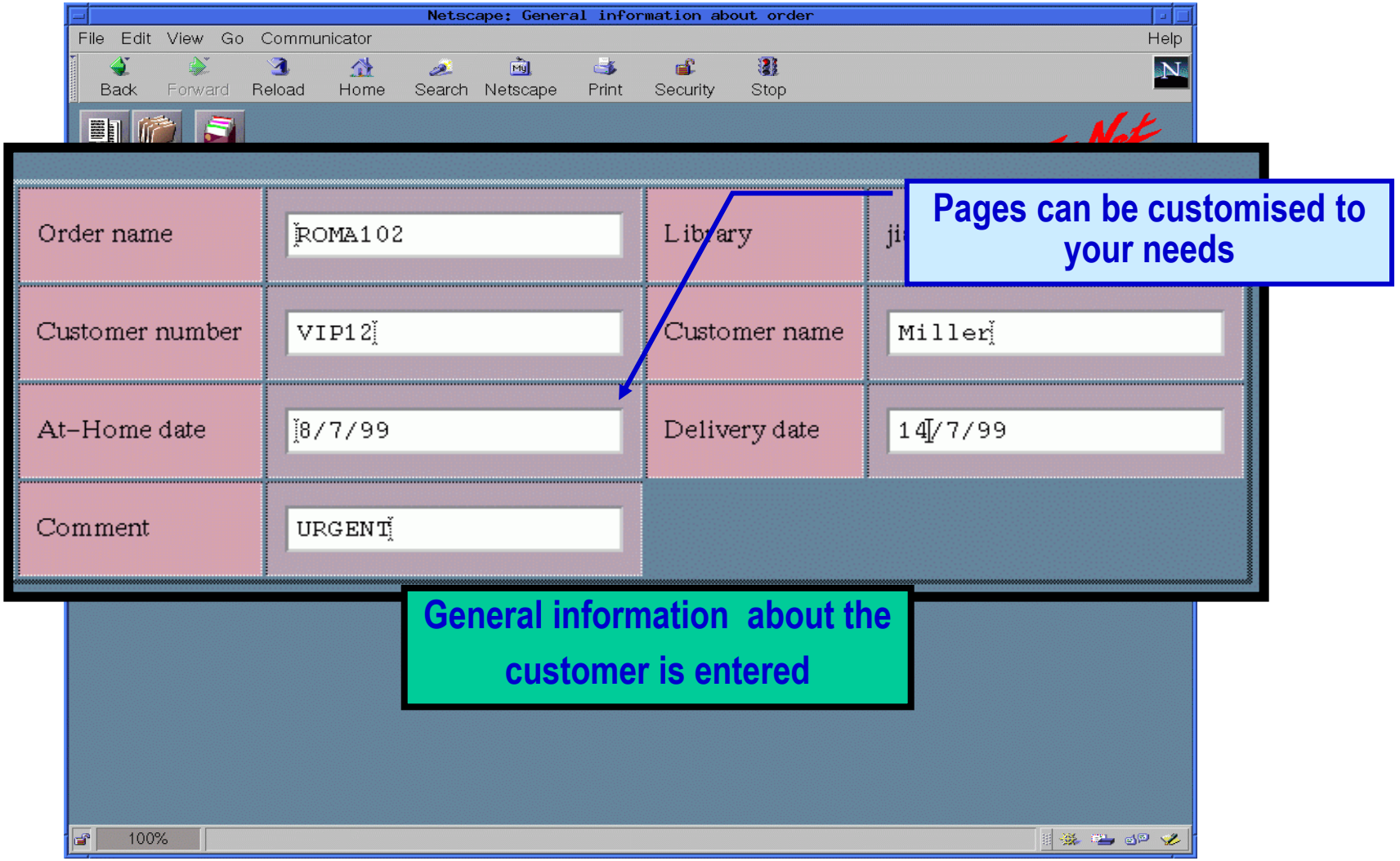
- **In the boutique**
  - 3D scanner
  - AutoMeasure software
  - Fitnet Store, to determine the consumer order (style, fabric, accessories, components, measurements)
- **On line manufacturing**
  - Fitnet Server, to apply alterations
  - Pattern/marker making
  - Single ply cutter



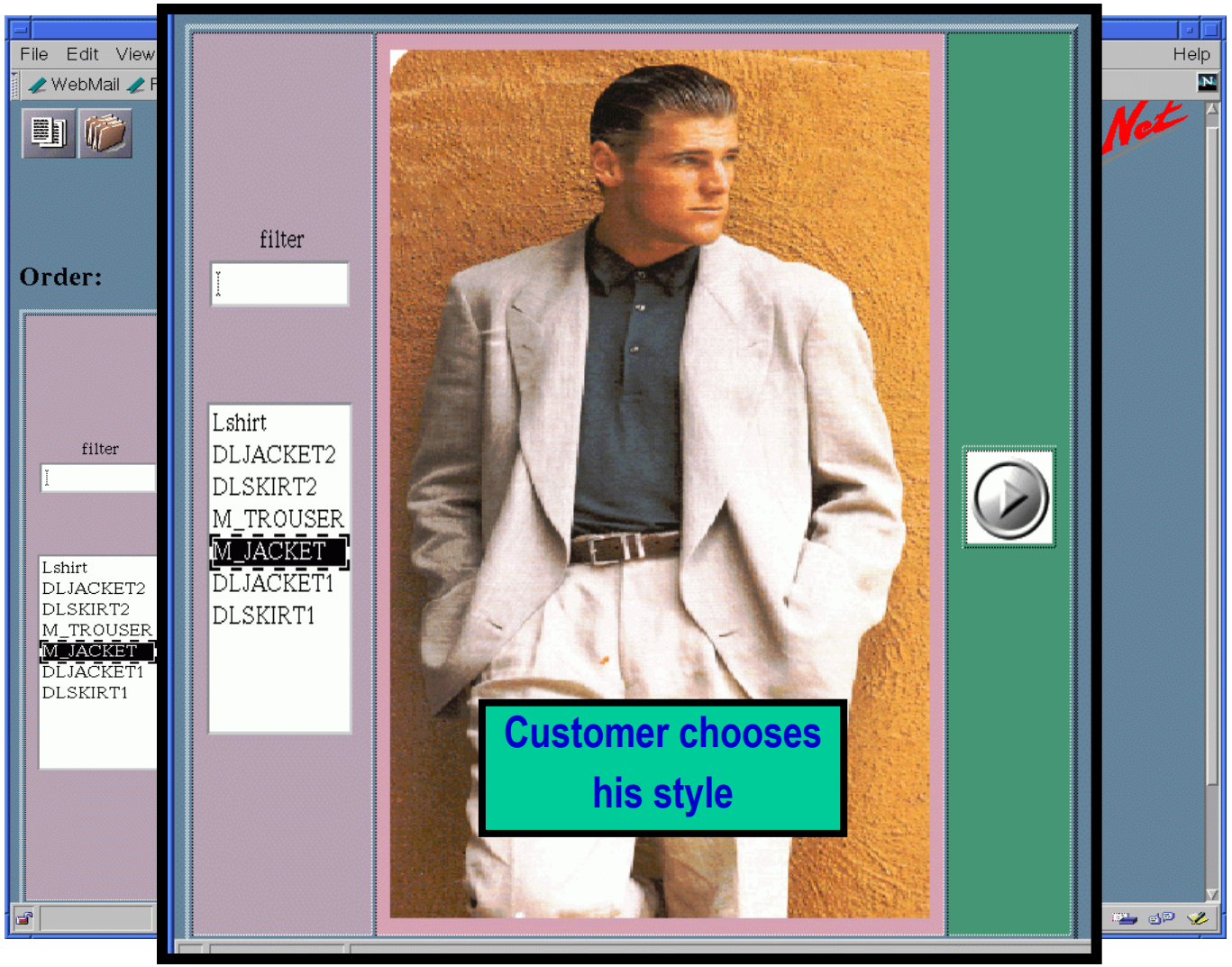
FitNet

How does it process in the retail store ?

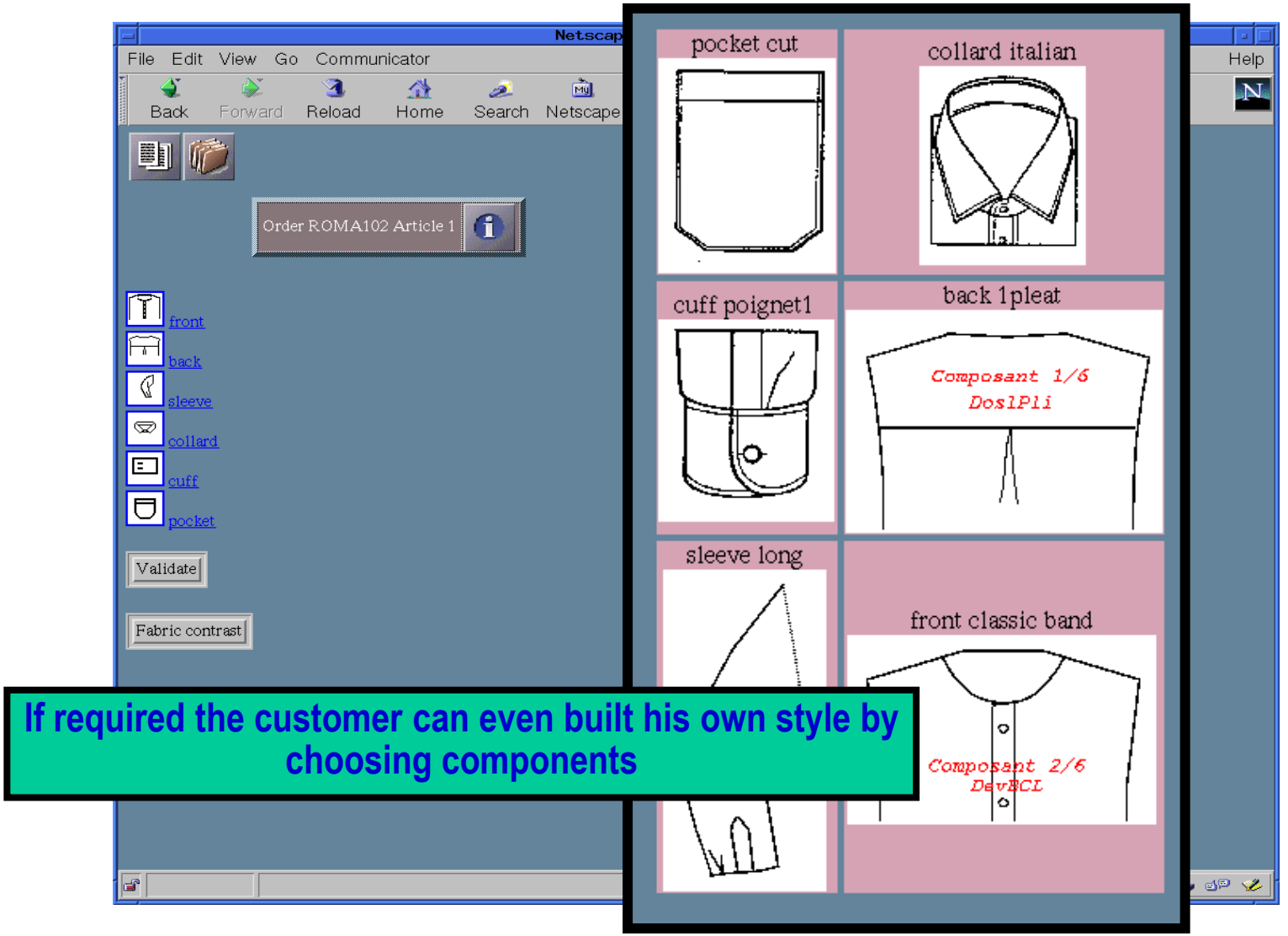
Customer data entry



Style selection

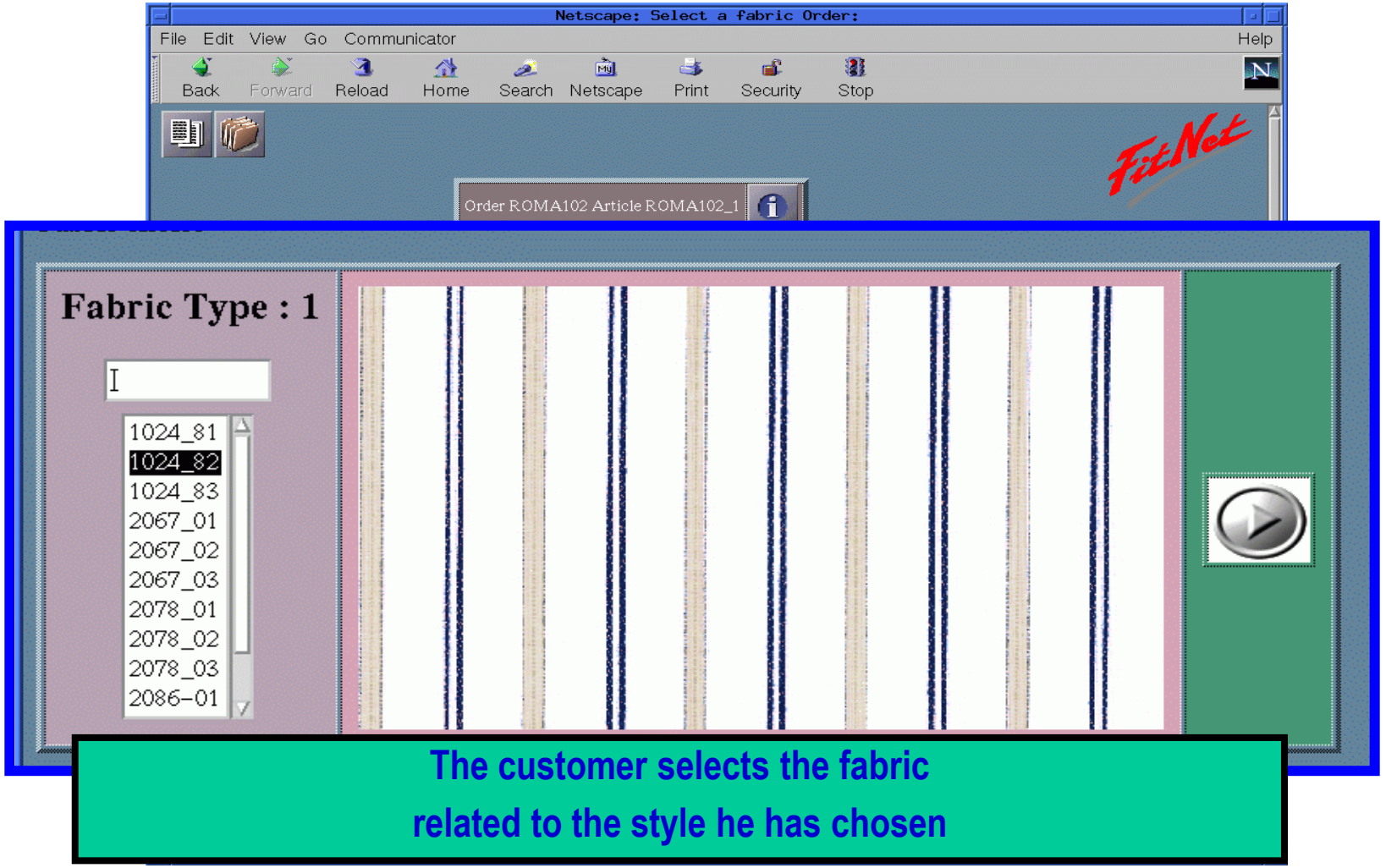


… or co-design a style with existing pre-defined components

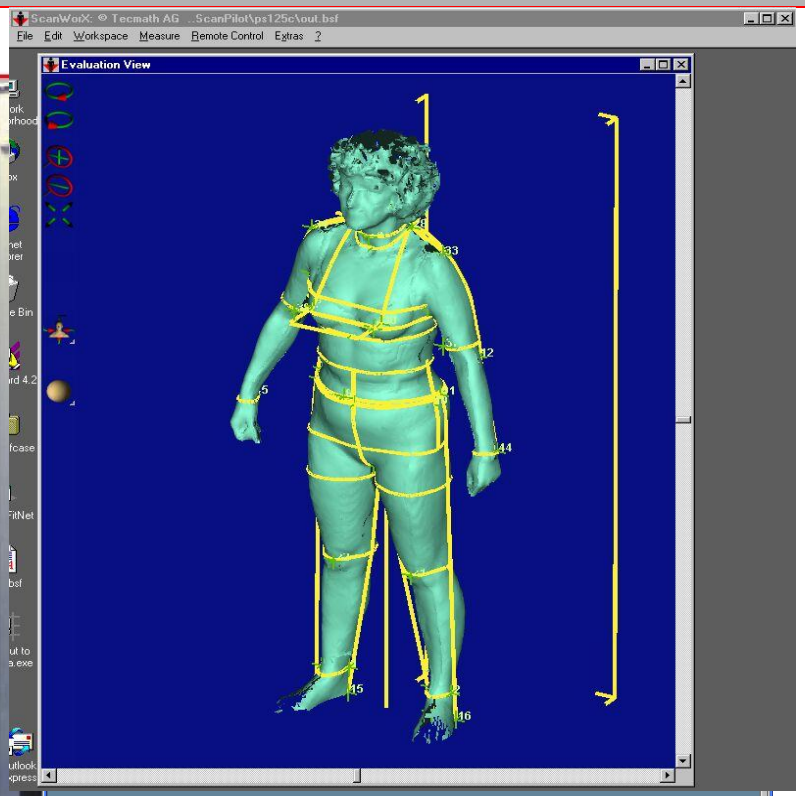


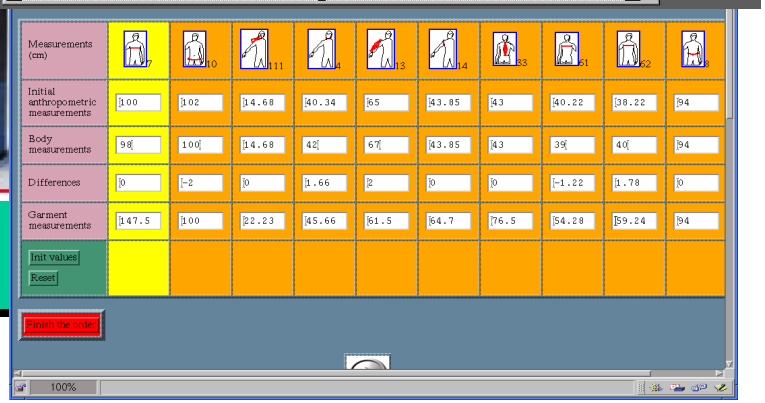
If required the customer can even built his own style by choosing components

Fabric choice



Taking customer measurements

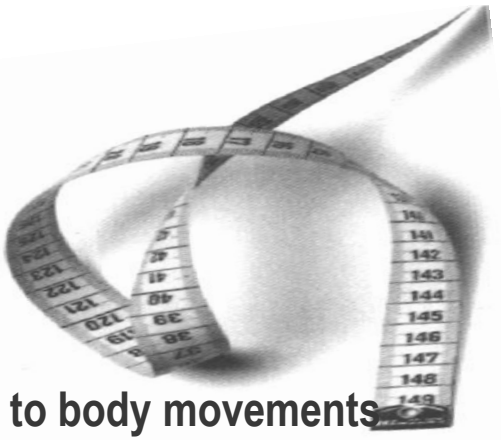




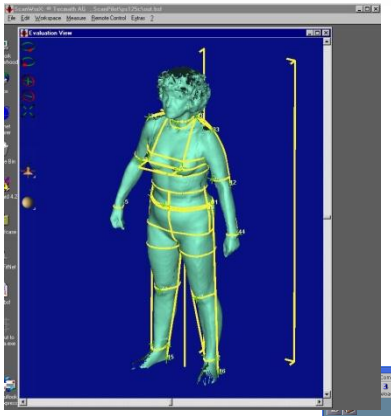
Measurements are entered by hand or from a 3D Bodyscanner

ADVANTAGES OF THE 3D BODYSCANNER

- Better than a manual measurement (fast, accurate and reliable)
  - **Without any contact**
  - **Accuracy:**
    - Manual: from 2 to 10 cm
    - 3D Scanner: from 0,2 to 2 cm
  - **3D laser triangulation technology is less sensitive to light effects and to body movements**



- The 3D virtual twin can be used without the original !!
  - **To control or to extract new measures**
  - **To control the posture**



- The measurement analysis can be managed off-line

- The postions and the definitions of the measures are stored with the 3D virtual twin

Garment measurements calculation

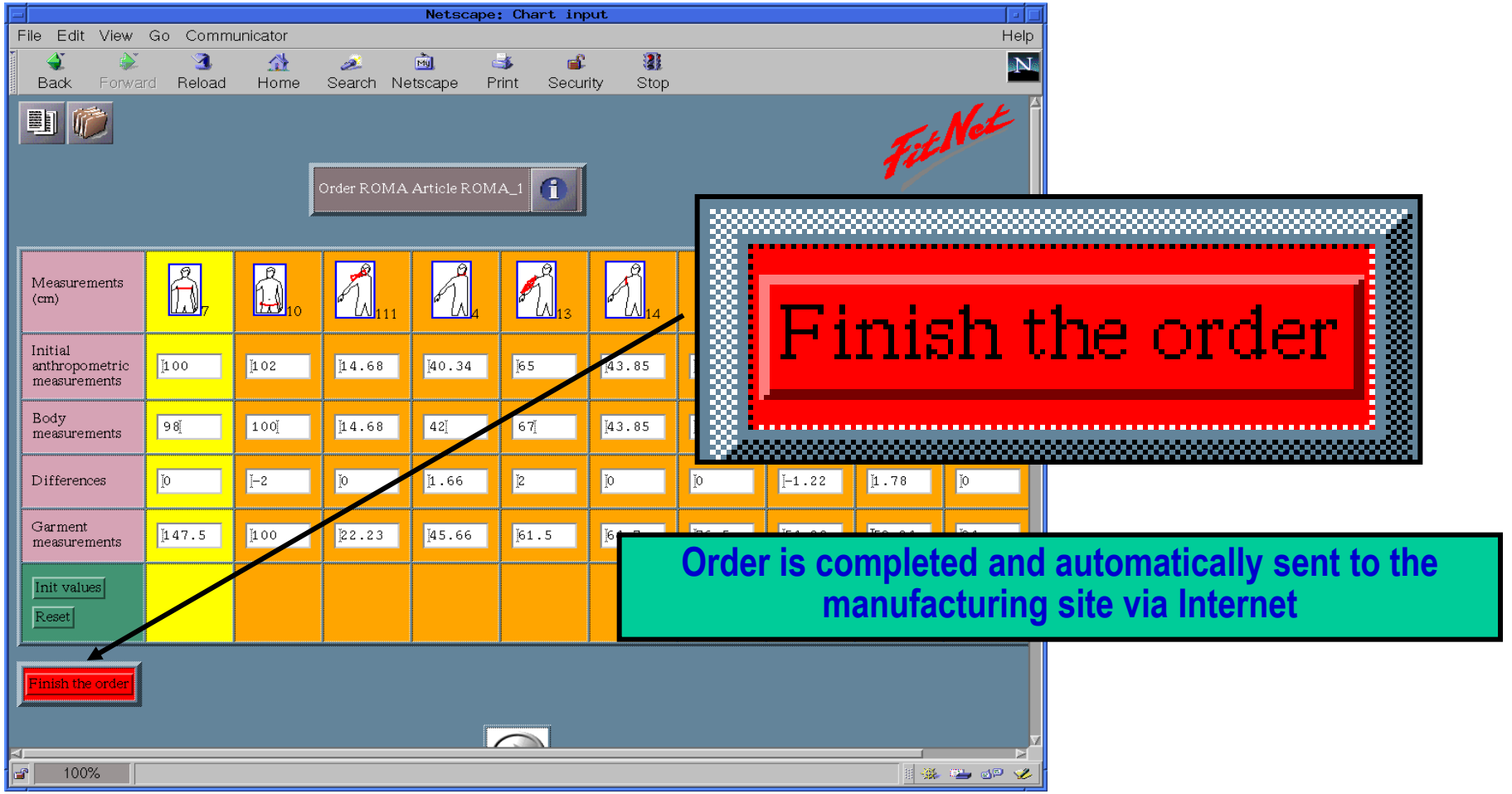
With 1 measurement the system calculates automatically the reference standard size of the customer

Measurements (cm)	7
Initial anthropometric measurements	100
Body measurements	98
Differences	0
Garment measurements	147.5
Init values / Reset	

4	13	14	33
40.34	65	43.85	43
42	67	43.85	43
1.66	2	0	0
45.66	61.5	64.7	76.5

All associated measurements are displayed and modified according to the customer specifications

… and then, the order is completed



FitNet

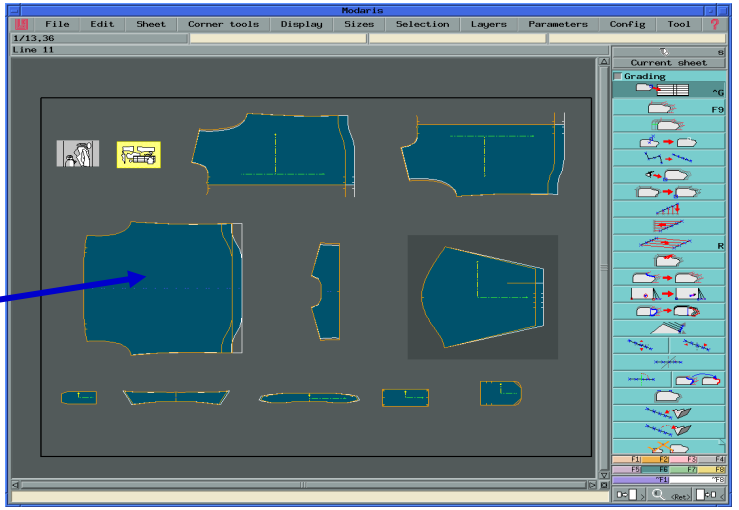
How do we process
in the manufacturing place ?

The order is processed

Order received from the retail store via Internet and processed

alteration	valeur
M/MB/LONGUEUR_MANCHE_LONGUE.ALV	40
M/MB/CARRURE_DEVANT.ALV	-10
M/MB/LONGUE	
./M/MB/ENCOL	
M/MB/CARRUE	

Styles automatically created from components and altered



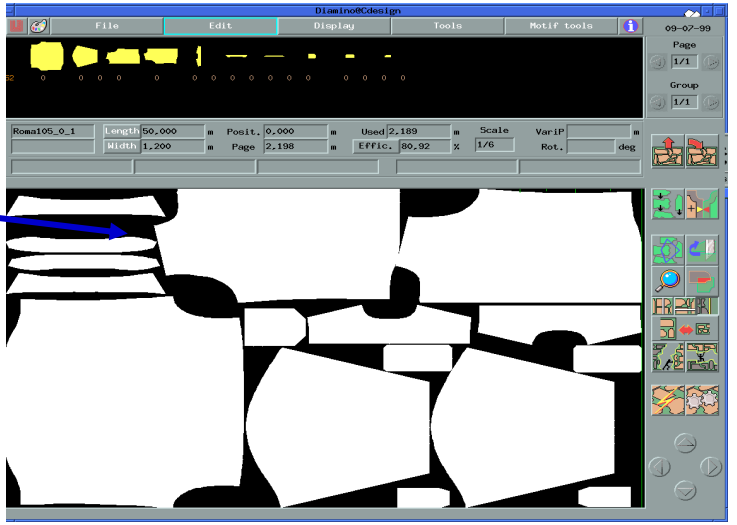
- Model generation : Roma105_1.md1

Marker

- Fabric treatment : : 1024_82
  Marker is realized

Marker	
Roma105_	

Markers automatically laid

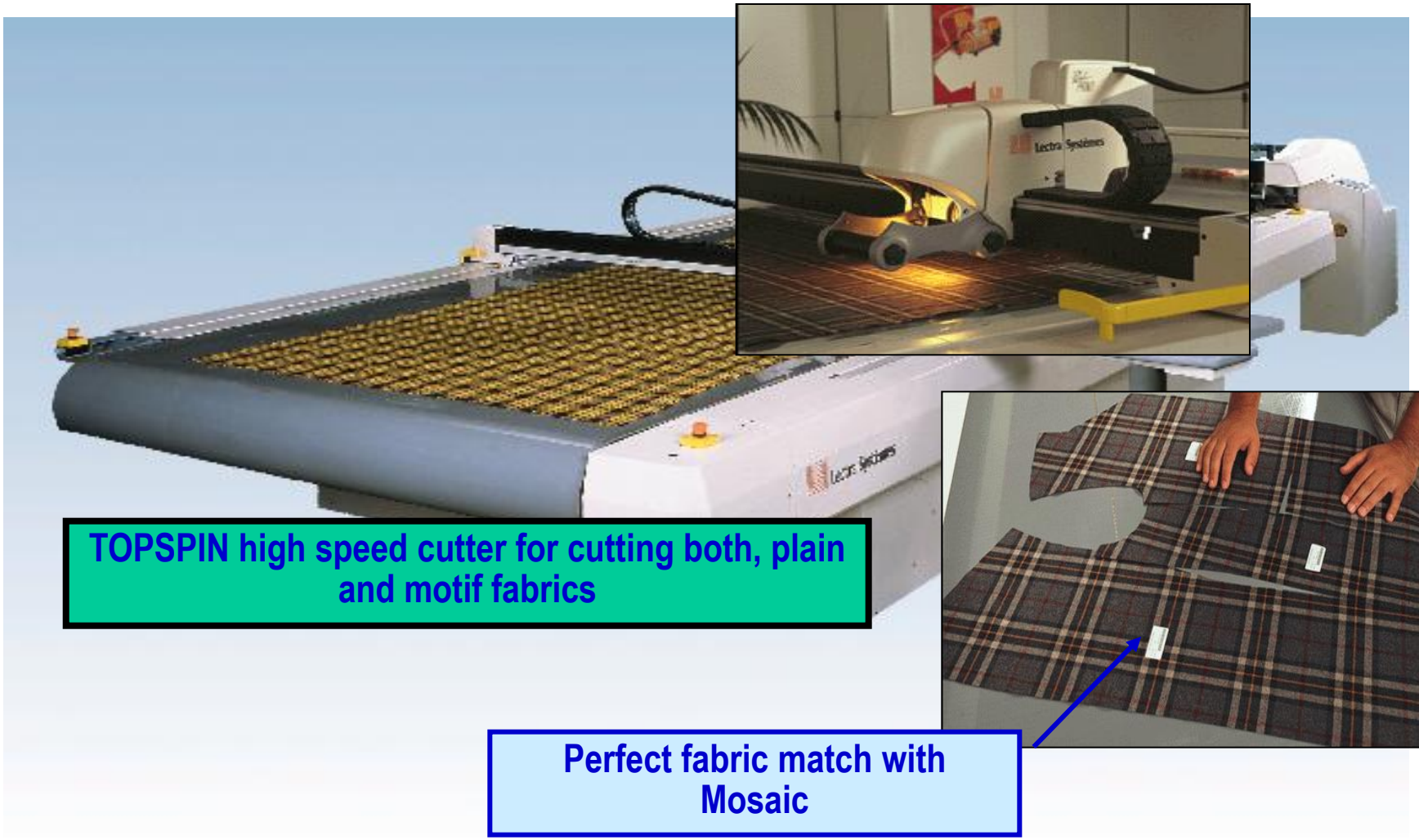


- Fabric treatment : : 2067_03
  Marker is realized

Marker	Length	Effic.	Try No.(Best try)	Max. time(min	Effic.
Roma105_1_2	0,238	13,28%	3 (1)	0,00	100

Close

and the garment is cut single ply



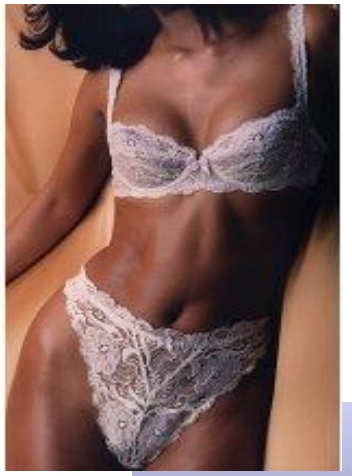
TOPSPIN high speed cutter for cutting both, plain and motif fabrics

Perfect fabric match with Mosaic

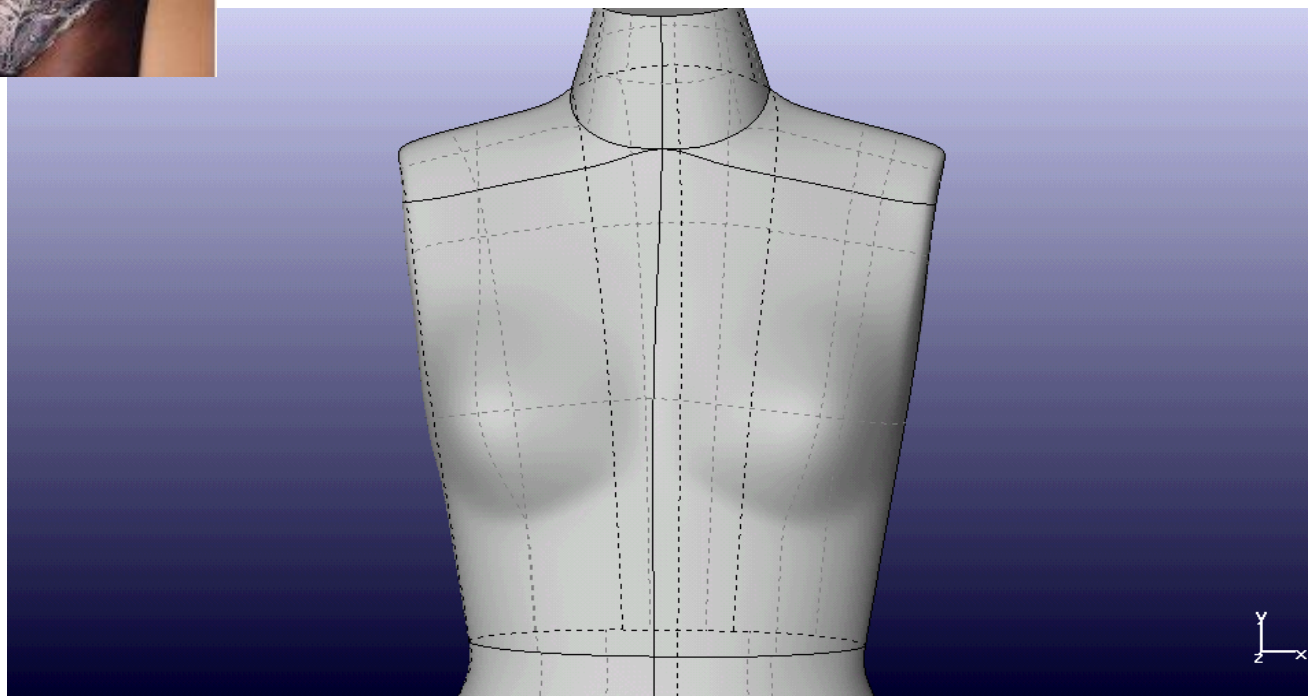
They have implemented the FITNET concept by Lectra

Custom Shop, Ike Behar, Martin Greenfield (USA), Corneliani (Italy), Bule (Belgium),Vila Romana (Brazil), Jack Victor (Canada), Korn, Molinel, Gauthier, Zins (France) Dolzer, Kuhn, Odermark, Van Laack, Windsor, Wilvorst (Germany), C&C Rooms , Rimms, Coco Nubuoca, Chugoku Sangyo,Nakaju Hihuju Kogyo, Asahisho Seni, Alta Moda, (Japan), Fairway, Camaro (Austria), Amma, Diniz & Cruz (Portugal), Symor Linea, Isabel Sanchis, Aracil, Rams (Spain), Jermyn St Shirtmakers, Multifabs Survival (UK),...

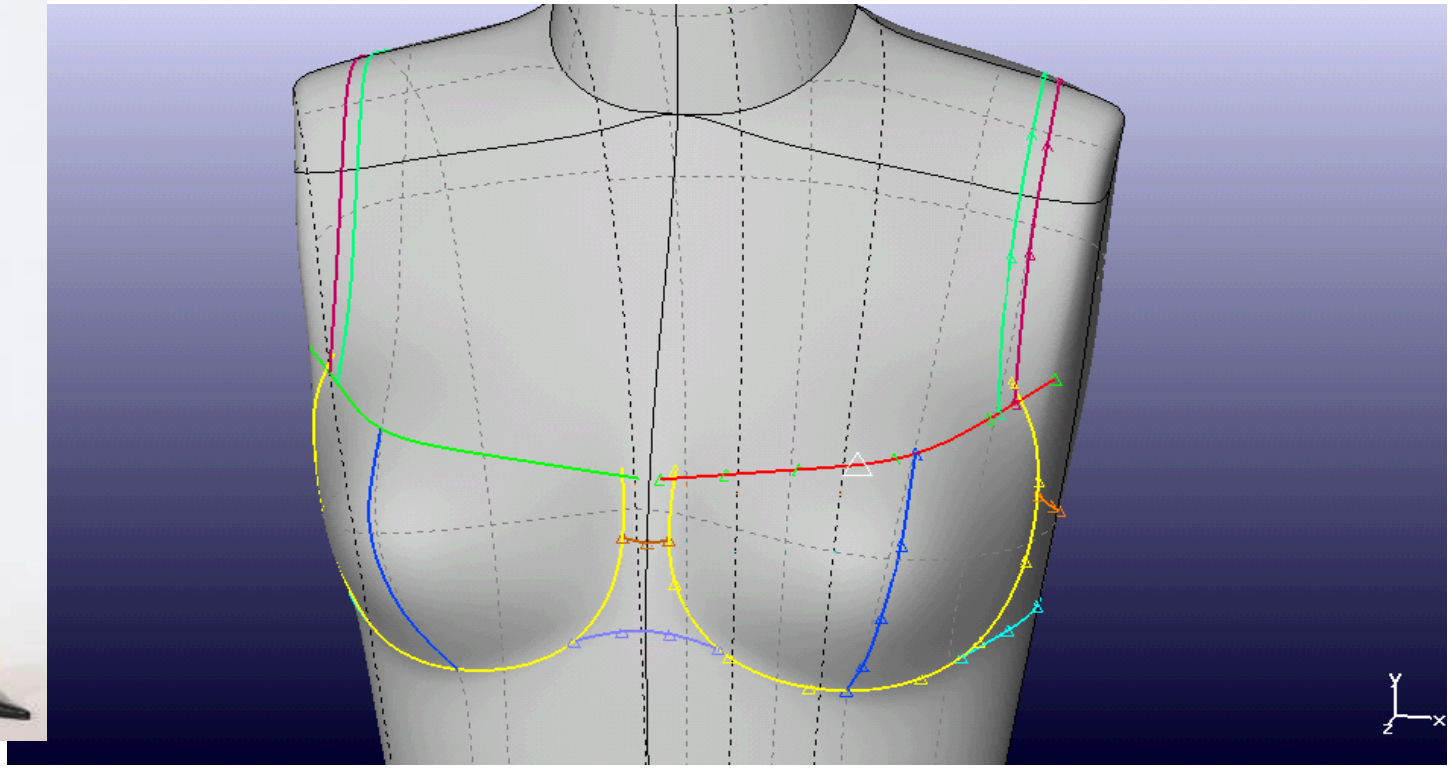
3D DESIGN: SELECT A SHAPE…



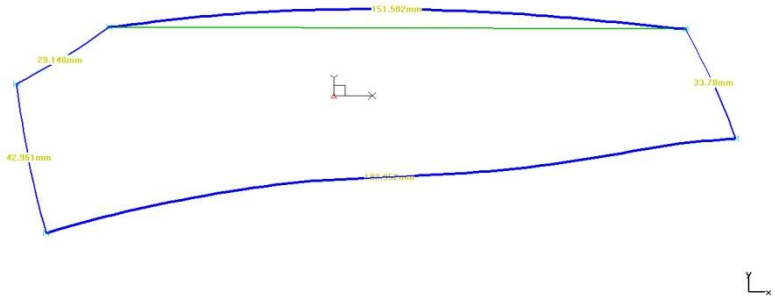
…AND CREATE YOUR LINES

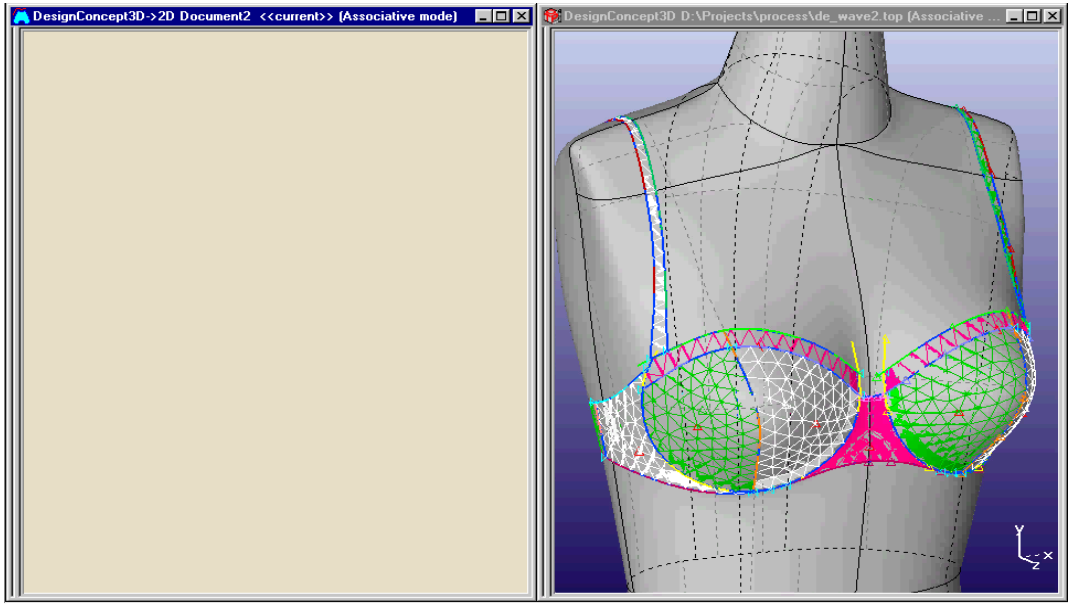


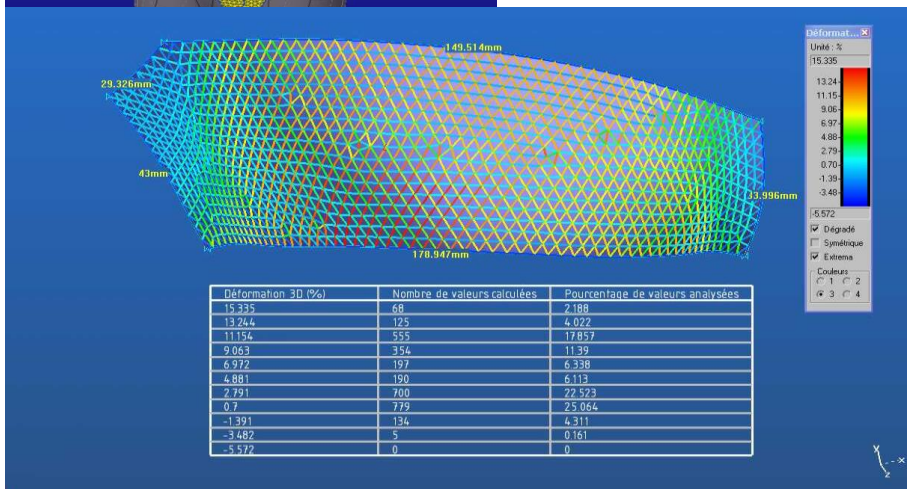
3D DESIGN: MESH YOUR MODEL



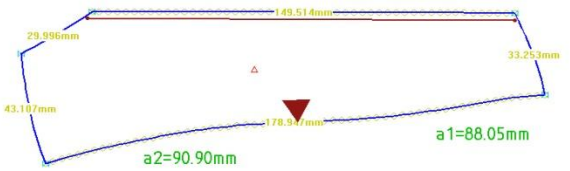
3D DESIGN: FLATTENING



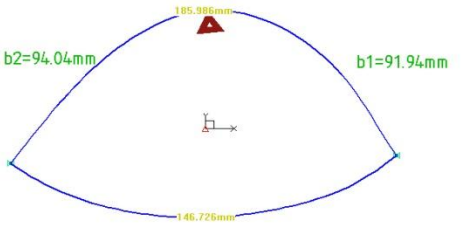




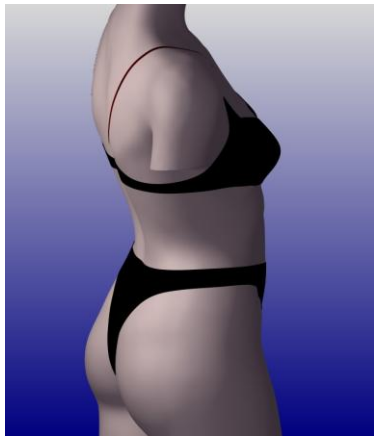
Déformation 3D (%)	Nombre de valeurs calculées	Pourcentage de valeurs analysées
15.335	68	2.188
13.244	125	4.022
11.154	555	17.857
9.063	354	11.39
6.972	197	6.338
4.881	190	6.113
2.791	700	22.523
0.7	779	25.064
-1.391	134	4.311
-3.482	5	0.161
-5.572	0	0

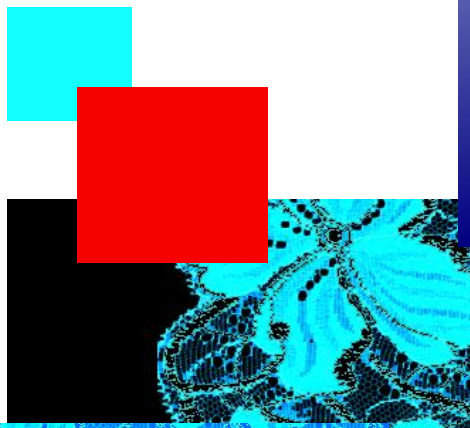


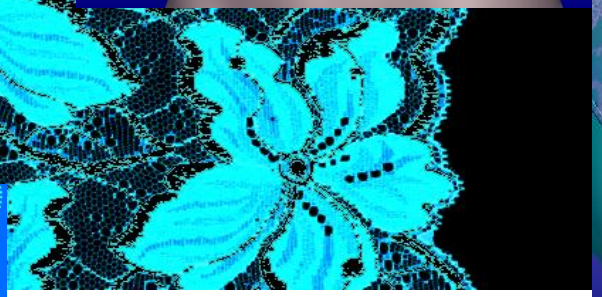
?colonne 1?	?colonne 2?
abs(a1-b1)	3.9mm
abs(a2-b2)	3.14mm



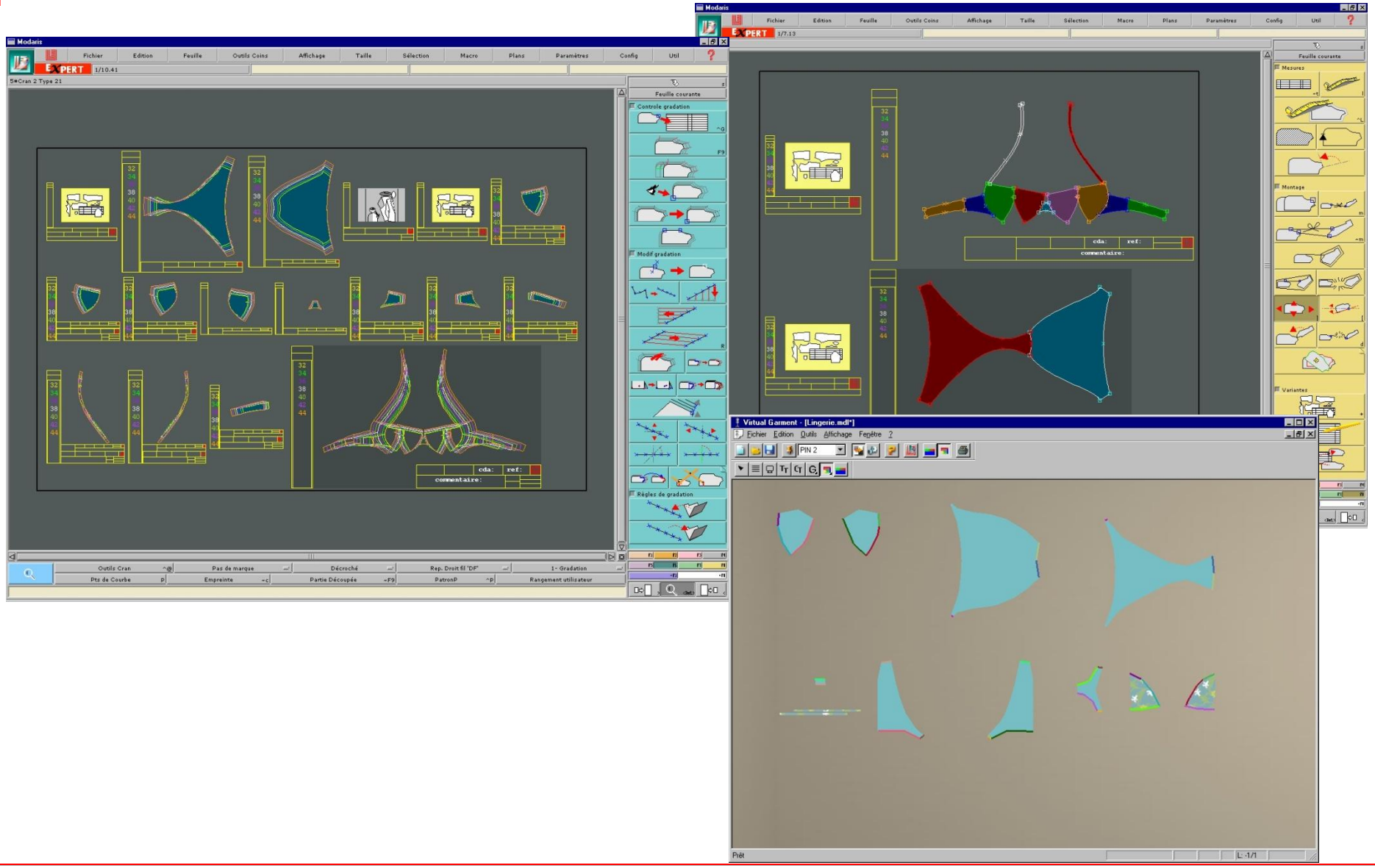
3D DESIGN: RENDERING





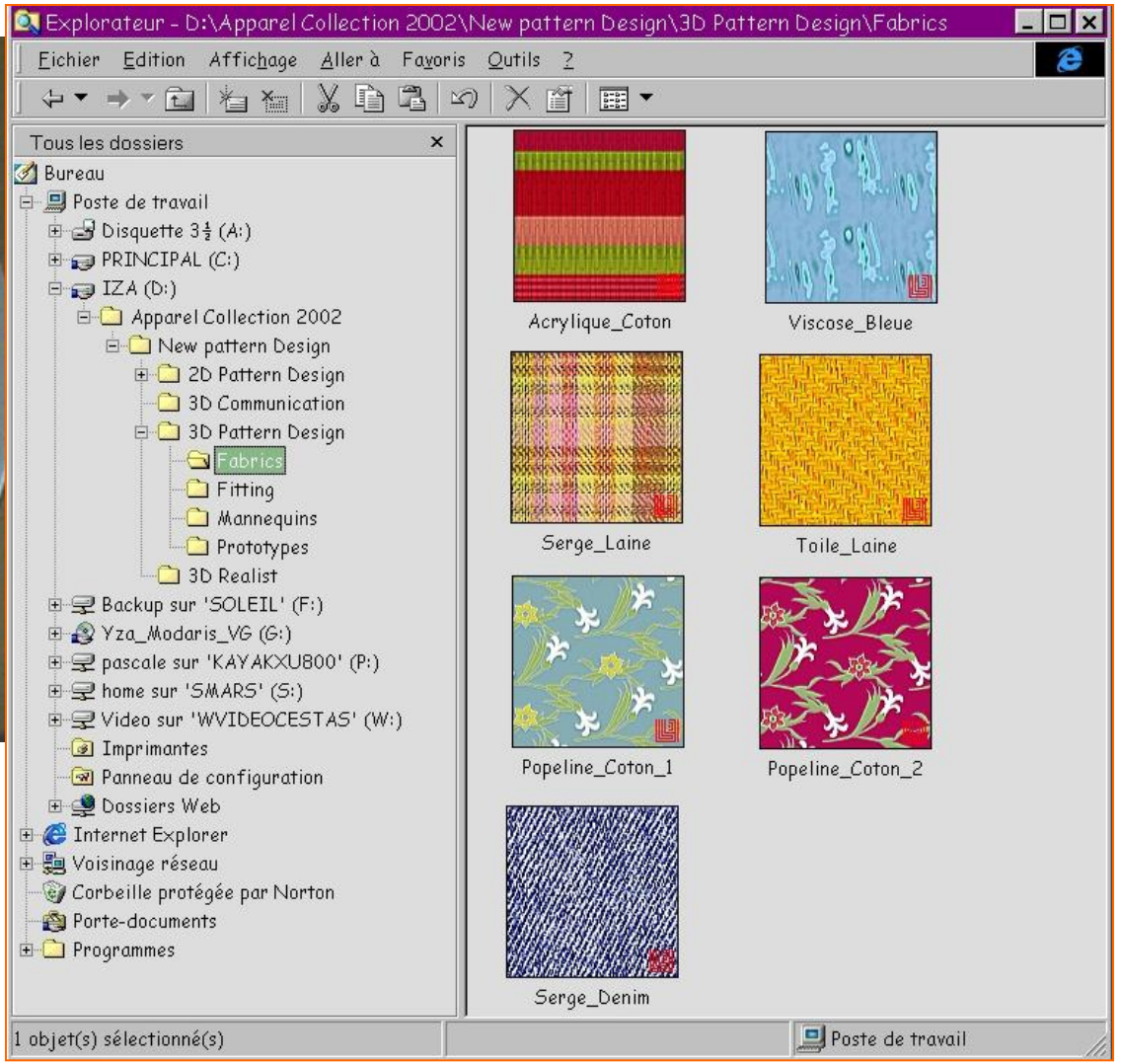


2D patterns and garment assembly data

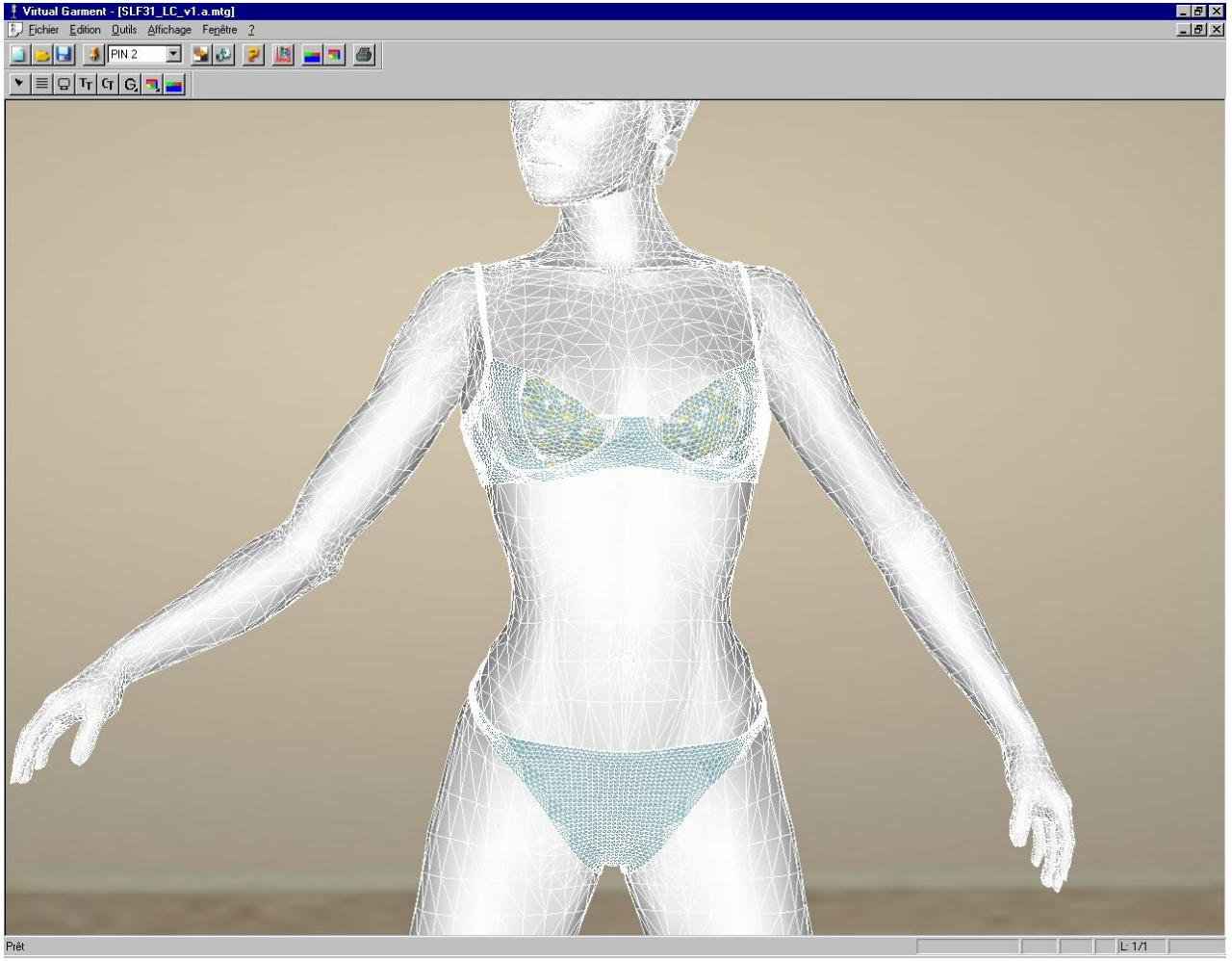


3D Mannequins

Virtual Fabrics database



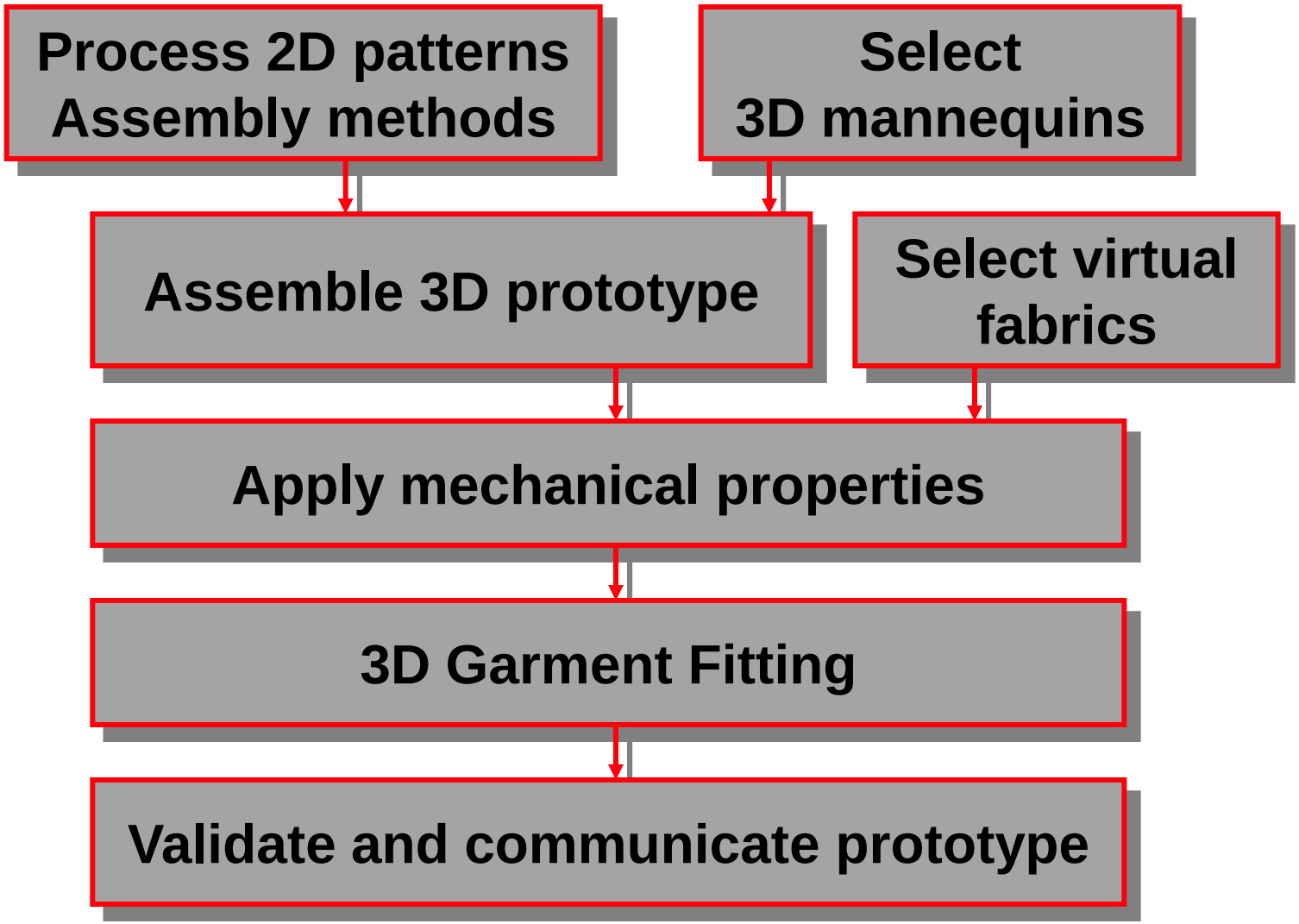
3D Garment is reconstructed



Fitting Assessment

Collection Communication

3D FITTING


Process 2D patterns
Assembly methods
Select
3D mannequins
Assemble 3D prototype
Select virtual
fabrics
Apply mechanical properties
3D Garment Fitting
Validate and communicate prototype

Thank you for your attention

For further questions please contact:

Karin Schiller

www.k.schiller@lectra.com

www.lectra.com