

FAnI Days / Workshop CTPig Clas

National views: Denmark and Sweden

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Contents:

- ☐ The "new" DMRI
- ☐ Learning from geometric measurements
- ☐ Some new results
- ☐ Final remarks

DMRI – a subsidiary of Danish Technological Institute

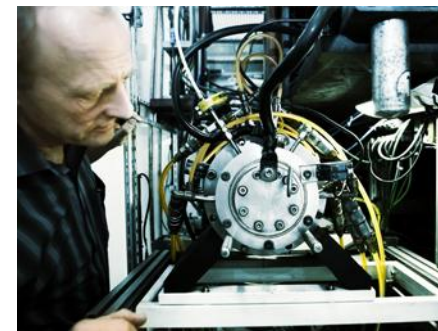
STATUS

An independent, non-profit institution

Approved as a technological service institute by the
Danish Ministry of Science, Technology and Innovation.

OBJECTIVE

The objective of the Danish Technological Institute is to address the needs
of the industrial sector and society as a whole through the development and
dissemination of technological innovation.



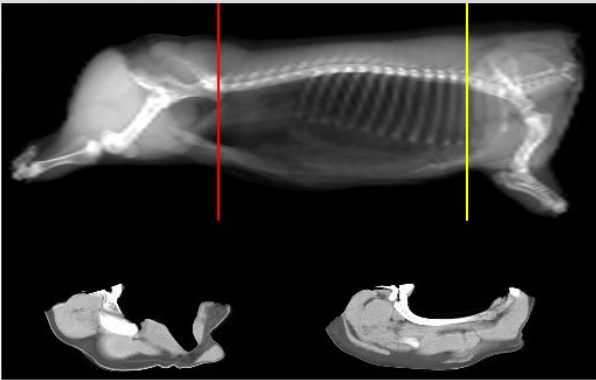
DMRI as technological service provider offer services within the use of (“macro”) CT scanner:

- ❑ *Calibration of online classification equipment, ex. Norway (2009) and Sweden (2010)*
- ❑ *Virtual cutting (individual and population (sample))*

Menu

Projects
Dataset
Upload
Cutting

Logged in as mah
Log out



0 mm

0 mm

Apply

Export

Cutting Yield

Current Dataset: sample 01

Primal	Average	Std.
Leg	0.2558756	0.0091057
Middle	0.4442429	0.0178638
Fore-end	0.2998815	0.0136800

© Danish Meat Research Institute 2009

Scannerborg

DMRI
Danish Meat Research Institute









Acquired in 2004
5 PhD projects
>> 200.000 images
3 species

Learning

Member of new Danish innovation network

Centre for Industrial Application of CT scanning (CIA-CT)



**Project
Presentation**

Focus on micro CT



- Objectives
- Partners
- Network
- Work plan

Project duration: 4 years (1st Sep. 2009 – 31st A

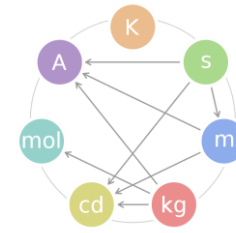
CT-scanners

- GE Phoenix Nanotom
- 180 KV Nanofocus tube
- Sample capacity: Ø150x100 mm (max 1 Kg)
- August 2008

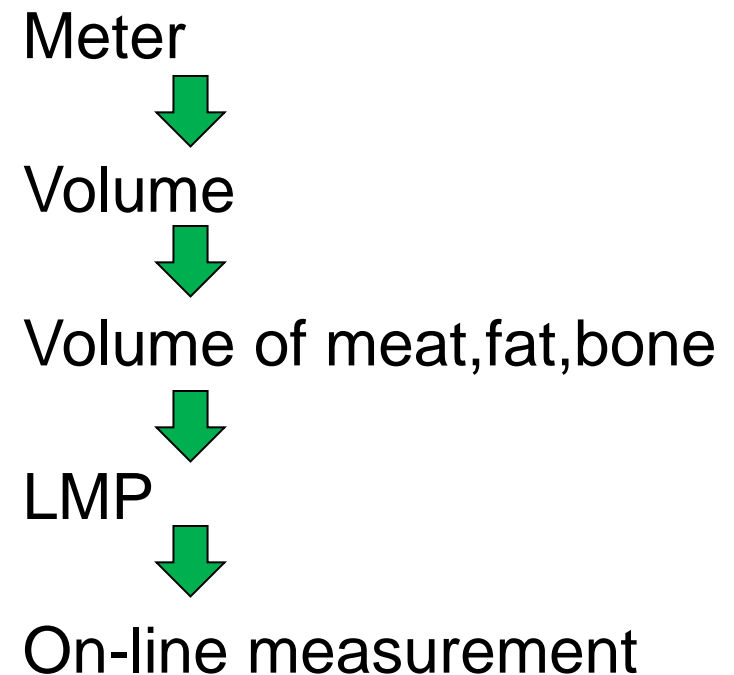
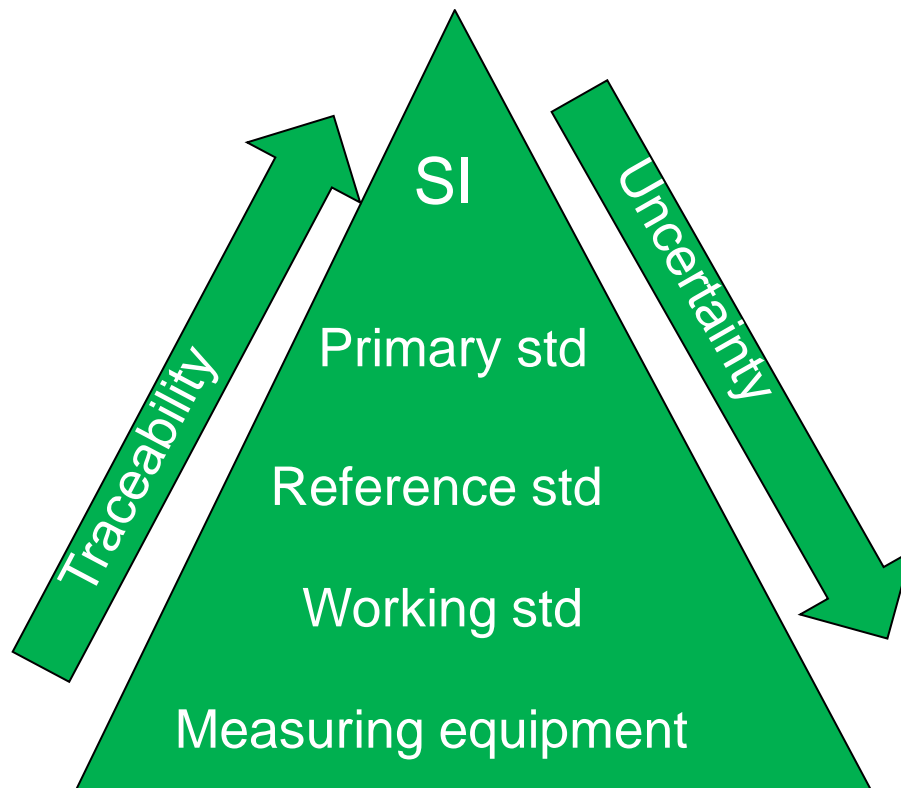


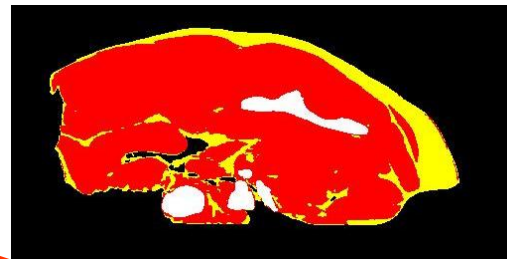
- Zeiss Metrotom 1500
- 225 KV Microfocus tube
- Sample capacity: Ø300 x 350 mm
- August 2009





Metrological traceability





Weight and virtual LMP

$$W = V_{\text{fat}} \cdot \beta_{\text{fat}} + V_{\text{meat}} \cdot \beta_{\text{meat}} + V_{\text{bone}} \cdot \beta_{\text{bone}}$$

W : Estimated weight of ½ carcass

V : Volume (estimated from images)

β : Estimated average density

$$\text{LMP} = \frac{V_{\text{meat}} \cdot \beta_{\text{meat}}}{W} \times 100\%$$

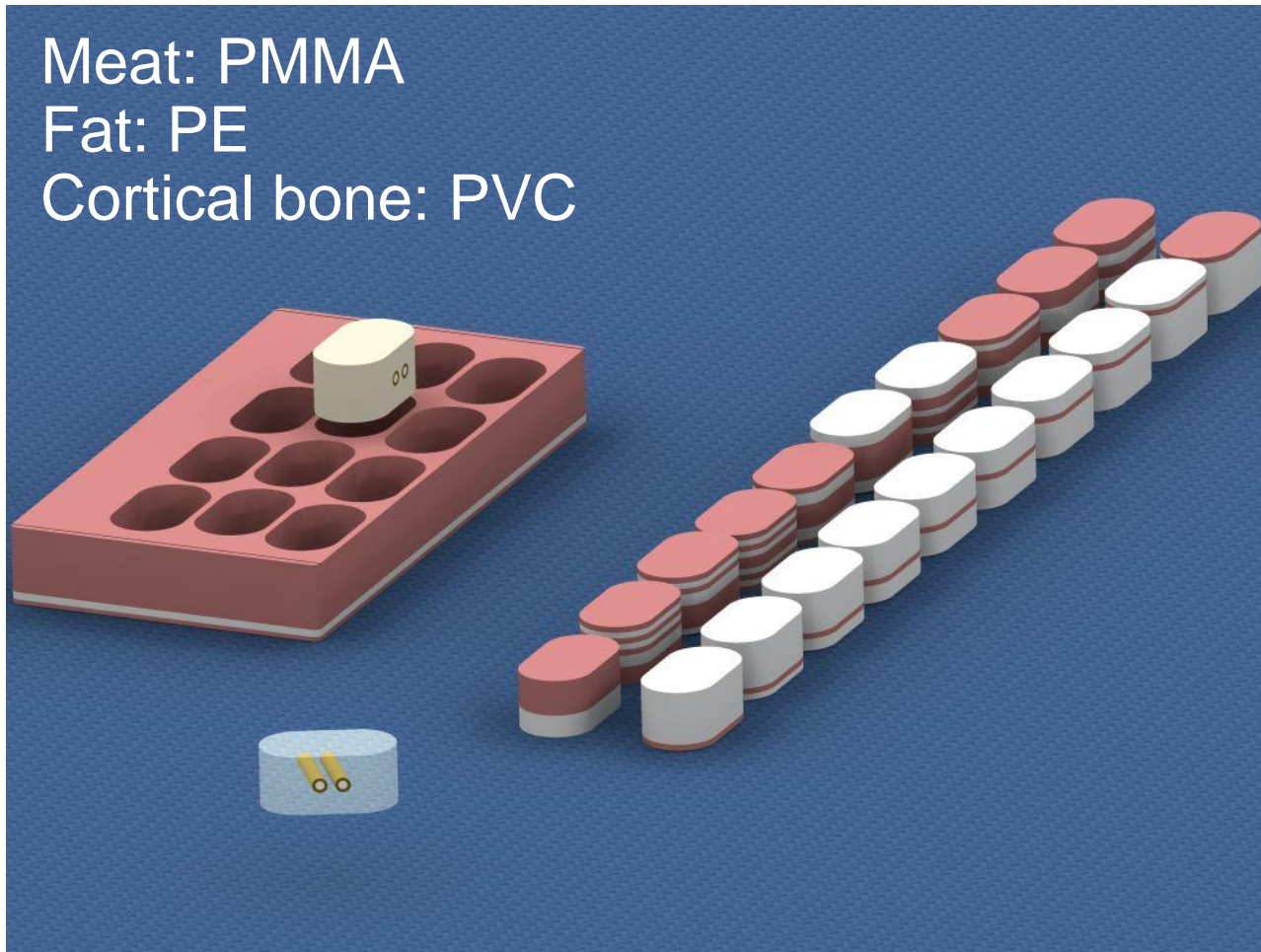
Reproducibility

Average densities	Fat	Meat	Bone
Denmark	0.997 [0.992;1.003]	1.117 [1.111;1.124]	1.433 [1.368;1.497]
Norway	0.976 [0.967;0.985]	1.105 [1.097;1.113]	1.434 [1.348;1.520]
Germany	0.984	1.108	1.463

Relation between "knife" and CT	Slope	RMSE
Denmark	0.92	0.48
Norway	0.91	0.76

Belly Phantom

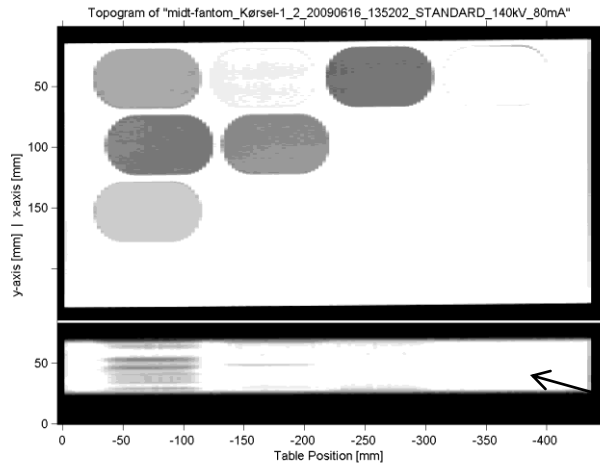
Meat: PMMA
Fat: PE
Cortical bone: PVC



- To be used in a Round Robin set-up
- Volume in SI units
- Volume standard
- HU standard

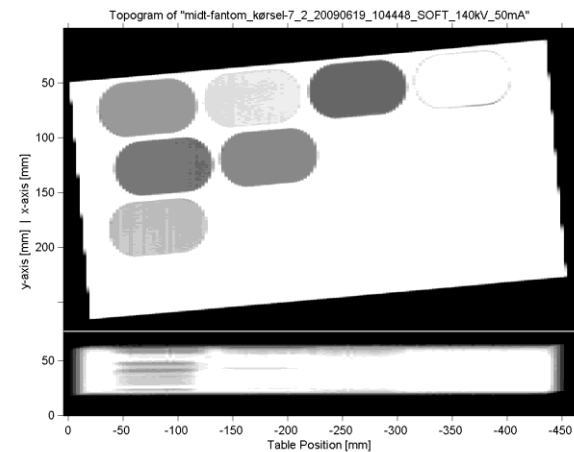
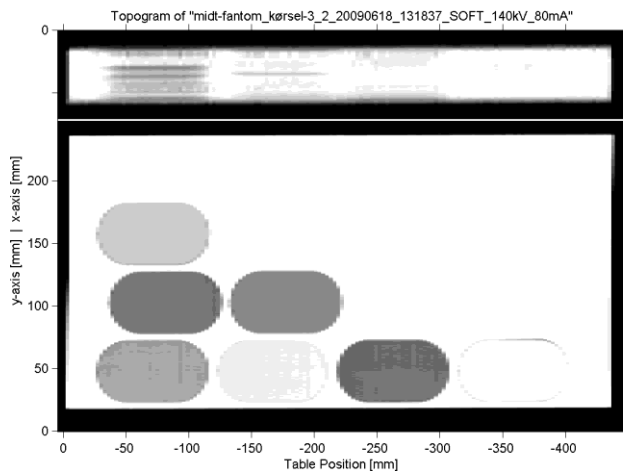
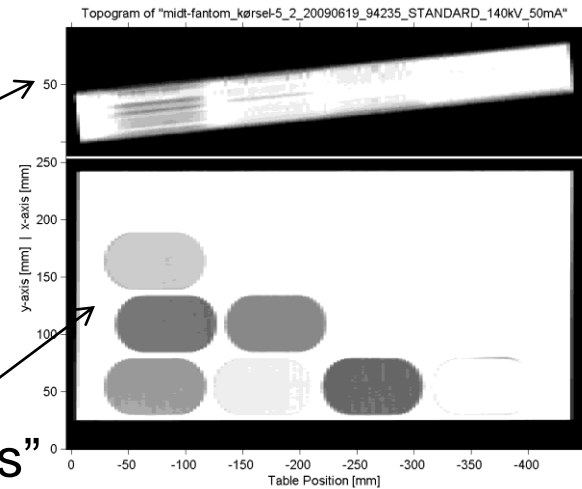
Compare CT methods on basis of volume

Robustness of phantom measurements



Topogram
"viewed from
above"

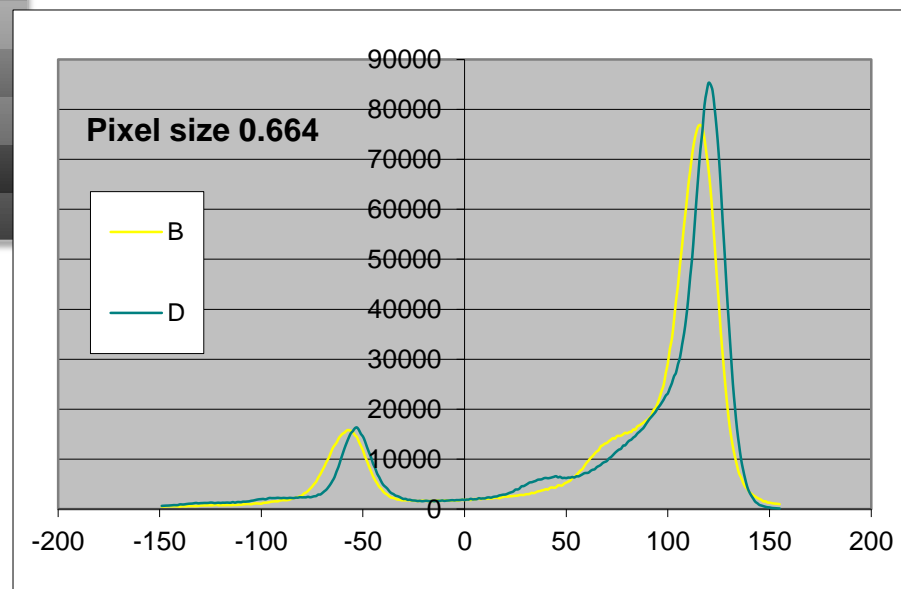
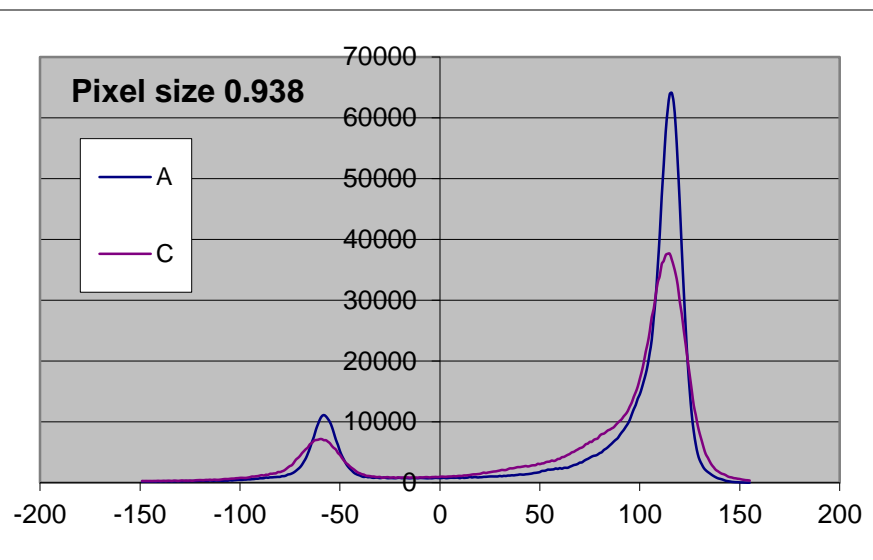
Topogram
"viewed sideways"



Experiment: "Half reduced design"

Energy: 140 kV Slice thickness: 3 mm	A	B	C	D
Tilted/Straight	Straight	Straight	Tilted	Tilted
Upright/Horizontal	Horizontal	Upright	Upright	Horizontal
Pixel size, mm	0.938	0.664	0.938	0.664
Current, mA	80	80	50	50
Software	Standard	Soft	Standard	Soft
Predicted weight	4.5435	4.5365	4.5383	4.5685
Predicted "LEAN"	81.21	81.59	79.59	81.03

Energy: 140 kV Slice thickness: 3 mm	A	B	C	D
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CT scanning of fat carcasses

Trail with 3 different crosses

- Slaughtered at a commercial slaughter house
- Scanning with the Danish mobile scanner
- Estimate of CT meat content
- Measured fat depth at P2

If time - Marchen
has prepared a
short presentation

