

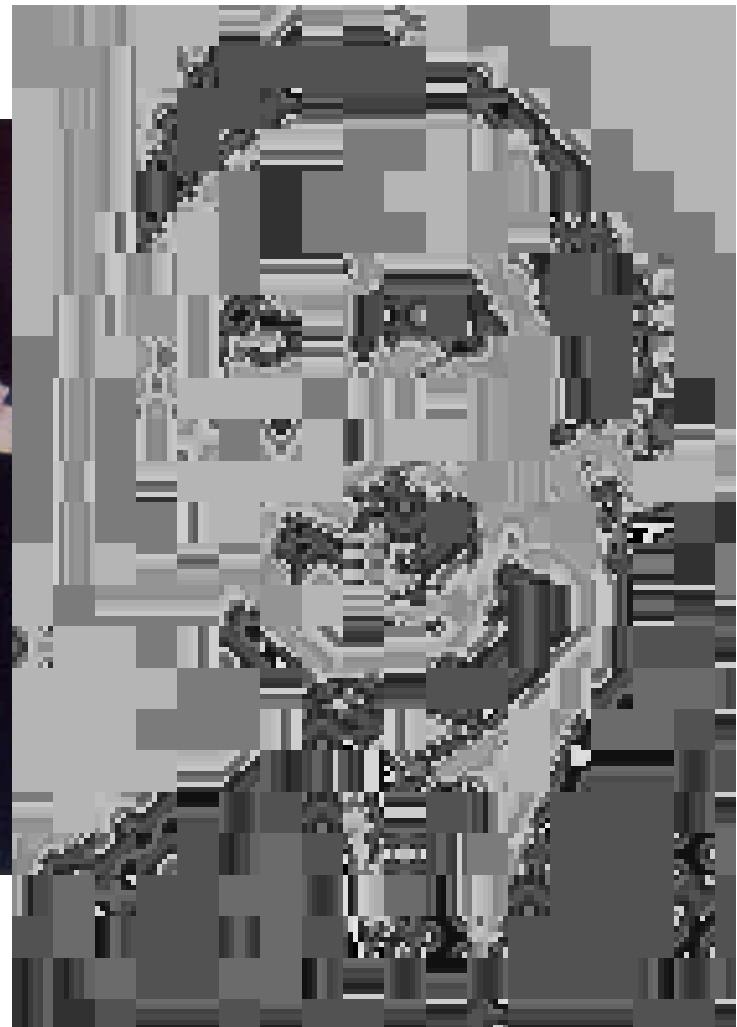
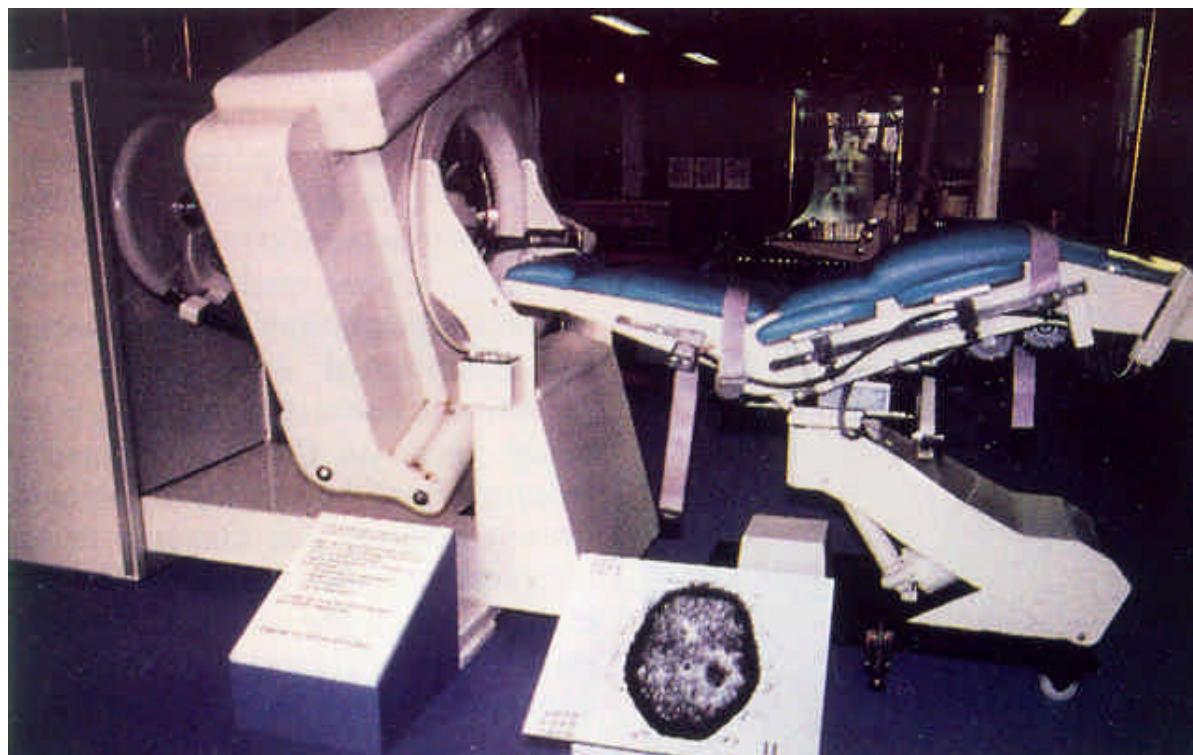
# CT- Volumenscanner in 2005



*APT Seminar  
Göttingen  
17-18. Juni 2005*

# Sir Godfrey Hounsfield † (12/08/2004)

## EMI-Mark I 1972



imagination at work



# Volume CT ?

## Volumen Abdeckung und submilimeter Schichten simultan

16-Detektor



VCT



40 mm

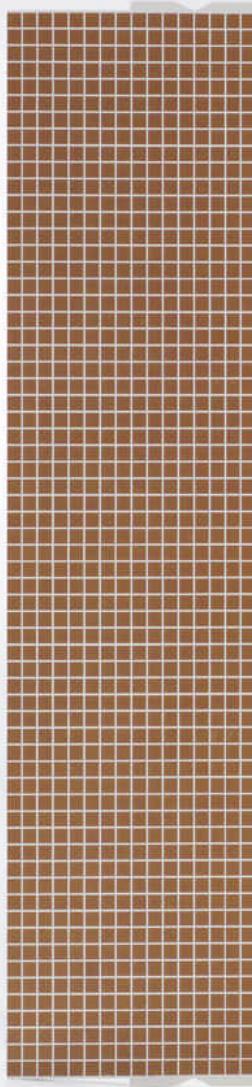


40 mm

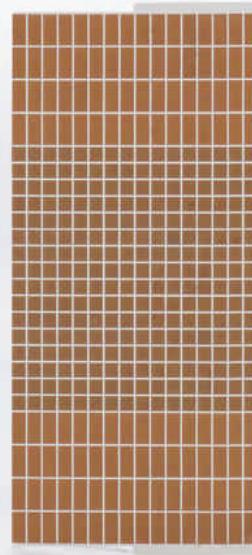
**40mm Detektorenbreite  
&  
microVoxel™ Resolution  
&  
175 mm/sec  
Tischvorschub**

imagination at work

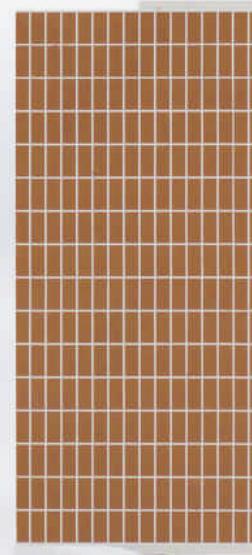




**VCT**



**LS16**

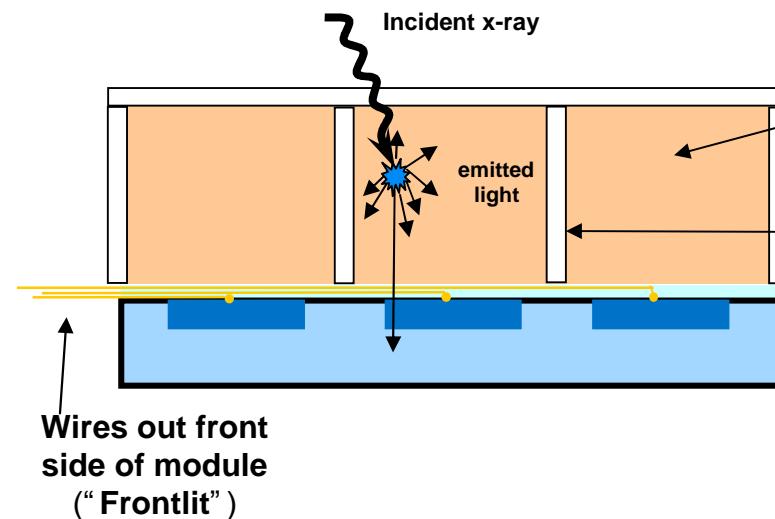


**LS4-8**

imagination at work

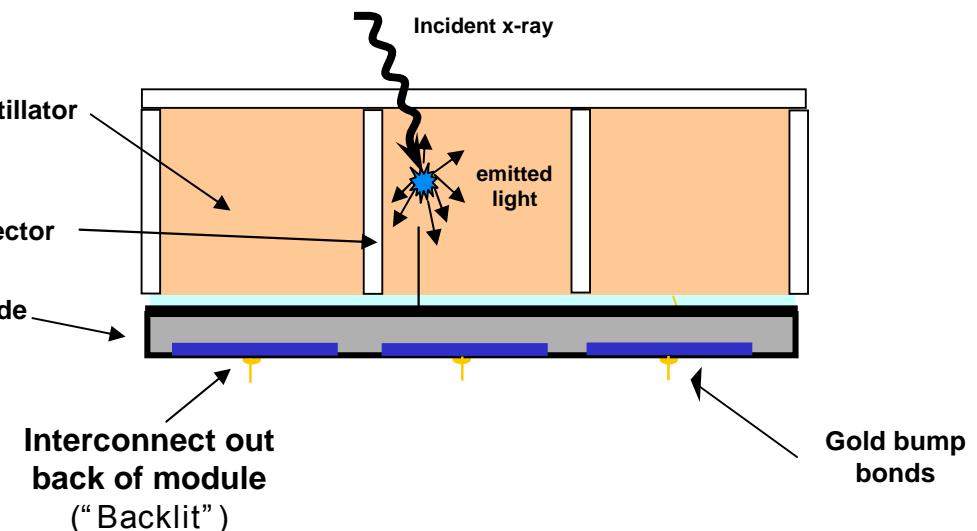


## MSCT Frontlit Diode



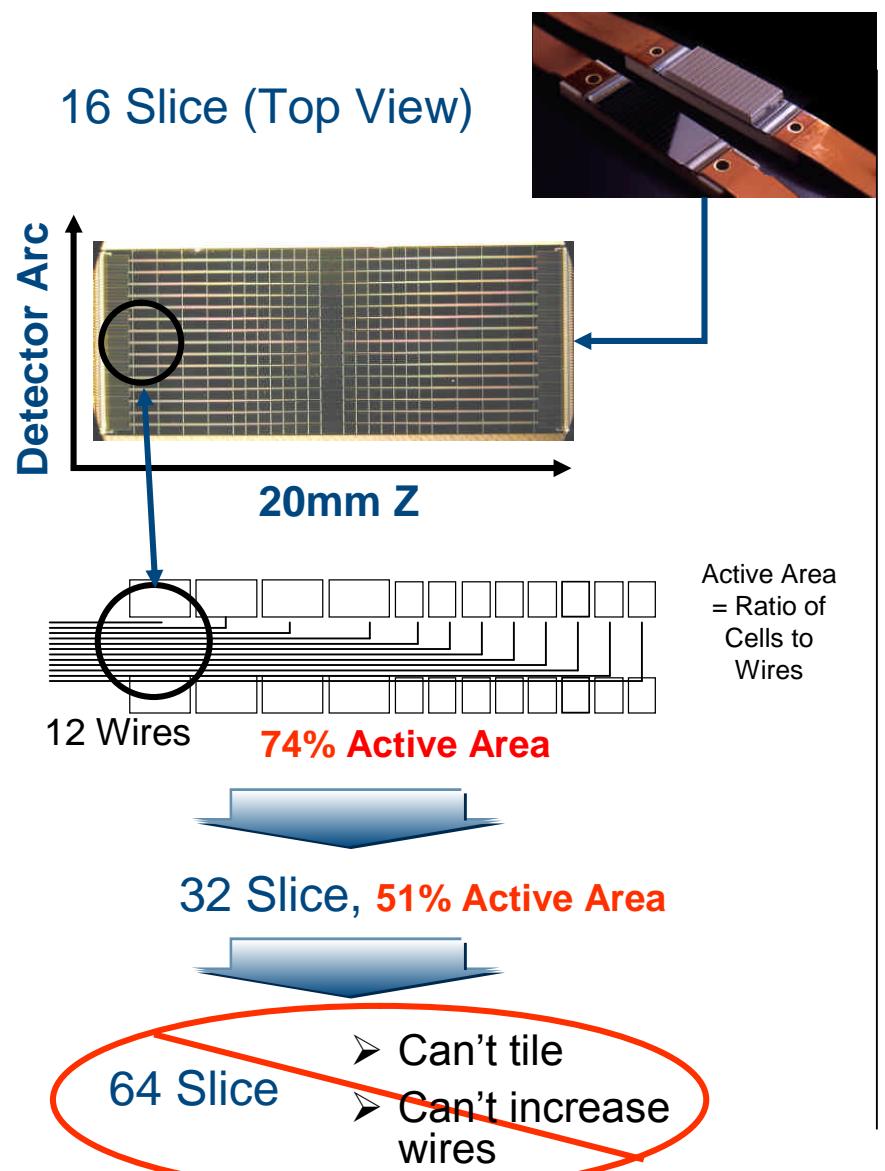
- + Traditional diode design ... used in all MSCT generations
- + Simple interconnect
- Wires reduce active diode area ... cannot read 64 channels
- Technology dead-end

## GE VCT Backlit Diode

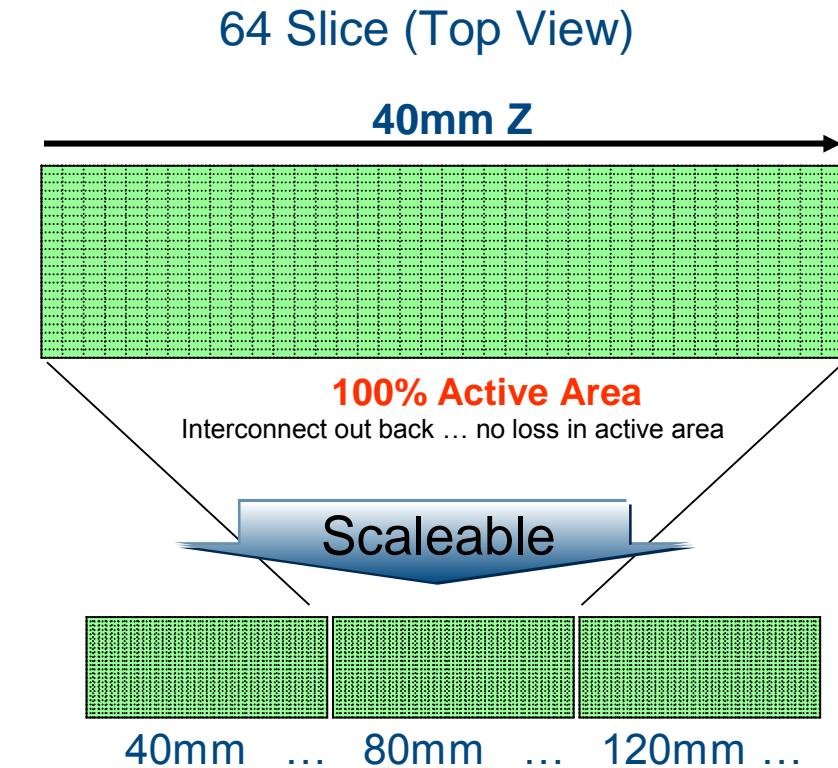


- + Enables 64 slice and beyond
- + Improves diode efficiency ... wires do not reduce active area
- Major diode re-design ... significant technology investment
- Complex interconnect to read over 50,000 channels at ~2500Hz

## MSCT Frontlit Diode



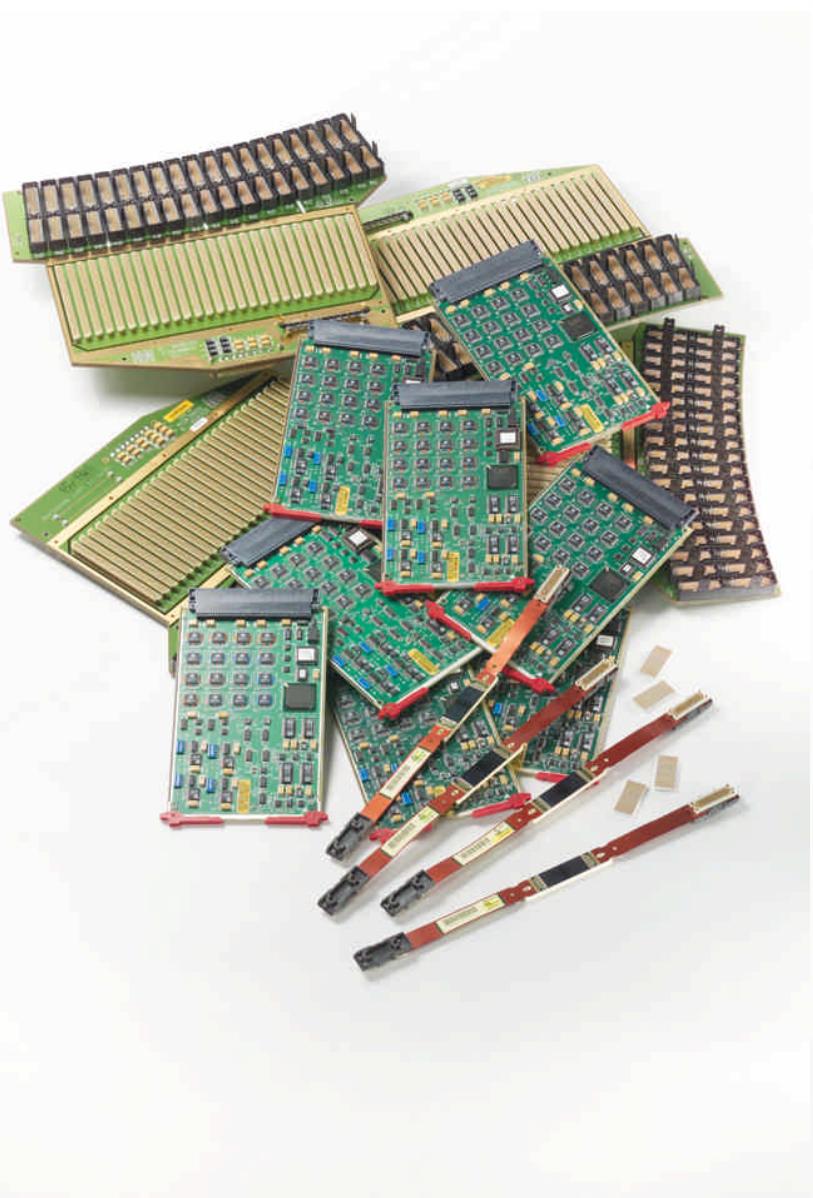
## GE Patented VCT Backlit Diode



- Enables Volume CT
- 100% active area ... no light loss, improved noise/dose performance
- Unlimited scalability to volume coverage needs of the future

imagination at work

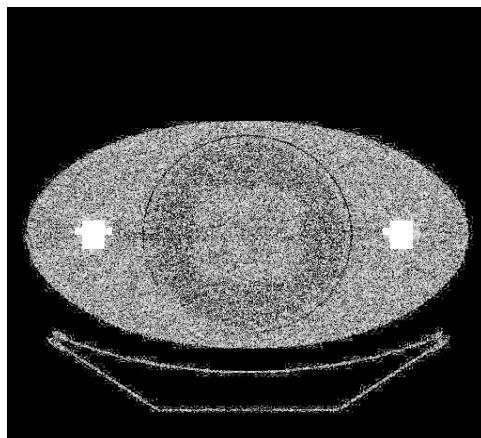




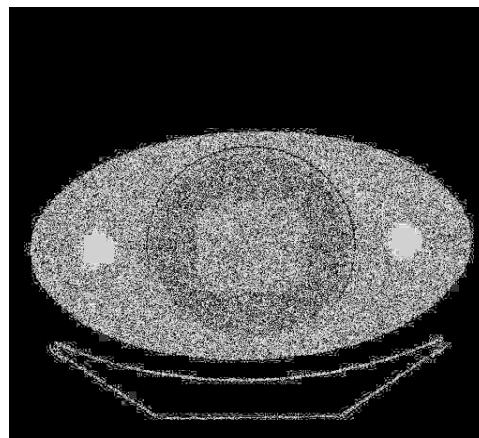
imagination at work



# Volara™ Low Signal Performance



Conventional DAS



140kV, 20mAs

Volara™ DAS



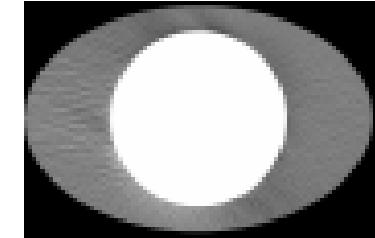
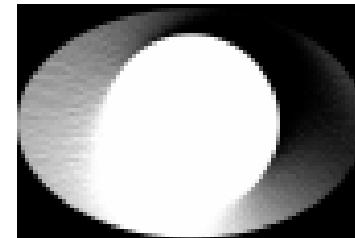
St Dev (Noise)	Low Signal Phantom	20cm H <sub>2</sub> O
Volara	62,8	7,38
Conventional DAS	79,2	7,94
Verbesserung	21%	7%

# Exact Volume Reconstruction

## CrossBeam™ & Hyperplane™

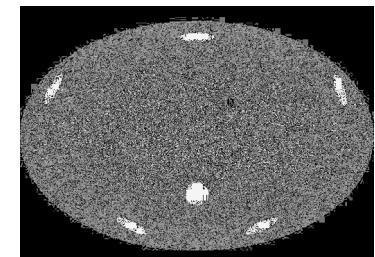
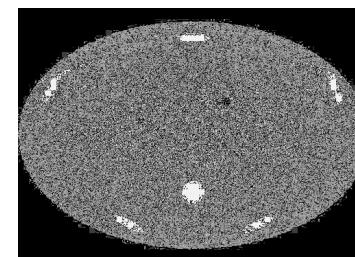
87.5mm/sec

Tangential filtering

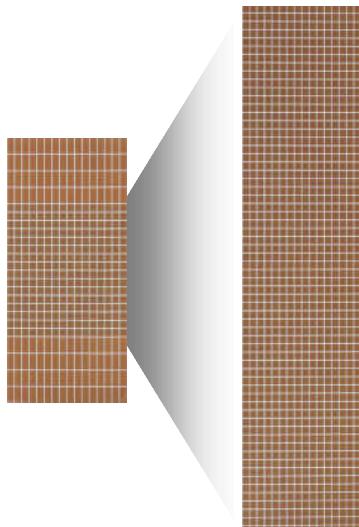


175mm/sec

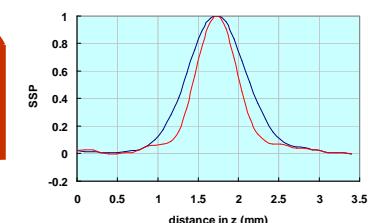
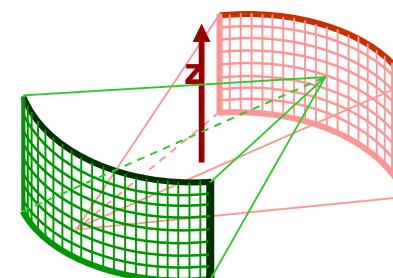
3D Helical Weighting



x4 cone angle



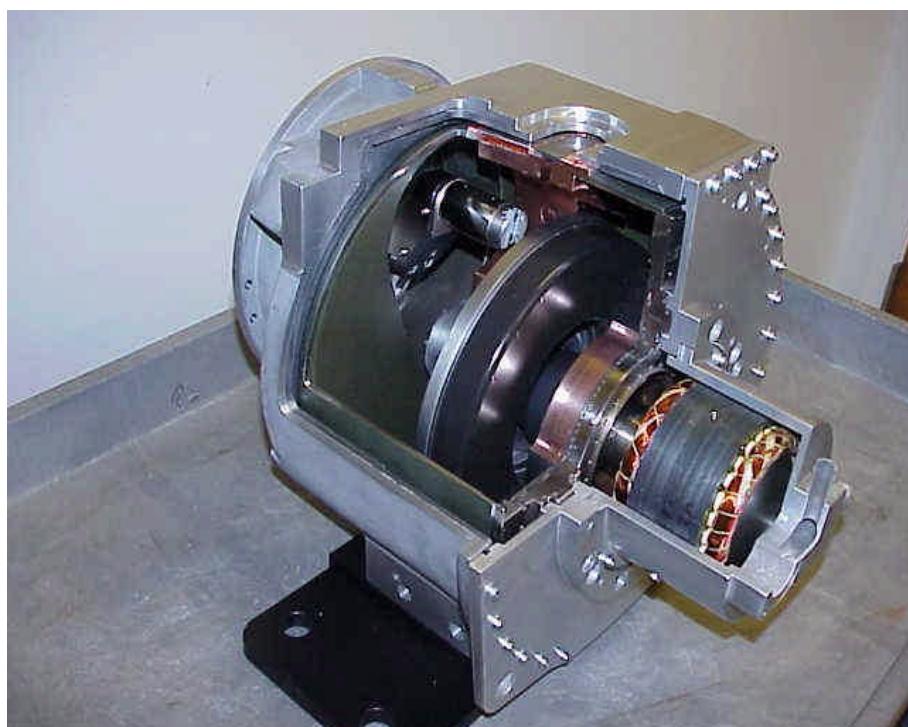
3D Conjugate  
Backprojection



imagination at work



# Röntgenröhre



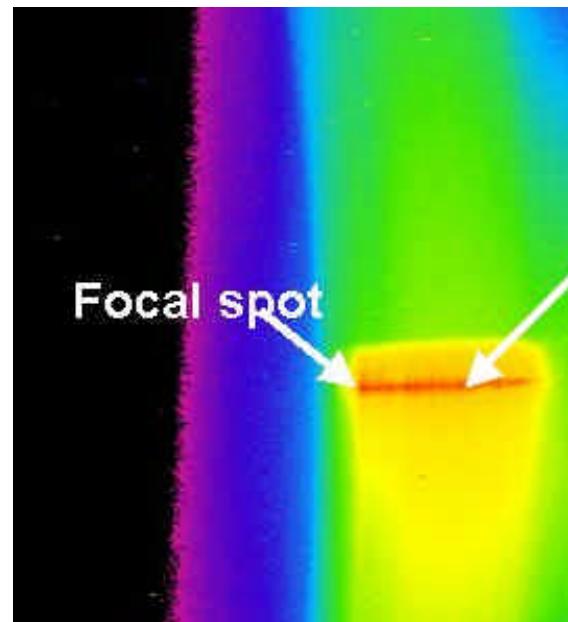
mAs	Rota-tion	mA Anode
200	0.5 s	400
200	0.4 s	500
280	0.4 s	700
		D-Pat.
200	0.35	570
280	0.35	800
		D-Pat.

# Performix-Pro Röhre

## Clinical Performance

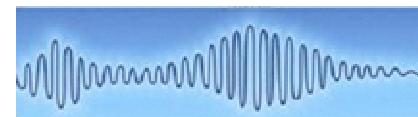
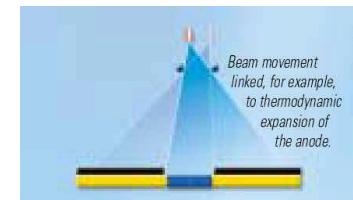
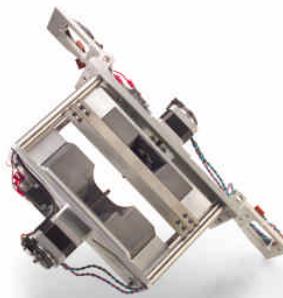
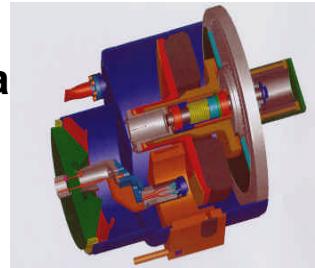
800 mA für 5  
Sekunden

670 mA für 20  
Sekunden



# OptiDose: GE Verpflichtung zu Dosis-Management

- Volara™ DAS Technology for higher detection efficiency
- V-Res™ detector with 100% active area
- Electron Collector
- Optimized cardiac filters
- 3D Dose Modulation
- ECG Dose Modulation
- SmartTrack Dynamic Collimation
- Color Coding For Kids
- SmartBeam –X-ray beam filtration
- NO Active Post Patient Collimation
- Prospective Display CTDvol, DLP, Efficiency



imagination at work



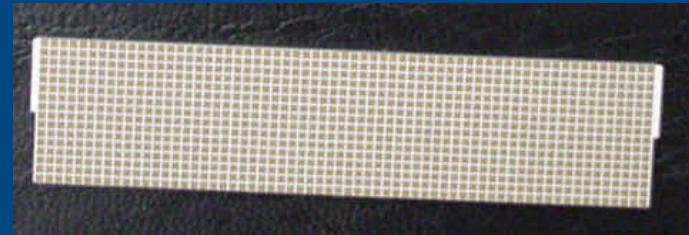
# Technologie Herausforderungen



64 channel DAS



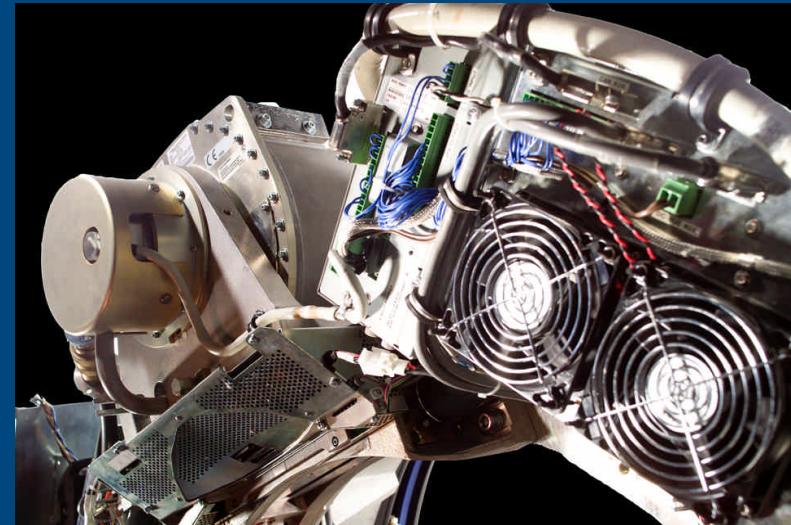
100 kW, 800 mA



64 Slice, 40mm



Xtream II

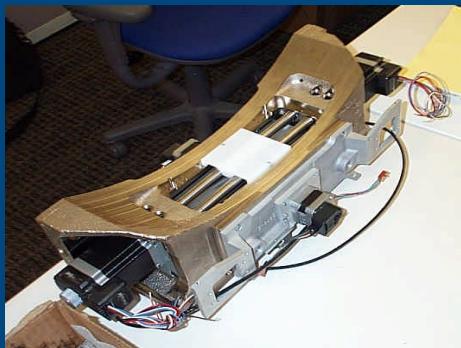


Gantry packaging, balance,  
0.35 sec rotation



5 Gbaud Slip  
Ring

# Technologie Herausforderungen



**40mm Collimator**



**Volume Recon  
Backprojector**



**40mm Detector  
Collimator**



**Inc Table Travel**



**64-slice  
Interconnect**

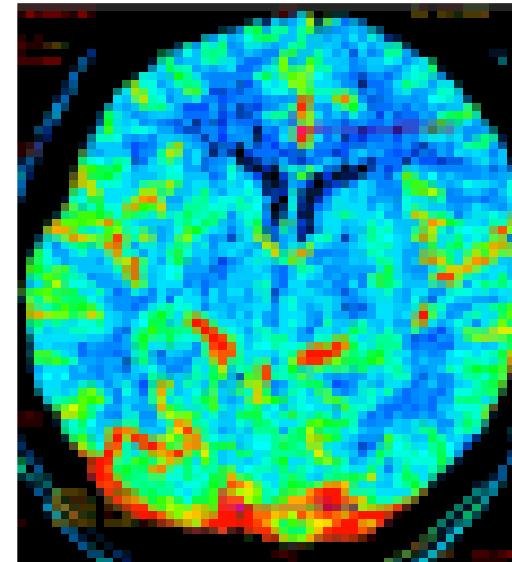
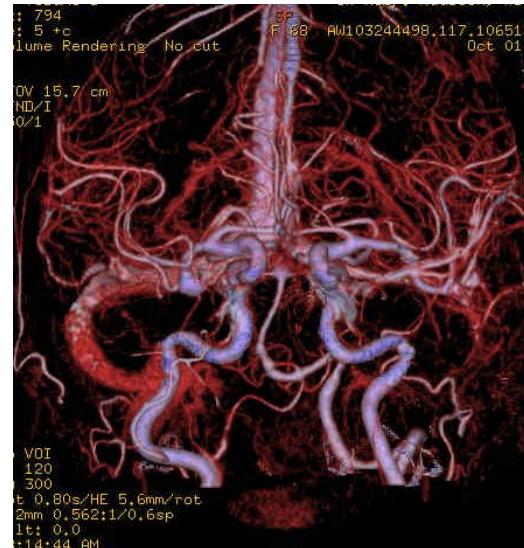


**64-slice DAS  
Control Board**

# Dynamische Angiographie: Circlus Willisi

## Horizonte

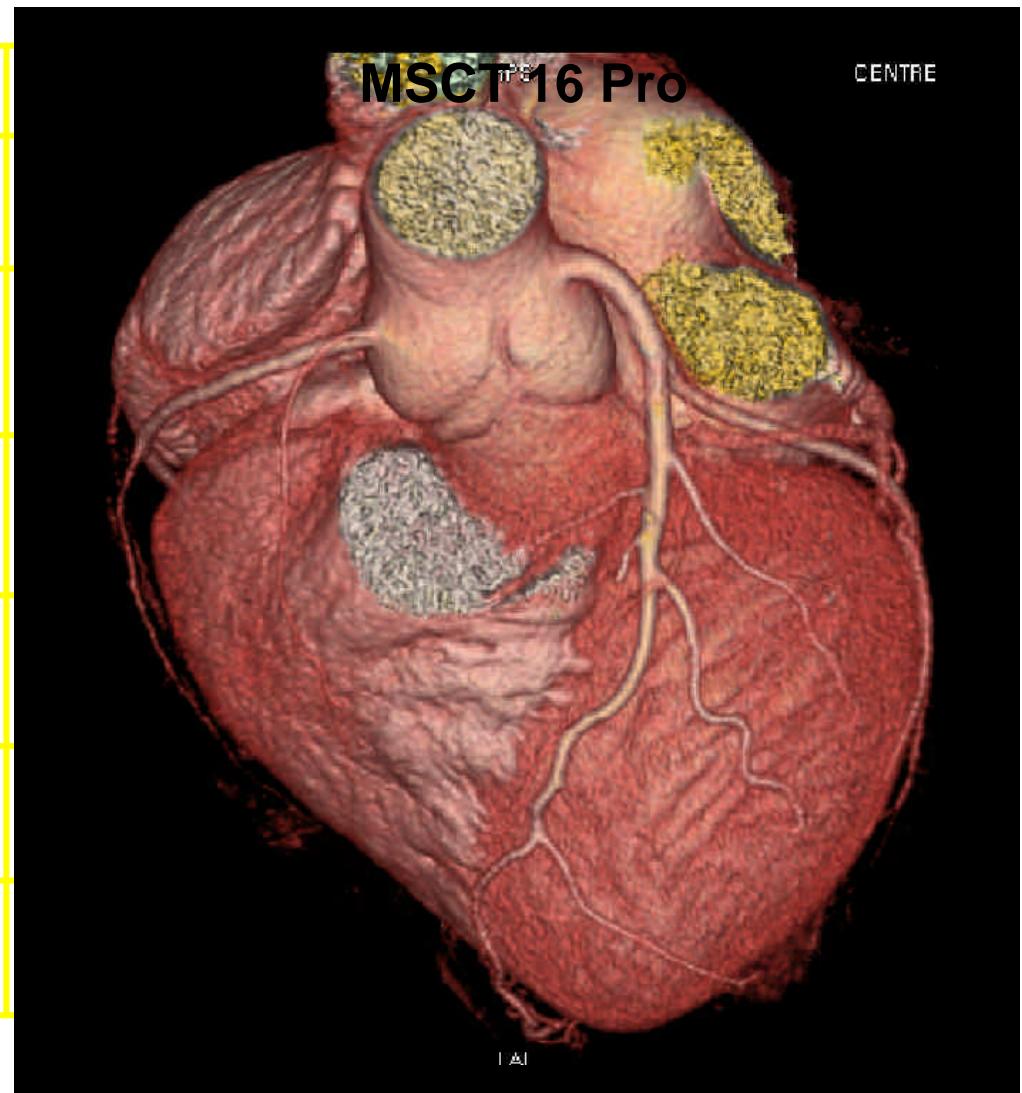
- Rein arterielle Angiographien
- 3D Flussdynamik
- Simultane Perfusionsanalyse



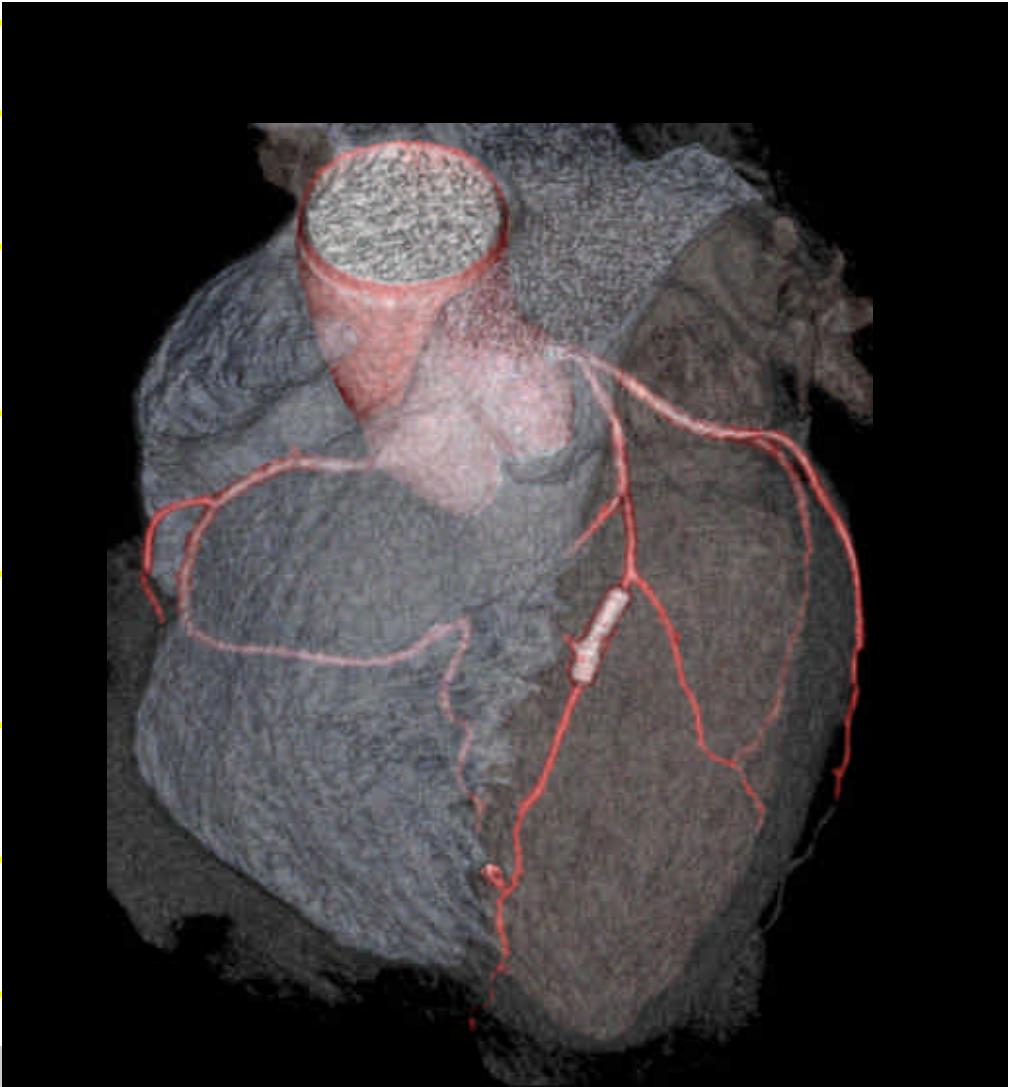
imagination at work

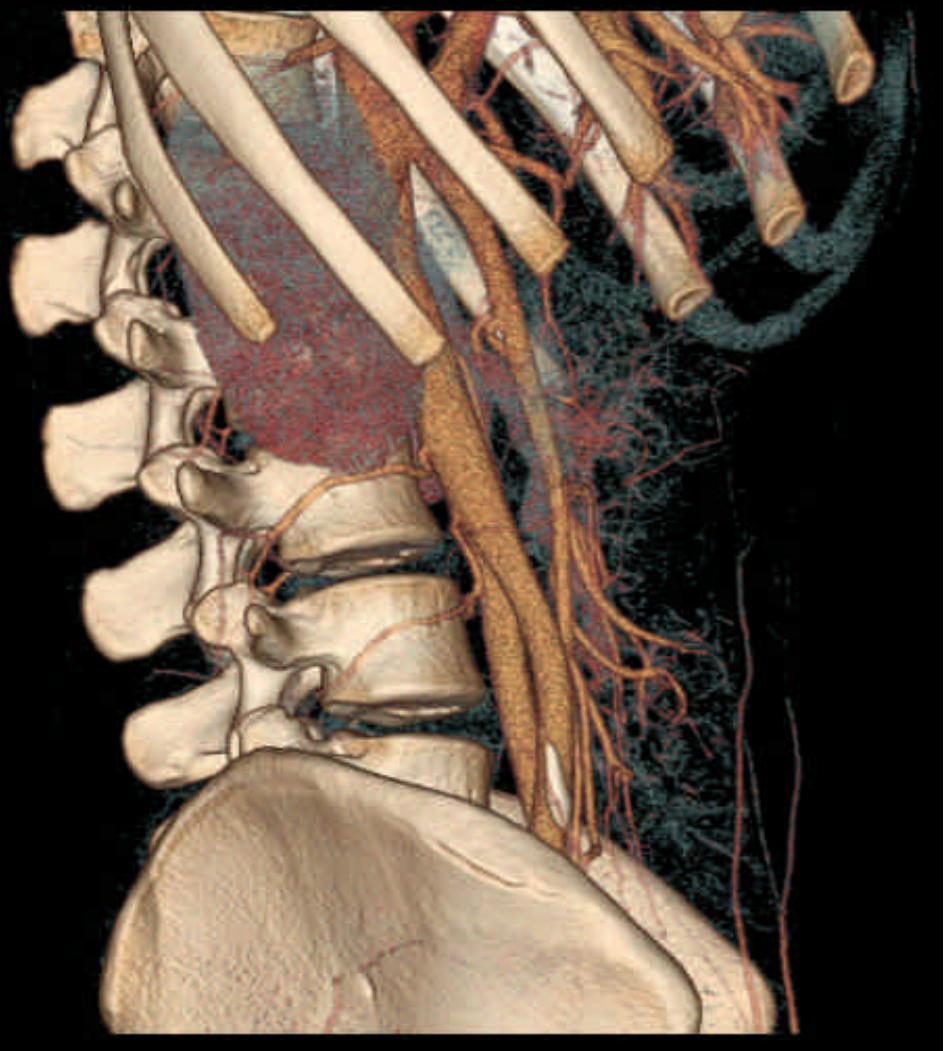
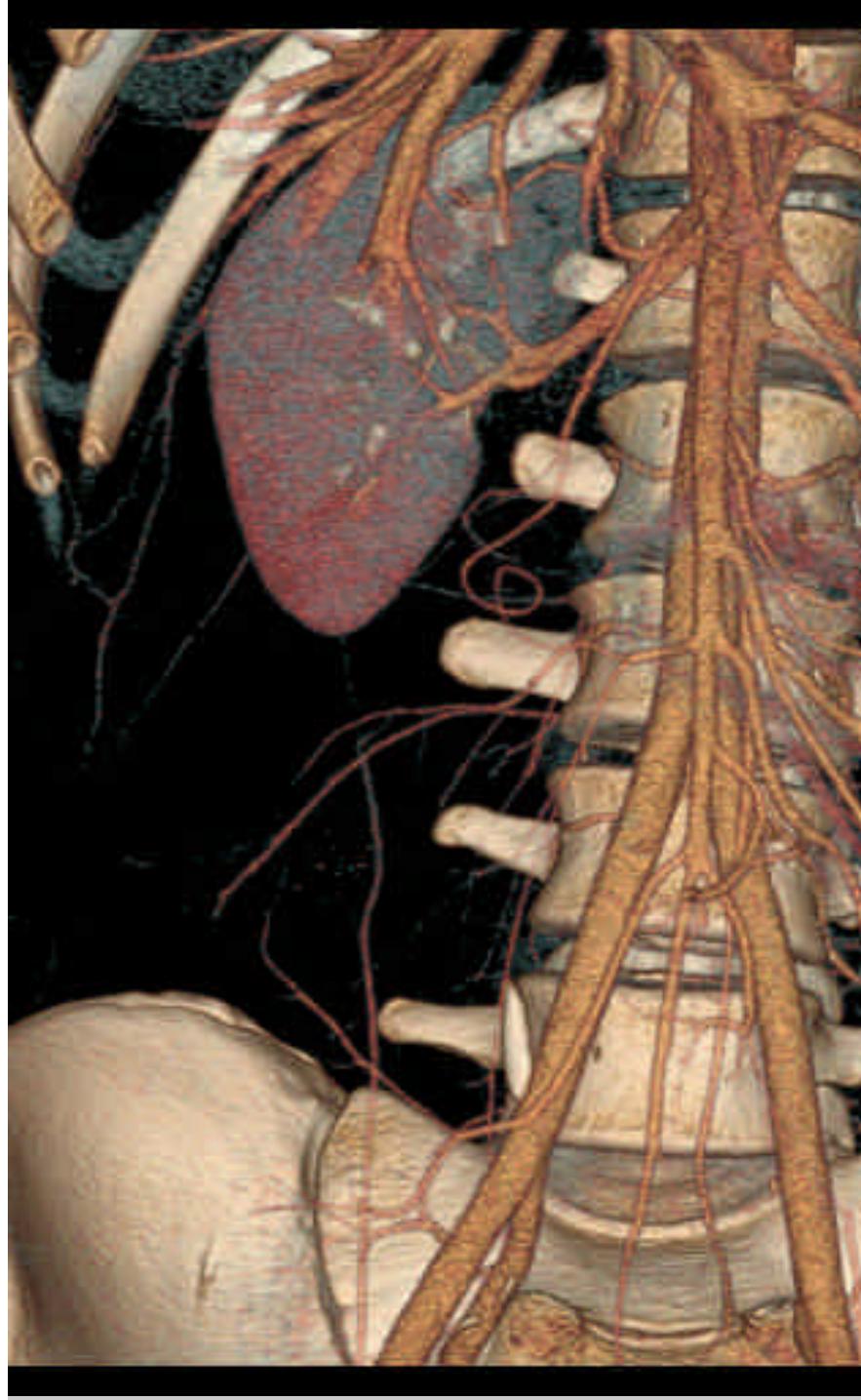


	MSCT 16P
Date	Sept. 2003
Anatomical coverage	150 mm
Acquisition time	20 sec
Scan rotation	0.4 sec
Slice thickness	0.6 mm



	MSCT 64
Date	Oct. 2004
Anatomical coverage	150 mm
Acquisition time	5 sec
Scan rotation	0.35 sec
Slice thickness	0.6 mm
Post	





imagination at work

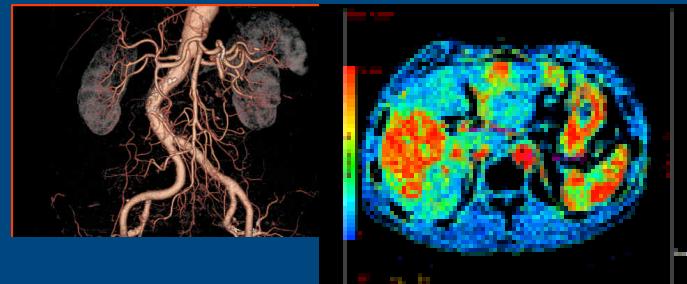


# Verbesserung der existierende Anwendungen



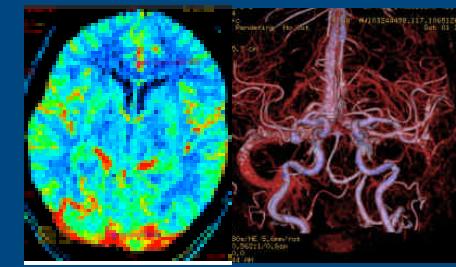
# Cardiac

- Functional Analyse
  - Lange Bypässe



# Abdomen

- Total Organ Perfusion
  - Nieren CTA + Perfusion
  - Dynamische GI

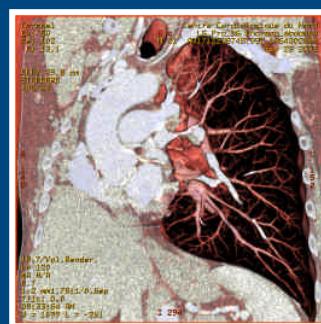


Neuro

- Angiographien + Perfusion
  - AVM Erfassung



## Trauma



# Lunge

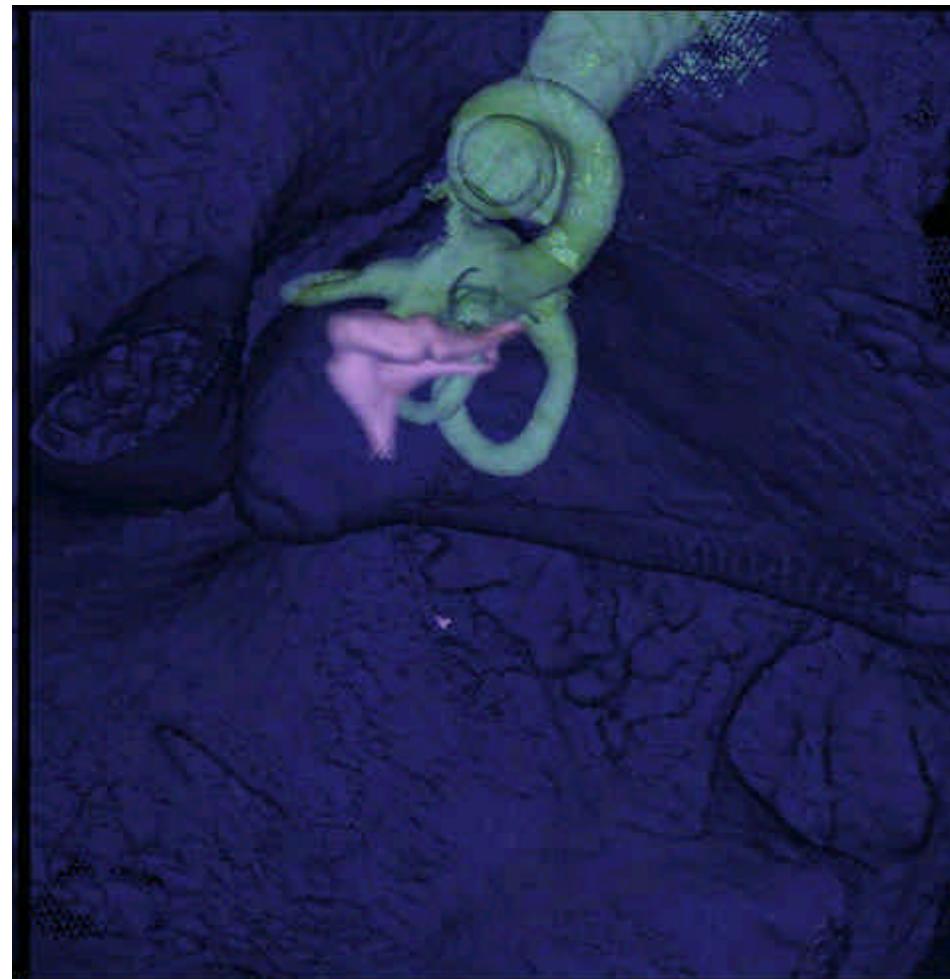
- Subsegmental PE
  - Lungenfunktion

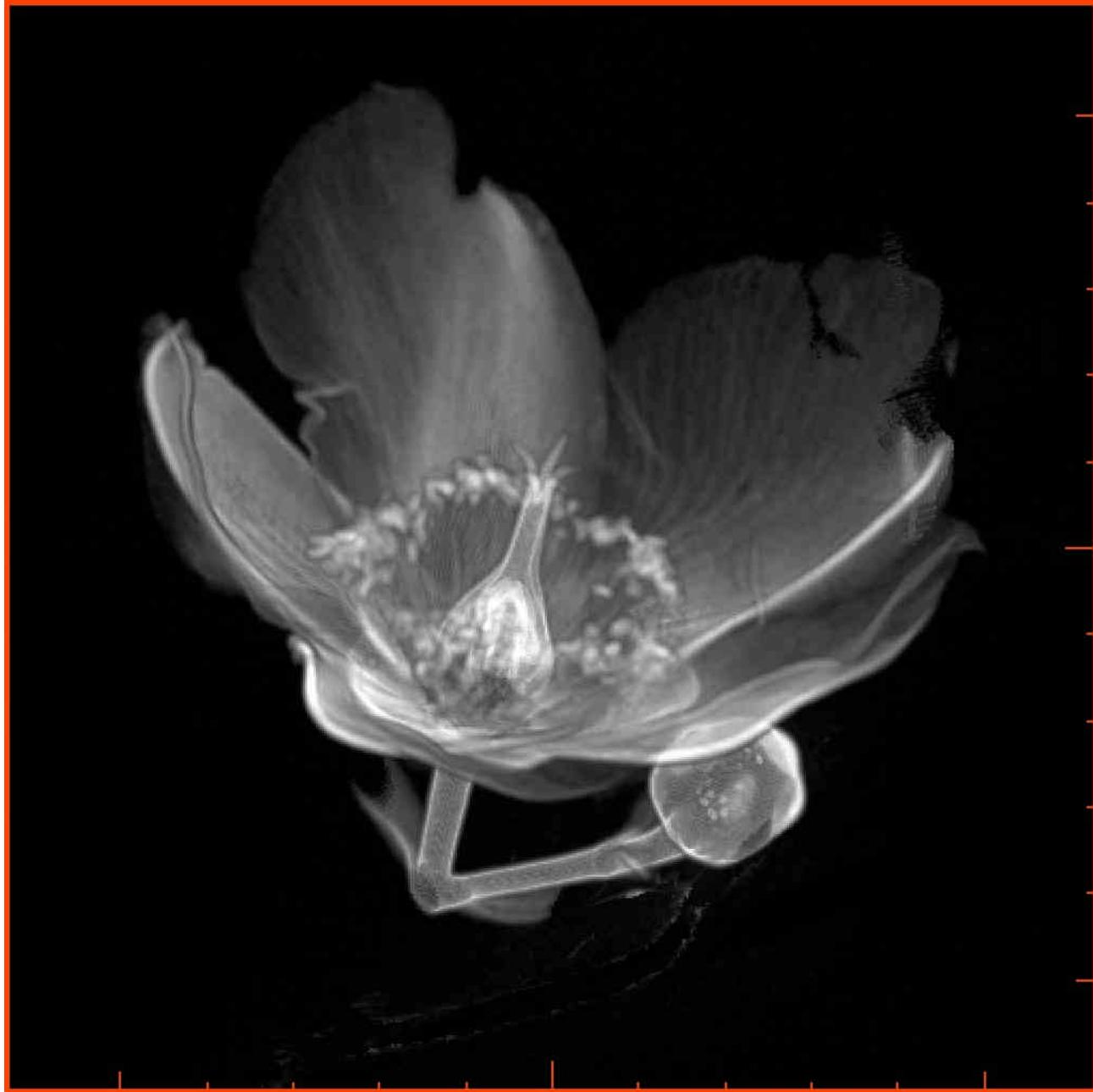


Pädiatrie

- Sedierung ??
  - Low-dose CTA
  - Arterielle CTA

**... Wir hören Ihre Bedürfnisse ....**





Dipl.-Ing, Dr. med. Sehib Tuerkay

*Vielen  
Dank*

imagination at work 