

Patient Study:

After extensive preclinical testing finally CAMC has been moved into the operation room of Chirurgische Klinik und Poliklinik – Innenstadt at Nußbaumstraße. First patients were treated successfully with CAMC-navigation support starting July, 09. The clinical investigation will cover 120 surgeries in orthopedic and trauma Surgery. Professor Navab and many clinical partners believe that in a few years CAMC will take over the current market of existing mobile C-arms.

Contact:

In Medical Collaboration with:

Prof. Wolf Mutschler**, Prof. Ekkehard Euler**, Dr. Sandro-Michael Heining**, Dr. Juergen Landes**, Dr. Simon Weidert**, and Anna von der Heide**

Scientific Director: Prof. Nassir Navab*

Contact Persons:

Prof. Nassir Navab*(navab@in.tum.de)
and M.Sc. Lejing Wang*
(wangle@in.tum.de)

In Industrial Collaboration with:

Dr. Rainer Graumann, Siemens
Healthcare, Erlangen Germany

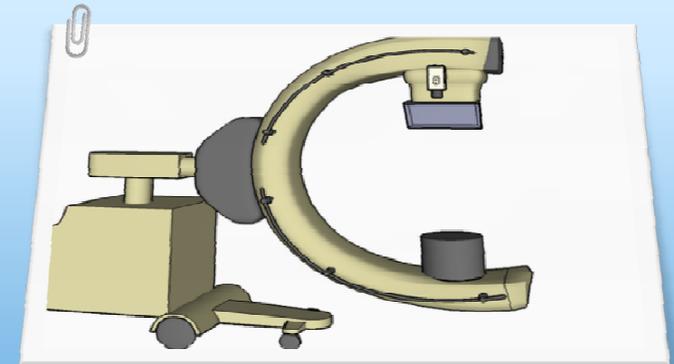
Web:

<http://campar.in.tum.de/Chair/ProjectCamC>

Camera Augmented Mobile C-arm

* Computer Aided Medical Procedures
(CAMP) – TUM, Munich, Germany

** Trauma Surgery Department, Klinikum
Innenstadt, LMU Munich, Germany



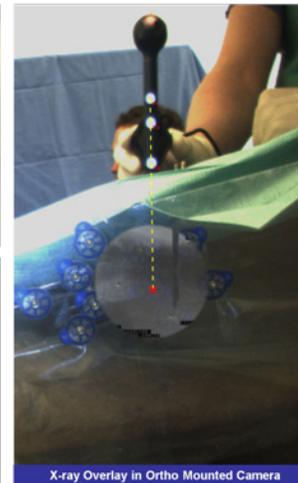
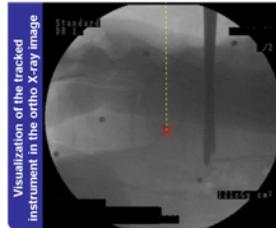
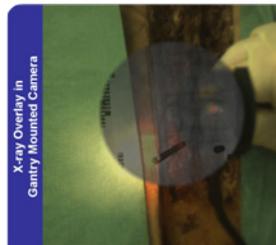
Abstract:

Mobile C-arms are an everyday tool to acquire X-ray images in the operating room during surgery. The Camera Augmented Mobile C-arm (CamC) system [1] that extends a regular mobile C-arm by a video camera for X-ray and video image overlay. Thanks to the mirror construction and one time calibration of the device, the acquired X-ray images are co-registered with the video images without any further calibration or registration during the intervention. The CamC system can support a wide range of potential clinical applications, such as X-ray positioning, needle guidance, interlocking of intramedullary nails, and pedicle screw placement.

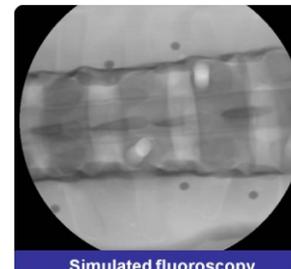
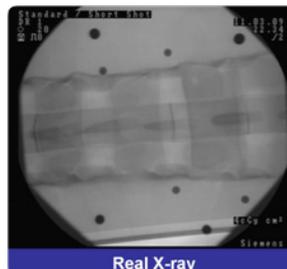


Research Applications:

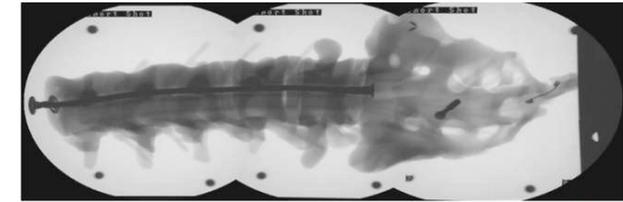
A **Multi-View Opto-Xray Imaging System** [2]. The second camera is attached orthogonal to the X-ray cone beam for the control of insertion depth.



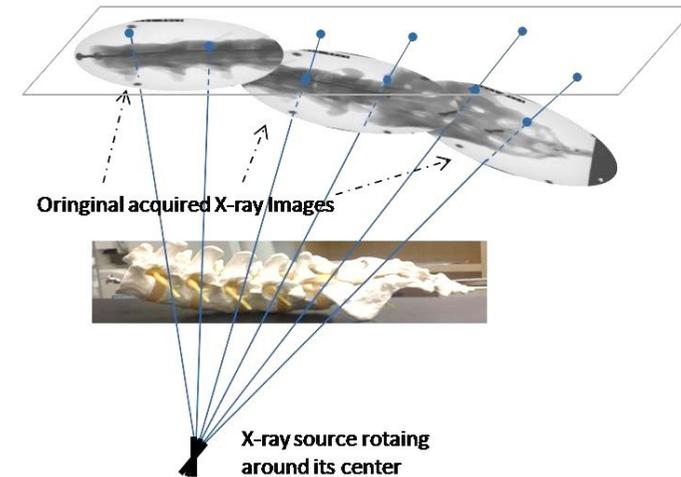
A **simulate fluoroscopic image** is generated from CT data with known C-arm motions.



A **parallax-free panoramic X-ray image** [3] is generated by stitching multiple X-ray images based on C-arm pose estimation using the CAMC system.



All acquired X-ray Images are mapped to align with the left one to create the final panoramic X-ray image



References:

- [1] N. Navab, S.M. Heining, J. Traub: Camera Augmented Mobile C-arm (CAMC): Calibration, Accuracy Study and Clinical Applications. IEEE Trans. Med. Imag., 2009
- [2] J. Traub, H. Heibel, P. Dressel, S.M. Heining, R. Graumann, N. Navab: A Multi-View Opto-Xray Imaging System: Development and First Application in Trauma Surgery. MICCAI 2007, Brisbane, Australia, October/November 2007
- [3] L. Wang, J. Traub, S. Weidert, S.M. Heining, E. Euler, N. Navab: Parallax-free Long Bone X-ray Image Stitching. MICCAI 2009, London, UK, September 20-24 2009