

R&D-activities related to 3D motion analysis and visualization at HiST AITeL

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R&D-activities related to 3D motion analysis and visualization at HiST, AITeL

- PhD-studies:
 - “Motion capturing, 3D-visualization and analyses of ski jumping” (Atle Nes)
 - “Real time Markerless motion capture and visualization of human movement” (Rune H. Bakken)
- The TrondheimSim
 - Simulation and 3D-visualisering of virtual Trondheim
- R&D- projects
 - “Real time 3D Data Capturing and Visualization of Human Motion in Complex Environments”
- LocMoc-project
- *Cooperation with:*
 - NTNU- IDI, -Programme for Movement Science, -Geomatics, HiST AHS, Olympiatoppen dep. Trh., Bonn Univ. College, IT-University København, StatoilHydro, Kongsberg SIM

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Prior R&D-project



HYDRIV:

Development and implementation of novel Imaging Velocimetry techniques suited to large scale hydraulic facilities.
2000-2003



Coriolis lab in Grenoble: Rotating tank, diam = 13 m

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PhD-Study



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Video-recordings in Granåsen

PhD-scholarship holder Atle Nes



- **Ski Jumping Hill:**
Calibration points (Metal bolts
white balls + well defined
features points)
- **Ski jumper:**
Signalised points (Strategically
placed on the jumping suit)



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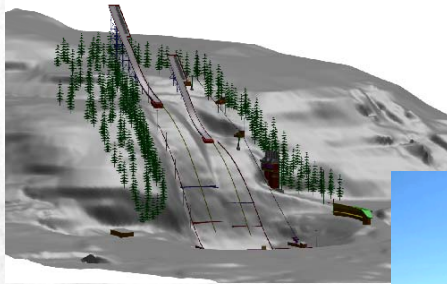
Software and accuracy



- **Synchronised** video recordings
(Own developed software)
- **3D-Motion capturing Calculations**
(Own developed software)
- **Camera system calibration**
(Distance 40-60m 5 cm xyz accuracy)
- **Visualization**
(Own developed software)

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3D Visualization



Granåsen ski jumping arena



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3D-Visualization



- A 3D digital model of a ski jumper



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3D-Visualization

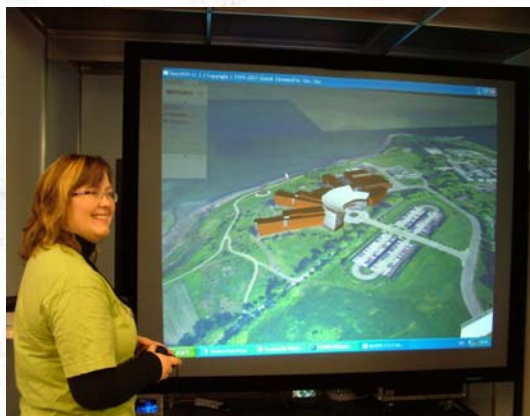


[Video 1](#) [Video 2](#) (from helmet)



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Simulation and 3D-visualization of virtual Trondheim (demo)



[demo](#)

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R&D project
"Real time 3D Data Capturing and Visualization
of Human Motion in Complex Environments"



Main objective:

Develop a high precision, low-cost portable system which integrates real-time 3D motion capturing and visualization of human and industrial movements, in complex environments.

Ongoing activities:

- Software/hardware integration
- Algorithms development
- Motion capturing
- Real time visualization of 3D-models
- Establishing of a Motion capture and visualization laboratory

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Motion Capture and visualization
laboratory



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Motion Capturing System for laboratory 1



Kamera: Oqus 3 Serie (Qualisys)

Infrared and high speed video
CMOS image sensor: 1280 *1024 pixels
Max recording frequency with full resolution and FOV:
500 Hz (image/sec) With reduced FOV: 10000 Hz

Software: OTM (Qualisys)
System Calibration and motion analysis
2D and 3D data can be exported to e.g. C3D, TSV and
directly to Matlab file formats



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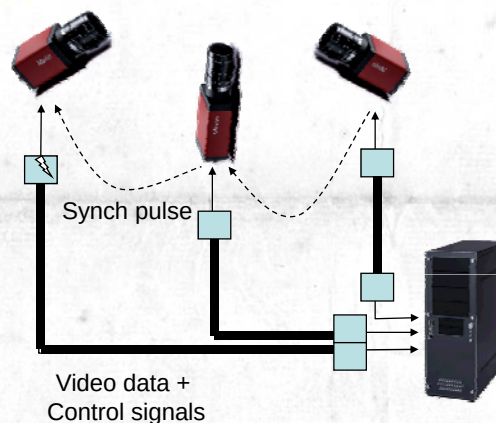
Motion Capturing System for laboratory 2



3AVT Marlin F080B (b/w) Digital Video Cameras:

- Digital interface:
 - 1394a FireWire IIDC.
- Picture size:
 - 640x480 (VGA) x 30 fps
- Resolution depth:
 - 8-bit greyscale.

<http://www.alliedvisiontec.com>



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Motion Capturing System for laboratory 3



- Two Projectors: 2 F1+ SXGA+ 1 (Projection Design)
Resolution: 1400 * 1050 pixels
Light: Up to 4200 lumens
Lenses: Ultra Wide 1:1
Two projectors mounted in a special constructed frame for passive stereo 3D-visualization
- Two front projection screens 3.00m * 2.25m and 2.13m * 1.53m (Da-Lite Cinema Contour)
One back projection screen: 2.20m * 1.65m (Stewart Film Screen)
- Surround sound: Logitech Z-5450
- Workstation: Dual core processors Intel Core Duo E6600 2.4 GHz, 4 MB cache, four PCI-e busses
Hard disk: 2 * 10 000 rpm i RAID-5
Graphic card: ASUS GeForce 7600 GS (nVidia) 2GB RAM (PC2-6400)

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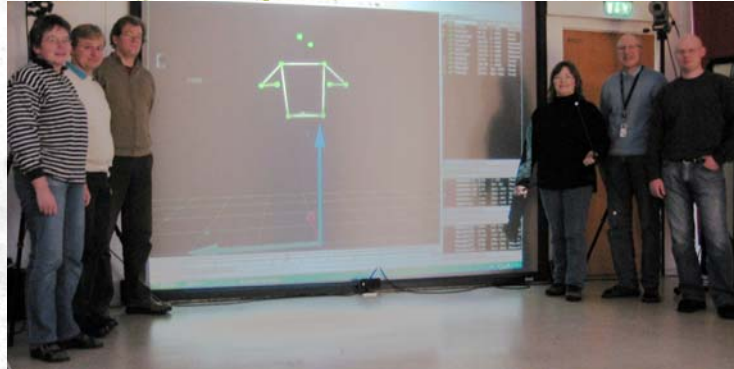
The LoCMoC project(2008)



- LoCMoC is a Bachelor project at HiST, AITeL
 - Computer Engineering Programme
- Main objectives
 - to develop a lowcost visualization system for motion capture data
- [Video](#), [Application](#)
- The students:
 - Are Akselsen, Tommy Fredriksen, Håvard C. Skåle
- <http://stud.aitel.hist.no/locmoc/>

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R&D - Motion capture and 3D-visualization staff at HiST AITeL



Associate Prof. Mildrid Ljosland
PhD-scholarship holders Atle Nes og Rune Bakken
Assistant Prof. Grethe Sandstrak
Associate Prof. Jan H. Nilsen
Assistant Prof. Tomas Holt
Associate Prof. II Bjørn Sæther, (Ikke tilstede)

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