

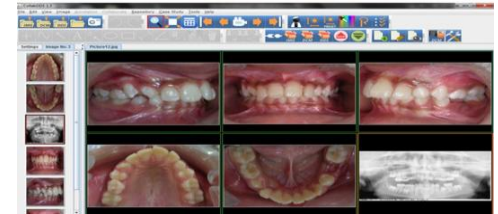
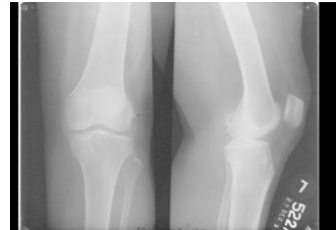
## II NKN Annual Workshop

### Enhancing Research Collaborations through NKN

## COLLABORATIVE TECHNOLOGIES FOR CAD & MEDICAL /DENTAL APPLICATIONS

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### CollabCAD & CollabDDS



# Collaborative Technologies

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## WORKSHOP THEME

### ENHANCING RESEARCH COLLABORATIONS THROUGH NKN

**CollabCAD: Automotive and Mechanical Design**

**CollabDDS: Collaborative Digital Diagnosis System**

# CollabCAD: Collaborative CAD/PLM/ERP



Initiative  
of

National Informatics Centre (NIC, Department of Electronics and Information Technology)  
Bhabha Atomic Research Centre ( Department of Atomic Energy)  
Vikram Sarabhai Space Centre (Department of Space)

## CollabCAD

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- Indigenous 3D CAD/ PLM/ ERP software
- Java, Java3D, Java RMI
- OpenCascade, Open-source solutions ....

**Total solution - Product Design, Drafting, Numerical Control  
Visualization, Simulation, Analysis  
Data Management, Workflow and ERP**

# Releases

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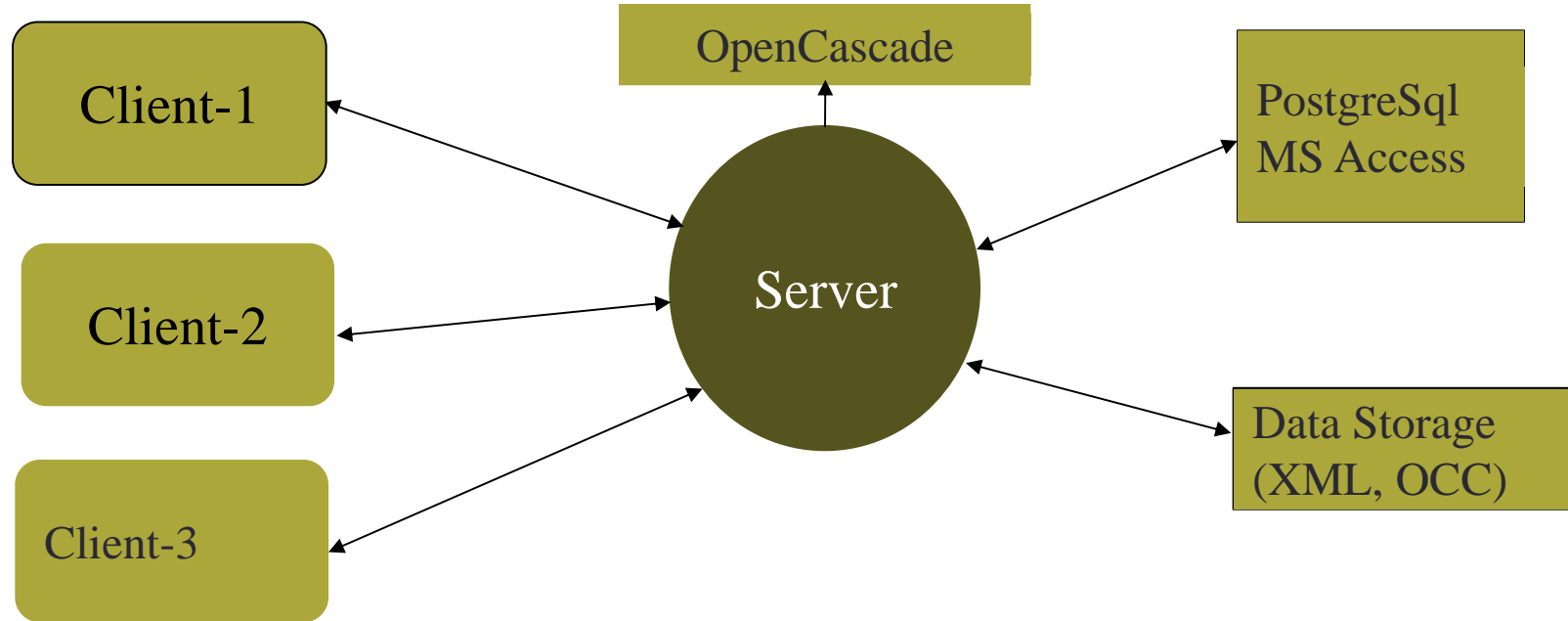
- Latest Release:
- **CollabCAD Version 1.9.9b (October 2013)**
- Academic version 1.9.8 available for free download  
<http://www.collabcad.gov.in>
- Runs on Linux, Windows
- CollabCAD runs in 2 modes:
  - Collaborative (Client-Server)
  - Stand Alone

# Highlights

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- Collaborative .. Intranet and Internet - Concurrent / Dynamic Sharing of same Design across net between multiple designers
- Uses proven Open source software and Open standards
- Cost-effective solution as development cost is low
- Client-side scripting using Jython for automation
- XML based geometry data storage & Database connectivity
- Tolerance Analysis for Assembly & Manufacture
- HTML help and also Context-based search
- Plot Configurator, BOM and BarCode for ERP Solution
- Virtual Reality & VRML Preview
- Reverse Engineering - Re-create geometries from measured points
- Product Lifecycle Management- Content Management & Workflow
- Customized ERP Application
- Interface to MRP/SCM/CRM

# Software Architecture



## Collaborative Design

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- Facilitates rapid product visualization
- Drastically cuts down the time for
  - Requirement specification
  - Modeling
  - Review
  - Analysis



## Collaborative Projects

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- Mega projects worth thousands of crores
- Subsystems developed at various locations
- Collaborative development involves large number of Designers
- To be completed in strict time schedule

## Collaborative Projects

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- CollabCAD allows geographically dispersed users to share information
- Deployment of CollabCAD can come very handy
- Greatly enhances the interactions
- Reduces the time frame for decisions

## Collaboration With CollabCAD

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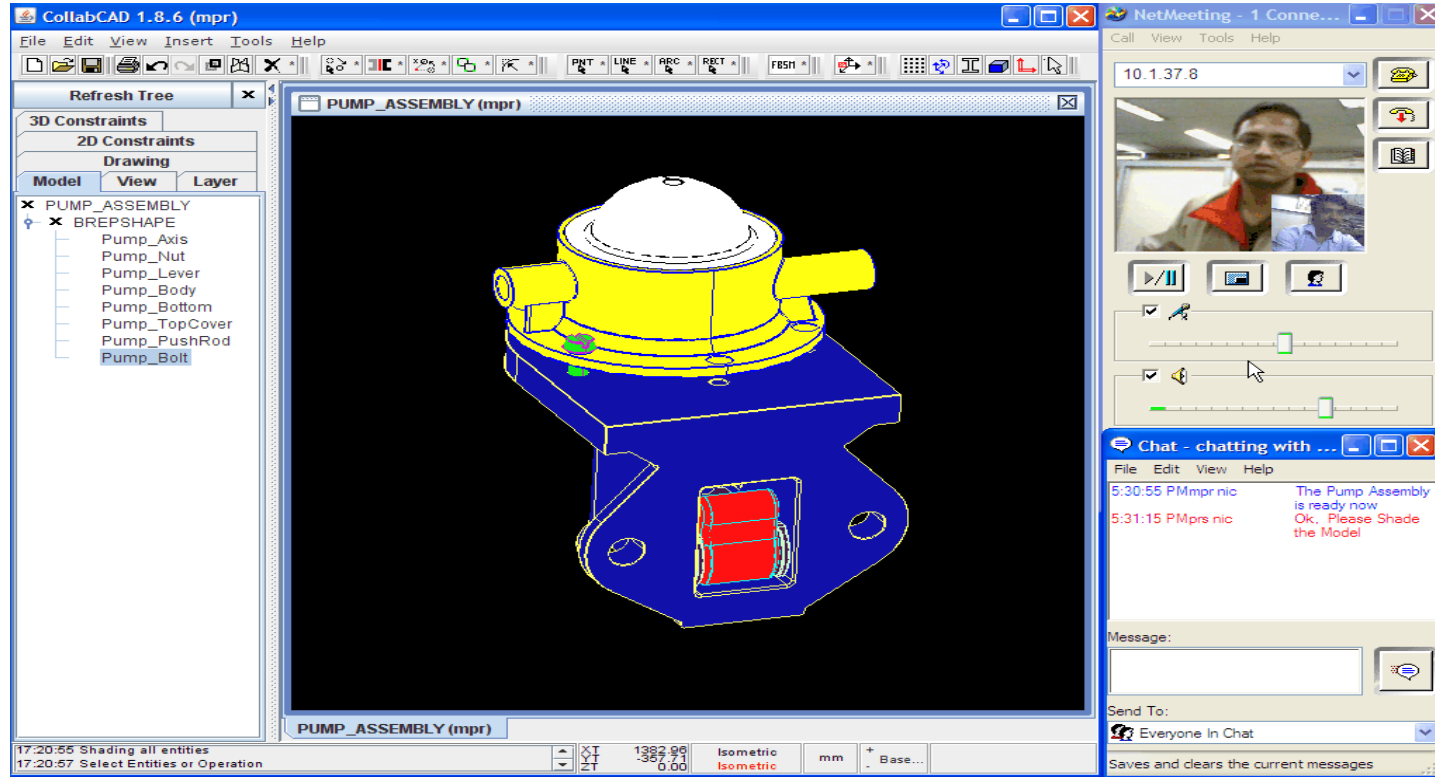
- Work together on complex cases using engineering drawings that are maintained on a central Server
- Mechanical systems have thousands of machined Components
- Each component has hundreds of dimensions

## Collaboration With CollabCAD

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- Interfaces among components need to be precisely defined
- Ensure smooth functioning between them and the adjacent parts
- Amount of data transfer and speed with which they have to be transferred is high
- Low latency & high bandwidth of NKN would make the online interactions feasible among physically distributed users

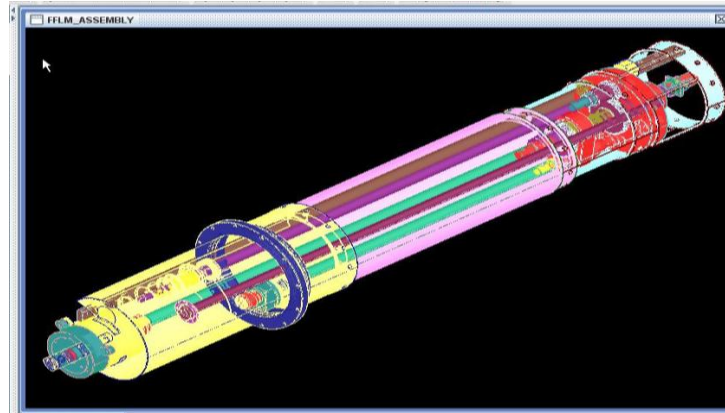
# Collaborative Design.....



## Sub-Assembly

Sub-Assembly of the 52 components which represent a 3D model of FFLM (Failed Fuel Location Module) in CollabCAD

Part of the Prototype of 500MW Fast Breeder Reactor being built at Indira Gandhi Center for Atomic Research, Kalpakkam



# CollabDDS: Collaborative Digital Diagnosis System

NKN Model Project



CollabCAD Group, NIC, New Delhi  
Department of Radio Diagnosis, AIIMS, New Delhi  
Department of Orthodontics, CDER, AIIMS, New Delhi  
OrthoCAD Group, Mechanical Engg, IITB, Mumbai  
CSIR-Central Scientific Instruments Organisation, Chandigarh

## Synergy of Experts

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- Medical and Dental disciplines
  - Dentistry-Orthodontics
  - Medicine-Orthopedics, Radiology
- Computational Methods
- CAD/Rapid Prototyping
- Image Processing & Pattern Recognition
- Medical Imaging



## NKN Model Project

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- Network Enabled Medical Diagnosis and Education in Skeletal Imaging using X-Rays
- Undertaken as a Proof of Concept to provide a Network based system for diagnosis using X-Rays and DICOM data

# Objectives

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- To create an integrated environment for visualising medical and dental images for Diagnosis & Treatment Planning in an online collaborative mode
- To develop a repository of teaching files to aid in Medical and Dental Education & Research

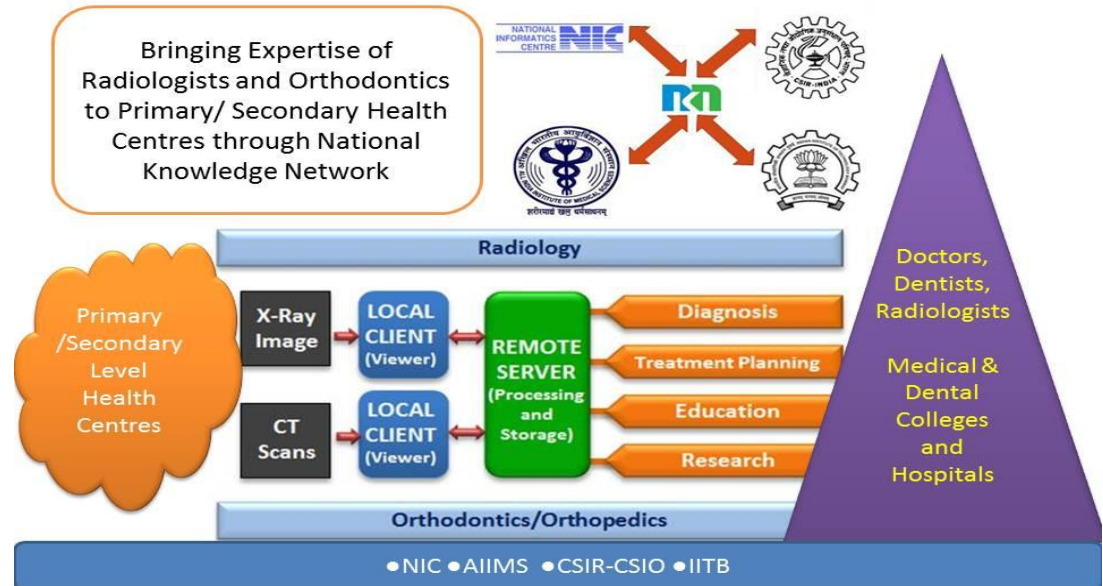
# CollabDDS



***V1.4 October 2013***

## NKN-CollabDDS: Collaborative Digital Diagnosis System

Bridging the divide between Rural and Urban Health – Towards Inclusive Society



System Requirements: OS: Windows or Linux, RAM 1 GB Minimum, Free Disk Space 1 GB



## CollabDDS

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- Application to visualise X-rays and DICOM files
- Transmit this data over Network
- Collaboration in Real time
- Image Manipulation Tools
- Tools to annotate and measure
- Repository
- Case Study Framework

# Advantages of CollabDDS

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- Efficient Digital Workflow of X-Ray Imaging
- Improved Diagnosis and Treatment by Collaborative Consultation
- Enhancement of Quality of Medical Services in Rural Areas
- Security and Accessibility of Medical Records
- Education based on Real Time Diagnosis

# Benefits

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- Beneficiaries - Patients @ peripheral hospitals
- Opinion of expert
- Savings: Time & Money
- Specialty, clinical, teaching/research faculty and students
- Unusual difficult cases can be discussed

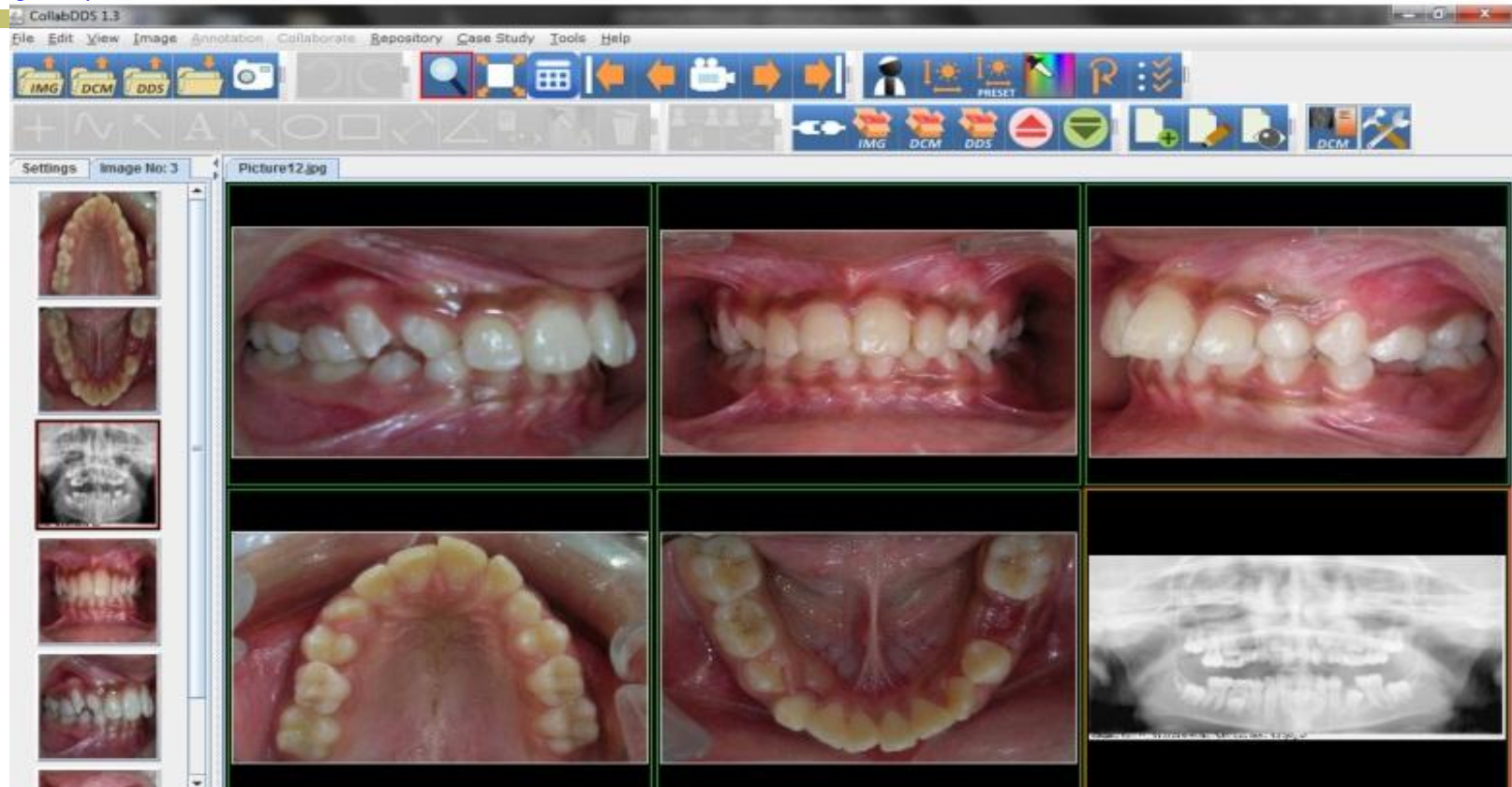
## Strengths of CollabDDS

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- Strength of such a system over telemedicine/web based consultation
  - Real Time Collaborative Environment
- Development of Repository of teaching files to aid in medical and dental education
- Case Study Framework







## Looking Ahead.....

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Operational Research Phase : Pilot Implementation of CollabDDS

Enhancement and advanced applications on 3D imaging

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## CollabDDS @ NBRC

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National Brain Research Centre has created a repository of images collected from their collaborators, through a web based application

- Huge volume of data generated in the collaborating hospitals
- NBRC to use CollabDDS for real time Collaboration with their other centres
- Annotate and store for Research or Education purposes
- Data to be anonymized before putting a copy in the NBRC repository area for research and educational purposes

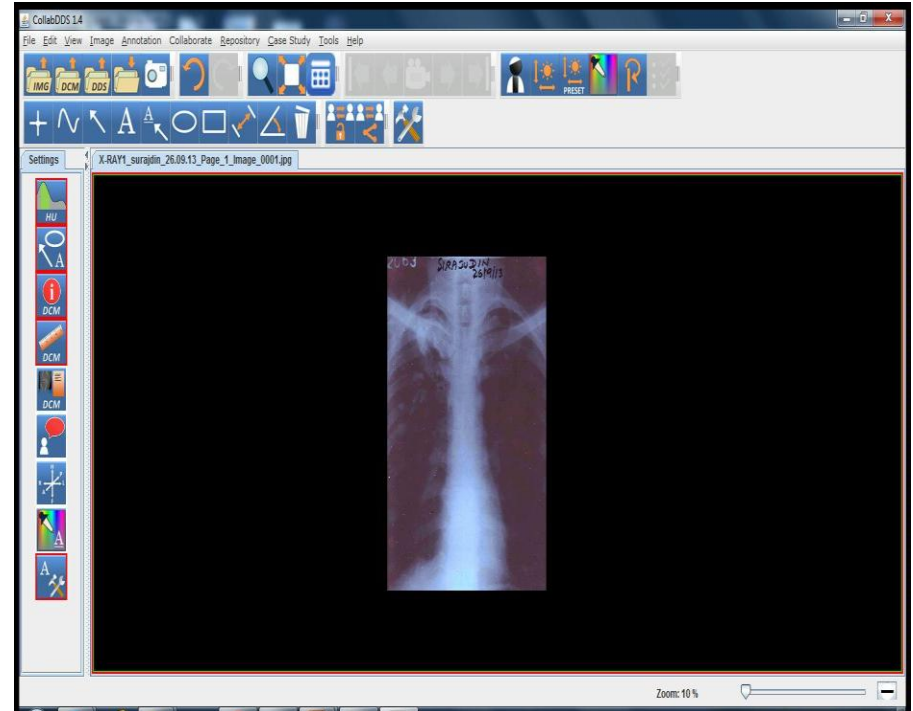
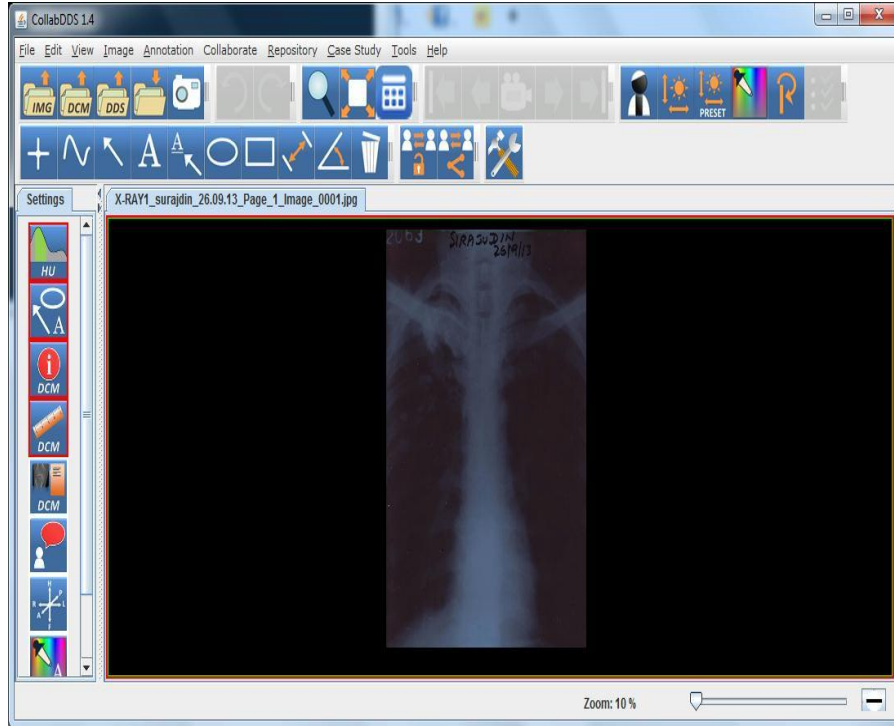
# CollabDDS @ National JALMA Institute of Leprosy

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## National JALMA Institute of Leprosy and Other Mycobacterial Diseases

- National Medical Rural Health Units
  - ICMR Project
  - Leprosy & TB
  - Interaction with Mentor Institutes
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- Poor quality X-rays
  - Images Scanned on Ordinary Scanner
  - Enhanced Using CollabDDS - Aids Diagnosis

# Image Enhancement



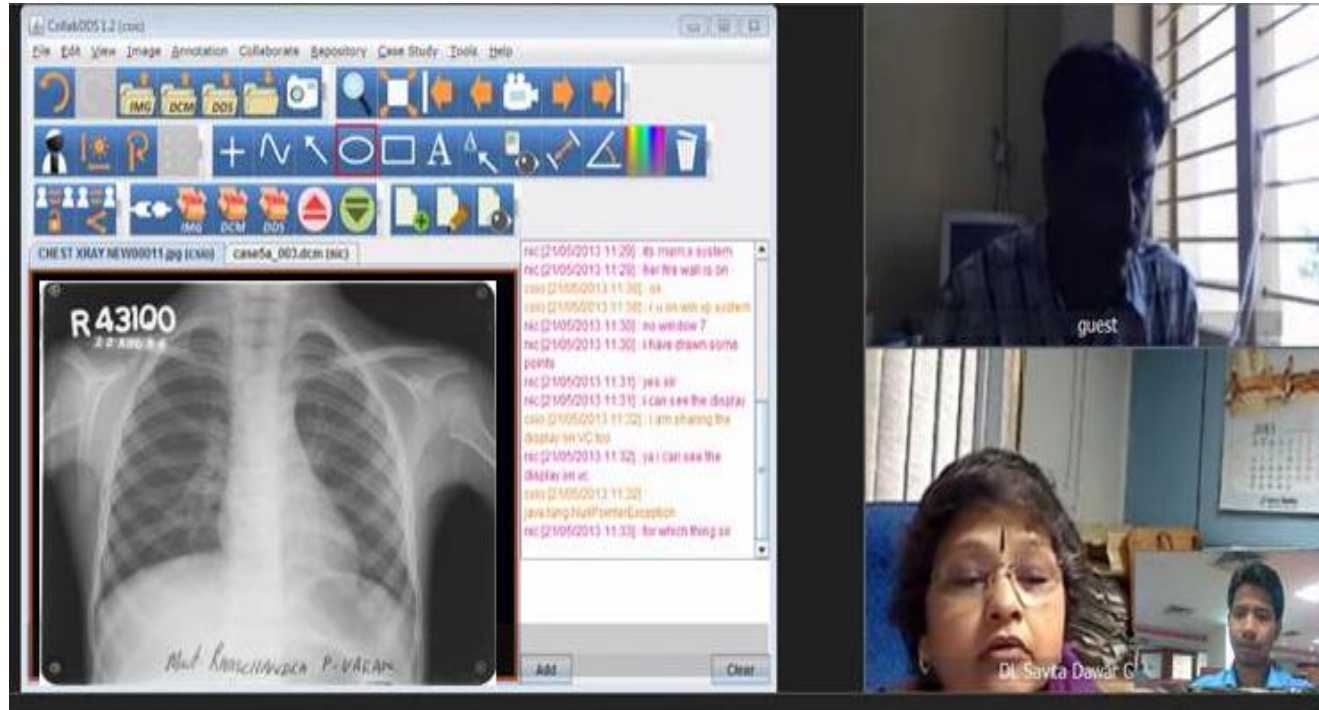
# Pilot Implementation of CollabDDS

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## Medical and Dental Colleges

- SN Medical College, Agra
- Government Dental College, Goa
- Government Dental College and Hospital, Ahmedabad
- Bangalore Medical College, Bangalore
- SMS Medical College and Hospital, Jaipur
- Sher-i-Kashmir Institute of Medical Sciences, Srinagar

# Collaboration with SN Medical College Agra





**CollabCAD Group, NIC, New Delhi**  
**Bhabha Atomic Research Centre, Mumbai**  
**Vikram Sarabhai Space Centre, Trivandrum**



**CollabCAD Group, NIC, New Delhi**  
**Department of Radio Diagnosis, AIIMS, New Delhi**  
**Department of Orthodontics, CDER, AIIMS, New Delhi**  
**OrthoCAD Group, Mechanical Engg, IITB, Mumbai**  
**Central Scientific Instruments Organisation, Chandigarh**

**Thanks to NKN!**

E-mail : [collabcad@nic.in](mailto:collabcad@nic.in)

<http://www.collabcad.gov.in>



# CollabDDS Demo.....

## System Configuration

RAM	2 GB (Preferred 4 GB) (CollabCAD) 1GB ( CollabDDS)
Free Disk Space	2 GB (For CollabCAD along with PLM, CAE, FEA) 900MB (CollabDDS)
Virtual Memory	800 MB to 1 GB
Graphics Card	Open GL Supported Hardware Accelerated Graphics Adapter with 64 Mb VRAM: Graphics Card based on Nvidia Chip set: Eg Asus
System	Intel and AMD Based Systems
<b>Operating System</b>	<b>Windows &amp; Linux</b>