

# The University of Queensland

## Centre for Microscopy and Microanalysis

### The GRANI Project

Requirements Analysis - Survey of Existing and Required Archival Facilities and Services

#### Access to Instruments

1. *Are all of your instruments online? If not, how many instruments do you have and what percentage are online?*

Only one cryo-TEM at IMB is controllable remotely – but only via local network. The other instruments only permit you to see images under microscope remotely not operate them. None are outside firewall.

2. *Do you have an online booking system? How is this accessed?*  
Calcium booking system – password controlled

3. *If not, what is the process for booking an instrument.*

Process for users a) apply for membership using online form linked to FileMaker Pro database; b) Interview with JD to assess best microscope and required training c) Book into training session; d) Pay membership fee; e) Pass training course/competency test; f) form completed by trainers (Ron, Graham) and sent to Bronwyn and Kay; g) Kay emails login id to user, plus DSX card and login id/password to access Calcium booking system plus swipe card to lab

4. *What is the charging scheme – subscription or time-based? Individual or organization-based?*

\$1500 per person per year internal

\$4,000 per person per year external

5. *Do you have secure logon procedures for registered users? Is it password controlled? How do users register and acquire a login id and password?*

- 1) Calcium booking system
- 2) DSX
- 3) FileMakerPro – records usage
- 4) Shared common file system – to store images

6. *How long can users book an instrument?*

*Booking limits – peak times (8-5) max of 2 x 2 hour sessions on TEMs and SEMs.*

*Unlimited bookings outside these hours. Some microscopes require longer sessions e.g., 12 hours so no limits to booking time e.g., Probe, Biological and Physical TEMs*

7. What security is used to stop hackers? Are the instruments behind firewalls?

*Currently all instruments and servers behind firewalls - BACS want to remove firewalls and replace with private VPN. BACS will only support Windows XP – not Mac or Linux*

### **Telemicroscopy**

8. How many instruments can be used remotely?

*None - one*

9. Are they connected to broadband networks? i.e., GrangeNet? What bandwidth?

*Aarnet or GrangeNet – Jill will have invoices from BACS for network usage*

10. How are the samples transferred and prepared?

*Vast majority done locally*

11. Is simultaneous videoconferencing available and a necessity?

*Usually operator has speaker phone and is looking down microscope. Remote viewers have 2-3 webcams plus microscope camera plus audio plus mike*

12. How often is telemicroscopy actually utilized? Under what circumstances is it used?

*Once every few months – mainly marketing and educational tool- not for real research. John Hunt doing PhD on Cyberstem  
ActiveX software required.*

### **Image Archival**

13. How do users save and organize their images? As flat files in folders or in databases?

*Saved in flat files in folders in shared directory. Folders named after user e.g., KHodge*

14. What image formats are supported?

*TIFF, Bmp, GIF, JPEG and lots of proprietary formats - .IMG, .DM3, .EDS, .SPT*

15. Do users save images in multiple formats?

*Yes – TIFFs, GIFs, JPEGs*

16. What image conversion services would be useful? e.g., tiff -> thumbnail

*Quite a lot is already available – MRC->TIFF, TIFF->MRC, using ThumbsPlus, ImageConverter*

17. Does each instrument have its own proprietary software?

*Varies – some have microscope plus built-in software, some have microscope plus camera and external software – depends on the age of the instrument. EMs that are 10-15 years old have had lots of things added*

18. Are there built-in image analysis and manipulation tools?

*Some*

19. Are any instruments connected directly to databases?

*Yes – some have own proprietary databases – but users told not to use them as no support*

20. What facilities exist for saving metadata/data with images?

*KV (kilovolts) and scale bar recorded directly onto image*

*TEMs – can save settings in header of TIFF file or DM3, SPC, IMG formats*

*Microprobes produce 2 files – image and a .TXT file*

*Some people use the file name e.g., hunter\_Sept24\_img1*

21. What data/metadata can be saved automatically/manually?

*KV and scale bar*

22. How do users relate an image to sample coordinates? What happens when a session is interrupted?

*A problem – put a mark on their sample to ensure it is positioned in same place*

23. Are there limitations on users' storage space?

*No – but deleted after 40 days. Limit is on space on server*

24. What happens when users exceed their space limitation?

*Hard drive 120 GB, Shared file store 70GB*

25. Are there time-limits on local image storage?

*2 weeks – in reality 40 days*

26. Are there any search and retrieval services for finding stored images?

*No – only Microsoft Find*

27. What kinds of search and browse facilities do you envisage?

*Name, Date, SampleId, Project*

28. How much disk space is available for recording image data?

*70 GB*

29. How do most users archive their images in the long term? On what medium?

*CDs, DVDs*

30. How do users transfer very large images/files across the network?

*Temporary ftp site*

31. Do users want to be able to share images with others? What kinds of sharing and access policies do you envisage?

*User, group, others – read, write, delete, copy*

32. What useful value-add services could be provided e.g., annotation services?  
Watermarking? Image segmentation?

*Yes – do want annotations and image segmentation – some software available e.g, Metallurgy dept. NIHImages, ImageJ.*

*Can't add watermarks because it corrupts/modifies image – need precise provenance information. Also don't want to do the training associated with value-add services*

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Finally –

- nominate which items are mandatory, highly desirable, desirable, optional, unnecessary (M, HD, D, O, U)
- nominate which items are high priority, medium priority, low priority (HP, MP, LP)

#### CMM Requirements Analysis Sept 13 Notes

- 1) when transferring large files – create temporary ftp site
- 2) Saving images – normally to CD or DVD. Some users create 2 CDs with mirror copies on each because servers can go down and lose the lot
- 3) During microscopy sessions, create huge amounts of data – but only keep relatively small amount – most is scrapped
- 4) Ideally – 3 areas
  - a. private work area – large amounts of data;
  - b. group/restricted access
  - c. public/open access area
- 5) Problem – excessively large files and large numbers of them – can't save to DVD or CD – what to do with them?
- 6) Files in shared storage area – deleted after 40 days. Need option to store long-term to RAID storage.
- 7) Problem of how to retrieve images and data from legacy DVDs, films from 60s and glass plates
- 8) Need to be able to trace the source of an image or data – CMM, Brisbane or Uni of NSW ...- if instrument details are attached, then the image can be traced
- 9) How long should “stuff” be kept – 5 years? - people leave, die etc
- 10) Some microscopes have separate cameras and separate databases and separate software – newer microscopes have this all built in – often proprietary
- 11) Telemicroscopy – used to have web cam on microscopes – 3 room cameras plus microscope camera – problem with people being on camera constantly – web stalking also issues wrt. confidentiality of data. Also removed public booking system on Web – privacy issues
- 12) Booking limits – peak times (8-5) max of 2 x 2 hour sessions on TEMs and SEMs. Unlimited bookings outside these hours. Some microscopes require

- longer sessions e.g., 12 hours so no limits to booking time e.g., Probe, Biological and Physical TEMs
- 13) Databases – a) Calcium booking system – web based – can see who has booked what. b) DSX system – cards required to login to instruments – only some instruments have DSX access c) FileMaker Pro – database of users and log of instrument usage – web-accessible databases are slow
  - 14) Databases backed up weekly – incremental backups hourly
  - 15) Different login ids and different passwords on different machines – need single signon
  - 16) Membership fees \$1500/year/person – time limit of 100 hours; external \$4,000/person/year (e.g., CSIRO, DPI, Art Gallery). Membership fees cover <10% of actual budget of CMM
  - 17) All images and data from sessions go into user-name folder in shared file area. One login id/password for everyone – open access, anyone can delete anything
  - 18) All users encourage to take copy of data with them when they leave – will be deleted in 2 weeks
  - 19) Instruments used to be on web – now behind firewall. Problem with hackers putting web sites on servers
  - 20) QBP – own IMB IT dept and separate rules to Otto and Hawkin – these depend on BACS ITS. AIBN to share with QBI and to be managed by BACS
  - 21) Shared file store on server – mirrored on a second server. Backup has fallen over because of old hardware. Just upgraded storage on existing server.
  - 22) Only one microscope (IMB) can be controlled remotely – cryo TEM microscope – very sensitive don't want any vibrations. Someone still has to load samples, fill nitrogen. Connected only to local private network in IMB.
  - 23) Most microscopes – can see images remotely but can't actually control instrument
  - 24) Online Calcium booking system – password controlled. Can only book time on instruments that you're licensed to use. DSX needed to access instrument. Logon to FileMaker Pro to record usage. Logon to shared file system to save files.
  - 25) Security – instruments currently behind firewalls. BACS want to remove firewalls and put on private VPN. BACS will only support Windows XP – no Macs or Linux machines
  - 26) Cyberstem – purely educational and marketing tool – someone needs to prepare and load specimen; can't operate remotely or load remotely; RS232 port – enough lag to be very frustrating
  - 27) Half the data is images and half is analytical e.g., spectrometry data. Processing of data and images e.g., matrix correction required to calculate chemical analyses – better to do this offline – can be very time consuming
  - 28) JEOL 64/40 does have software that provides a Web interface to database – may be worth investigating
  - 29) Number 1 priority – a single centralized database