QSS HARDWARE
QSS SOFTWARE
APPLICATIONS AND OUTLOOK

QUICK SCANNING SYSTEM NEWS

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QSS HARDWARE

The hardware design of the Quick Scanning System is based on five principles
1) KISS = Keep It Super Simple
2) Commercial
3) Easy to replicate
4) Modular (easy to adapt to different possibilities)
5) Sustainable with minimum funding

At the moment we don't have specific funding for hardware development

Upgrades are incremental and dictated by workload requirements

The system hardware is split into
- Emulsion readout part
- Postprocessing (mostly tracking) part

QSS HARDWARE

Standard setup

- ESS XY stage
- ESS Nikon trinocular
- Modified MICOS box
- Nikon 20× (NA 0.75)
- CMC 4000 (4 Mpix, 385 fps)
- Radient DFCL
- 1 Dell Precision Workstation
- ProDex MAXk 4000/5000
- nVidia GTX 690 or better (currently 980 ti)

Obtained ~95% microtracking efficiency on OPERA-like emulsions
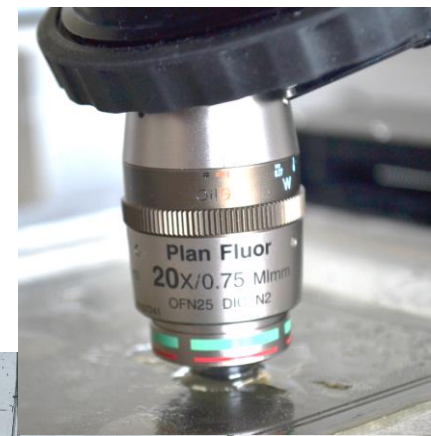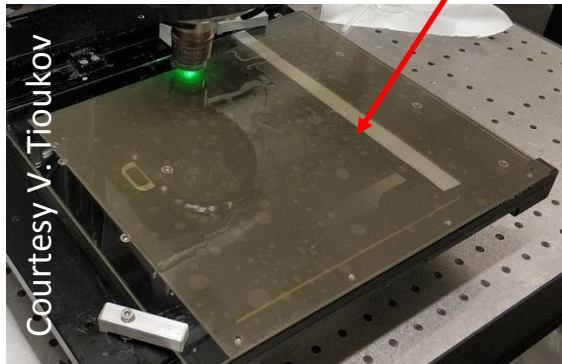
QSS HARDWARE

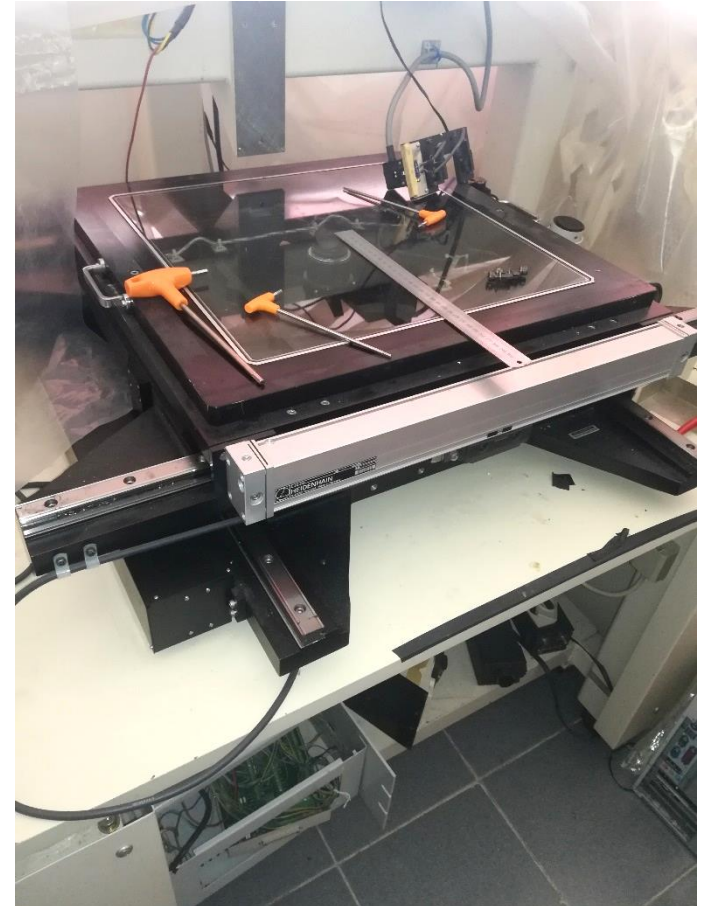Alternate setup for large area emulsion films

- Nikon large area stage (~36×36 cm²)
- Nikon trinocular
- Same motor box, different gearing ratio of motor power output

Scanning such films is hardly sustainable for us:

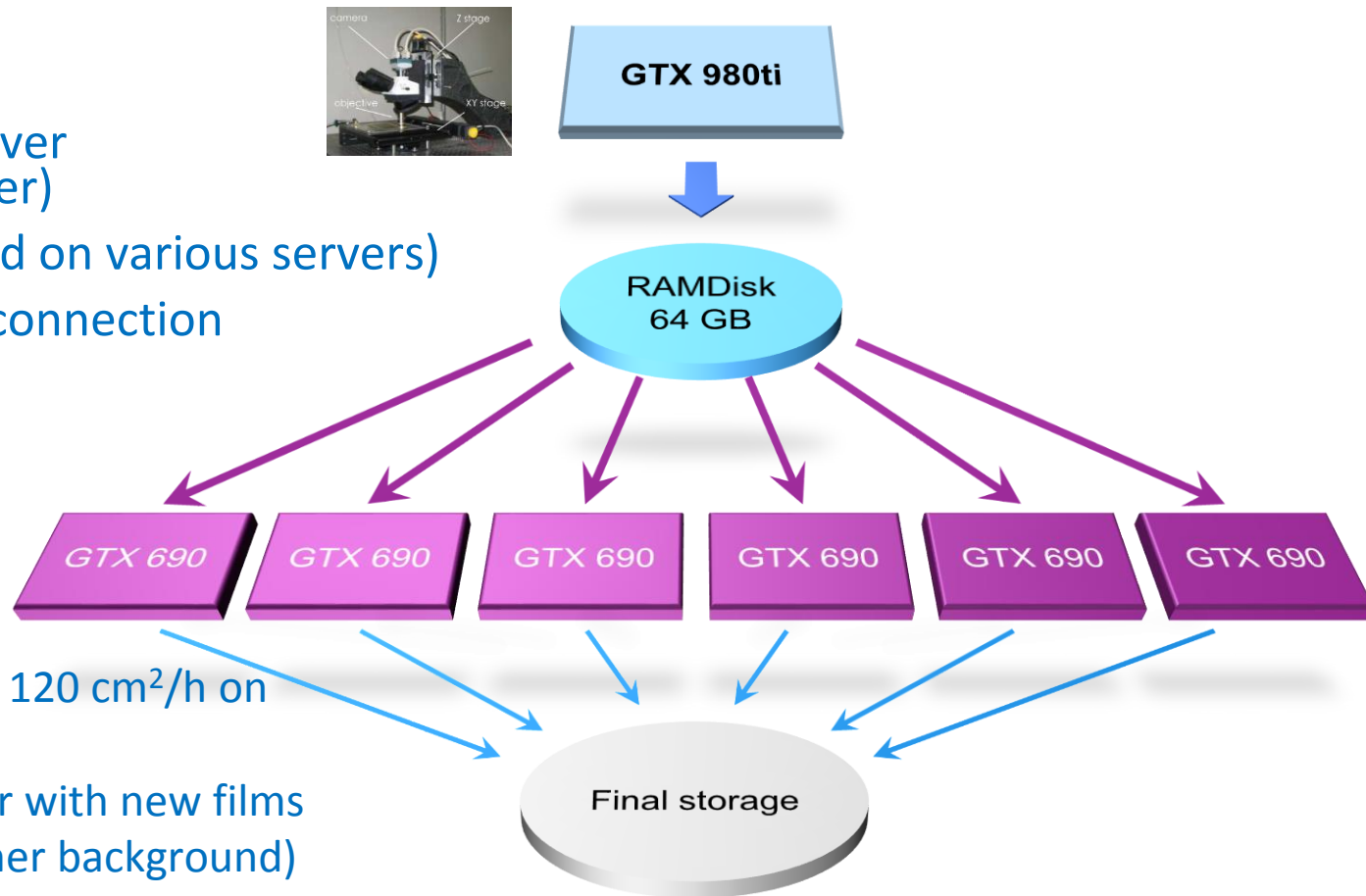Courtesy V. Tioukov

No dedicated manpower for scanning

Film setup once or twice per day (9:00-14:00)

QSS HARDWARE

Post-Processing HW

- 1 distribution server (64 GB RAM buffer)
- 6 GTX 690 (hosted on various servers)
- 1 Gbps network connection

This HW could sustain 120 cm²/h on OPERA-like emulsion

Speed 2÷3 times lower with new films (90 μm thickness, higher background)

Not a problem as long as load is small (not many films to scan)

Incremental upgrade foreseen (no funding for scanning system, using University funds)

QSS SOFTWARE

SySal.NET now evolved to run on 4.5 NET Framework (or Mono 5.x for offline tasks)
Fully back-compatible (including Oracle connectivity, now using Managed ODP.NET)
Python libraries for RWD and TLG files (run analysis on Windows/MacOS/Linux)

Windows 7 64 bit for data acquisition (NExTScanner)
(Windows 10 64 bit might work, driver incompatibilities to be checked)

Windows Server 2003 or better for Post-Processing Manager (RAM buffer manager)
Porting to Linux Debian 9 or CentOS 7 scheduled (1 year from now)

Windows 7 or better (currently using Windows 10) for GPU Tracking Servers,
running on CUDA 8.0 or higher
Porting to Linux Debian 9 or CentOS 7 envisaged (1 year from now)

APPLICATIONS AND OUTLOOK

Currently focusing on muography applications

Need specific funding for major upgrades

QSS evolution will continue in incremental mode according to needs and usage

SW is general and can accommodate different hardware

Areas for improvement (in order):

- Computing power for tracking
- Camera speed
- Field of view
- Frame grabber

Preview from La Palma fault exposure
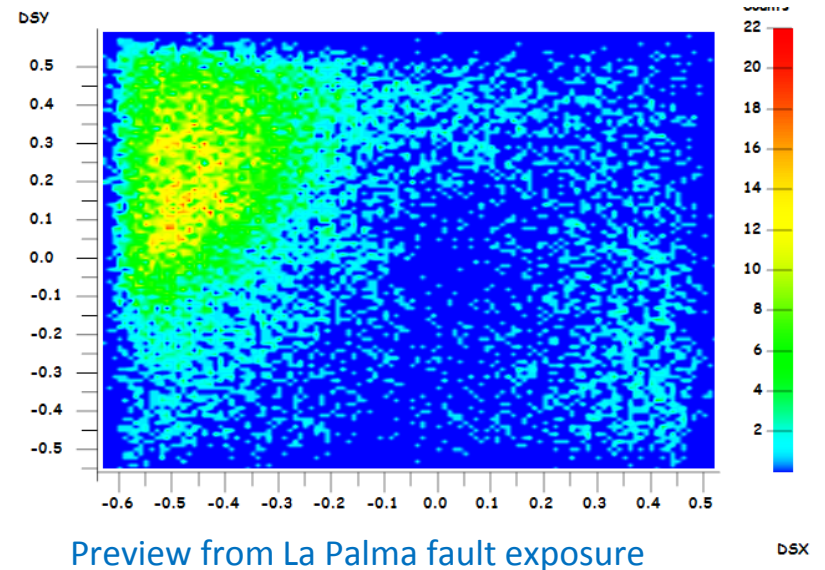
The system is very modular, but fund allocation must be optimized (upgrades/human resources)