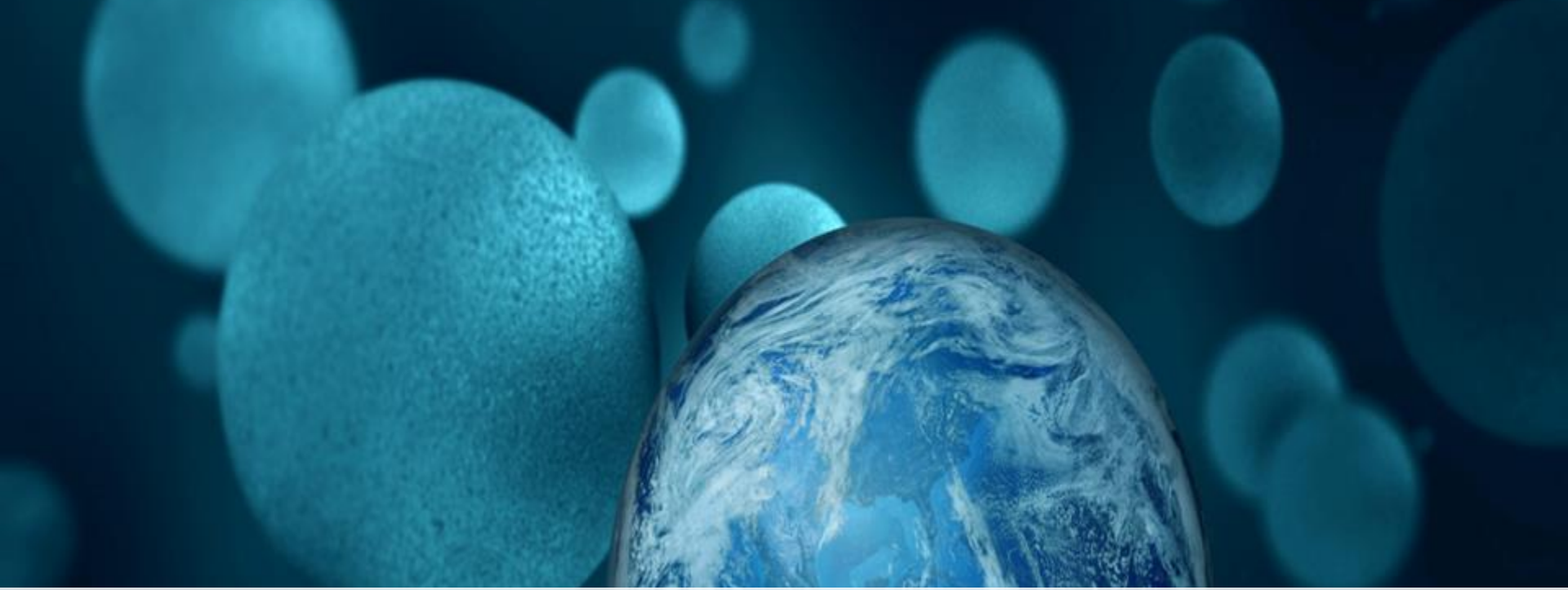

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# Accelerate CryoEM Success

National Facilities Workshop, NYC, Feb 6-7, 2017

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# Goal of the Meeting

- A major goal of the workshop will be to discuss best practices for managing CryoEM facilities. Topics to be discussed will include sample handling, instrument management, computational environments, training, user management and workflow.

Thermo Fisher vision for cryoTEM:
*Moving from product based support to outcome based support*

How can ThermoFisher support National Facilities:
*Accelerate cryoEM success by remote system monitoring, user training, and support for facility service model*

# Outcome Based Support

- National Facilities: Characteristics and Requirements
- Workflow and Possible Hurdles
- System Health Monitoring
- User Training & Support
- Remote Operation

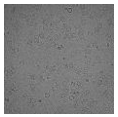
# National Facilities: Characteristics and Requirements

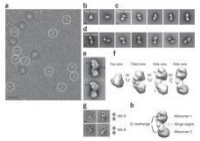
- Characteristics
  - Lots of different users / customers
  - Queue of jobs
  - 24/7 usage
  - More Krios's in the same facility
  - User scheduling
  - User billing
- Requiring
  - High uptime
  - Schedulable downtime
  - High productivity
  - Secure data management
  - Sample logistics
  - User logistics

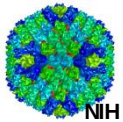
**From academic instrument**  **To industrial tool**

# Workflow and Possible Hurdles

| Sample making | Sample screening | Data collection | Processing |
|---|---|---|---|






*possible negative stain step*

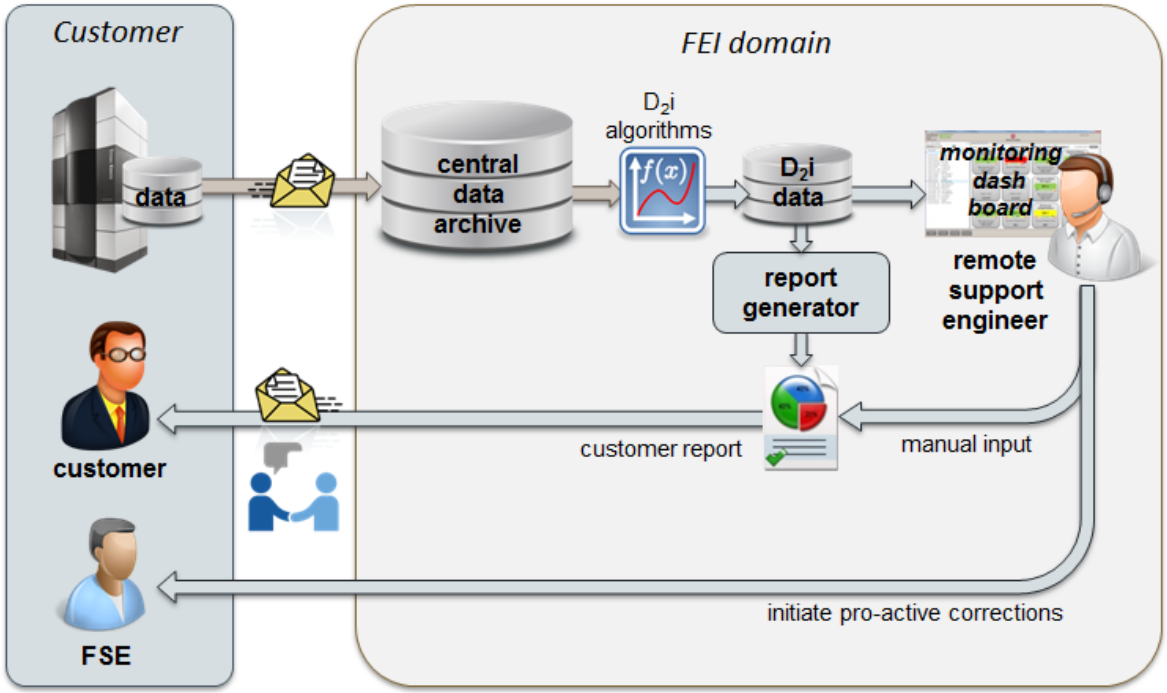
## Possible hurdles

| | | | |
|---|---|---|---|
| • Success rate<br>• Connectivity to microscope | • Quick feedback on sample quality<br>• Quality check for moving to high end data acquisition | • Data quality<br>• Throughput<br>• Automation<br>• Uptime<br>• User experience | • Speed of data offloading<br>• Speed of processing<br>• Amount of data |

Connection to the customer

# System Health Monitoring

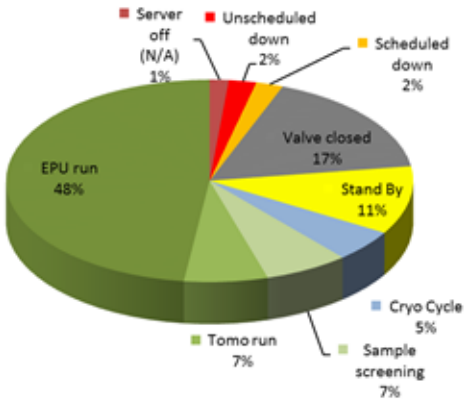
- System parameters in daily e-mail to central archive
- Monitoring dashboard at central service
- Daily check on alarms of system parameters going out of control limits
- Notification to field service engineer and/or customer
- Early warning on trends and failure situations
- Quicker troubleshooting



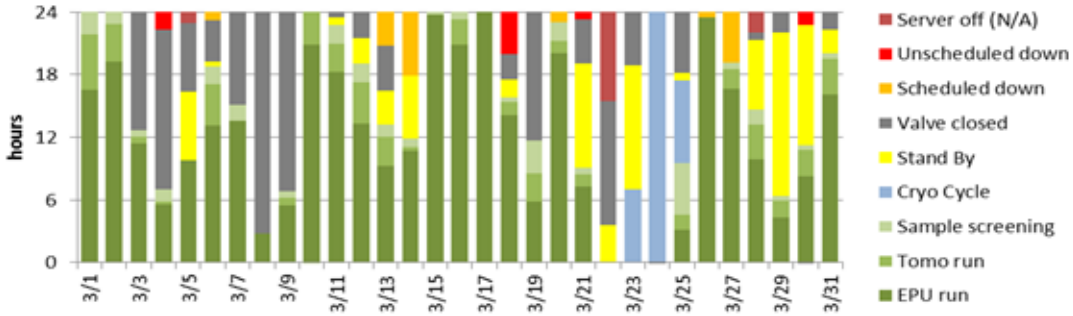
# System Health Monitoring

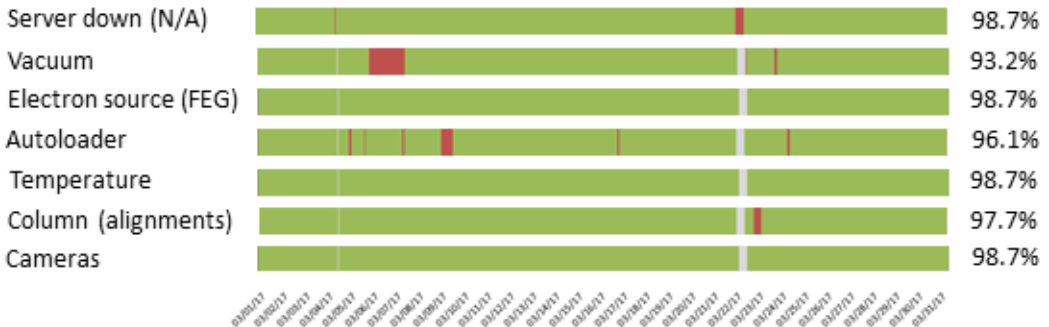
- Insight in usage of microscope
  - Throughput
  - Uptime
  - Downtime better schedulable
- Insight in behavior of major critical components

## Performance Report March 2017
## Titan Krios D1234




| Performance metrics 01-Mar-17 to 31-Mar-17 | | |
|---|---|---|
| Uptime | | 94% |
| Utilization | | 61% |
| Cartridge loads | | 62 |
| Cassette loads | | 23 |
| EPU images | | 4210 |
| Data collected | [GB] | 25.6 |
| Valve open time | [hrs] | 469.7 |
| Server Down | [hrs] | 11.6 |
| CryoCycles | | 2 |

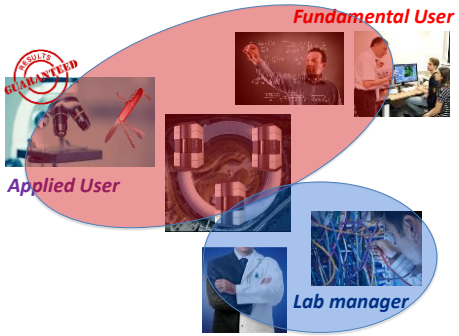


# User Training & Support

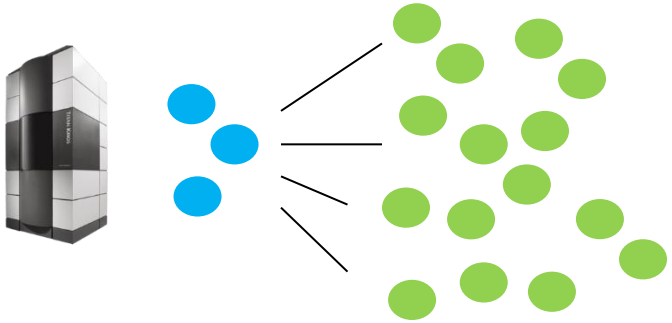
- CryoEM School
  - 9 week fulltime (pilot Leiden/CNB)

**Week 1: Introduction and Sample Preparation**
**Week 2: Image Formation and Basic Processing**
**Week 3: Screening and Optimal Grid Preparation**
**Week 4: Optics and Optimal Microscope Setup**
**Week 5: Camera's and Optimal Settings (incl F3, K2)**
**Week 6: Data Collection**
**Week 7: Full Workflow**
**Week 8: Advanced Processing**
**Week 9: Exam**

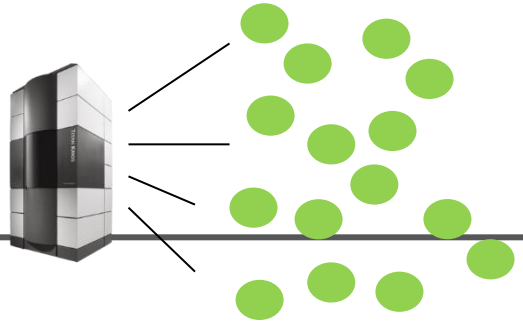



  - Lots of hands-on time
  - Creating online content

- On-site applications support
- Training needs depend on user model
  - Only limited number of experienced users



  - Lots of different, and less experienced, users





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# Remote Operation

## Three Levels of Remote Operation

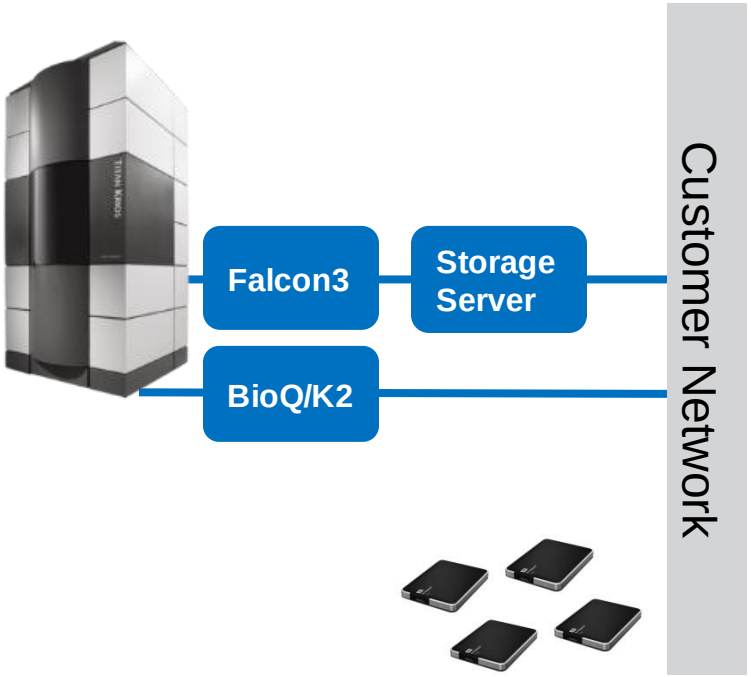
remote monitoring

remote monitoring, limited control

remote monitoring, full control

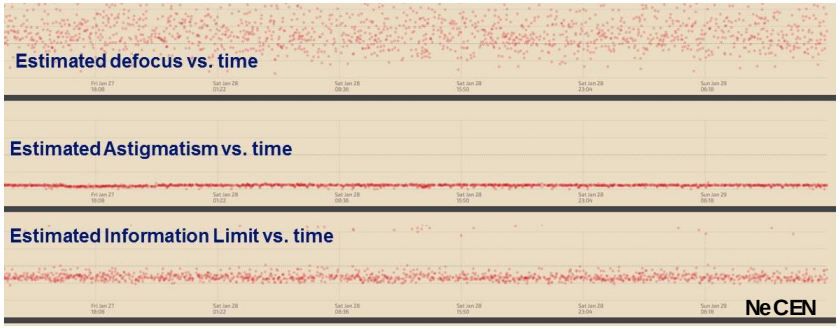
- How is the service model ?
  - Customer on-site to do and/or watch the experiment or remote?
  - Do people want to monitor and/or control experiments remotely?
  - Do multiple users need access to set up experiment simultaneously?
- What can be optimized?
  - On-the-fly check of data quality?
  - Connectivity of data & sample allowing experimental setup on a screening tool?

# Data Processing




- Data processing: public available packages

- Enable and speed up on-the-fly processing while acquiring ?




- Need quick data offloading for a specific customer

- Connection to the cloud for storage and processing?
  - Reduce data on-the-fly?

Thermo Fisher Cloud



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THANK YOU