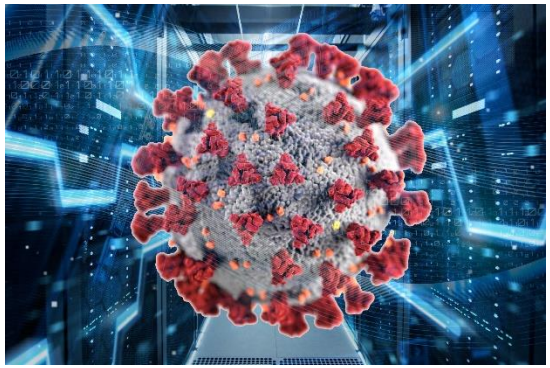
ESRF IT Solutions for COVID-19



ESRF | The European Synchrotron

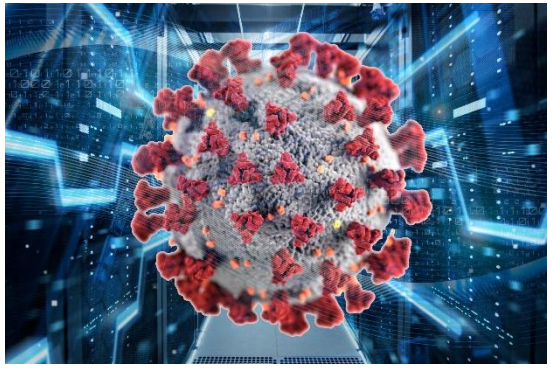
Andy Götz

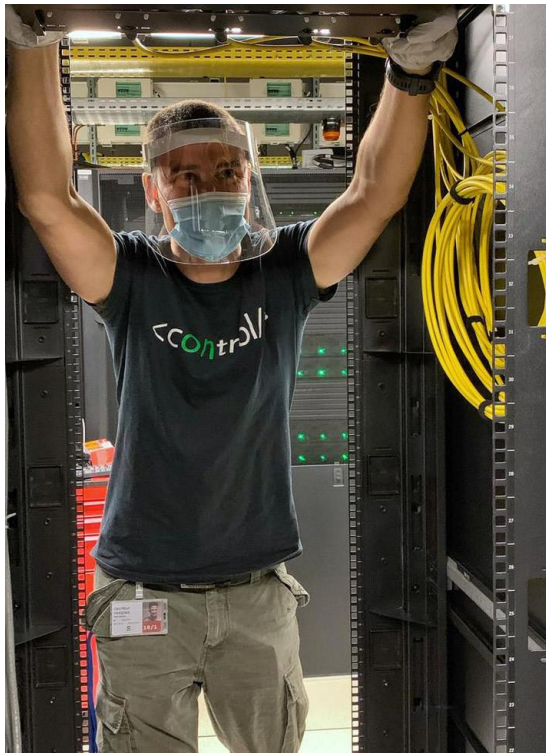
on behalf of ESRF staff working
on IT solutions for COVID-19

LEAPS-IT (remote) workshop on IT for COVID-19

18 June 2020

IT SOLUTIONS FOR COVID-19@ESRF





1. Commissioning a new storage ring under COVID-19
2. Remote experiments
3. Remote data analysis
4. Sharing the data
5. Conclusion

ACKNOWLEDGEMENTS

Laurent Hardy

Jean-Michel Chaize

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Constance Bochot

Thomas Vincent

Axel Bocciarelli

Loic Huder

Aidan Campbell

Antoine Roux

Bertrand Dupré

All computing personnel @ ESRF

EU projects:

PaNOSC
Calipsoplus
STREAMLINE

Collaborations:

ICAT
SMIS
ISPyB

ACCELERATOR OPERATION

Dec 2019
- Commission new storage ring (EBS)
- Until 14 March

14 March
- COVID-19 imposes the accelerator to stop
- Until 20 March no activity

22 April
- From 20 March gradual restart of equipment
- Beam injected with 2 people in control room

13 May
- Accelerator operated with 3 people in control room
- 10 people in remote via zoom

Today
- Accelerator operated for beamline commissioning

credits: **Laurent Hardy**

TOOLS USED FOR ACCELERATOR

- Created **chat** channels for control room
- Created **chat** channel for the controls team, with all remote workers permanently connected
- Created a **zoom** channel for controls and used it for a weekly **zoom team** meeting for following-up the priorities
- Organized one to one **zoom interviews** and project meetings via zoom of 3 or 4 people for following individual project
- Attended to weekly restart **coordination meeting** with the operation crew and representatives of each hardware group.
- **Confluence, jira and jlogbook** have been actively used

ZOOM - LARGER THAN LIFE!

image credits: **Laurent Hardy**

CONTROL ROOM = ZOOM ROOM

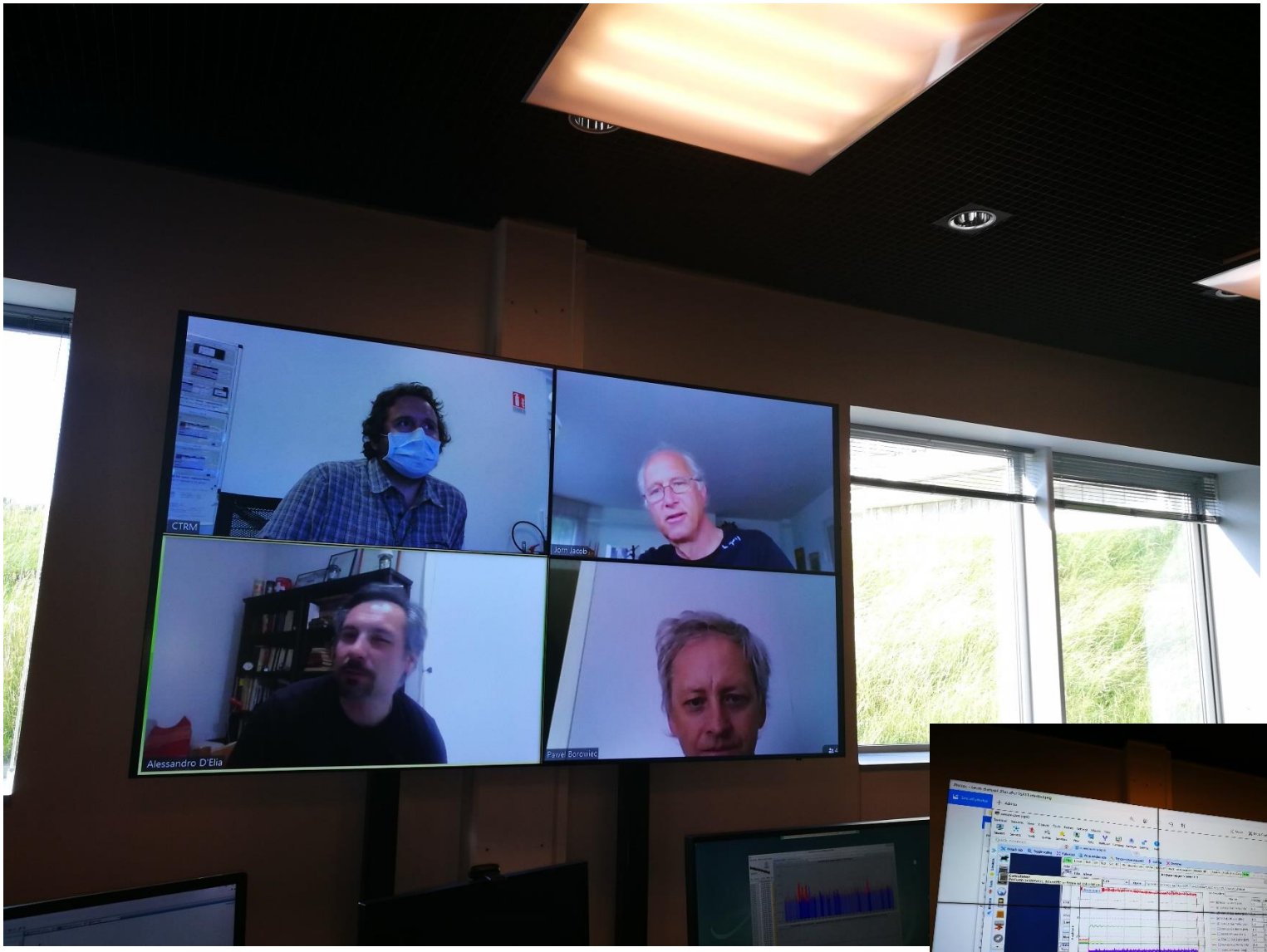


image credits: **Laurent Hardy**

ACCELERATOR REMOTE OPERATION

How do you see the role of zoom in the future - only for interventions or for remote working as well?

Laurent Hardy (Operations Manager):

"For me, ZOOM has become an ESSENTIAL tool for the CTRM. We discovered that complete MDT shifts can be done using Zoom in link with experts and the CTRM. We also discovered that serious failures can diagnosed and sometimes even repaired from home !! And in a more efficient way than on site, since we save the time for travel but also, we can quickly select, after discussion, the best people who will be able to help the Control Room.

So, yes, we will continue to use it. BUT , as said already , a chart for a "good use" should be applied: people are not supposed to be available 24/24 7/7 365/365. If we abuse, they will just disconnect ..."

POST-COVID-19 → HUGE IMPACT ON USERS @ ESRF

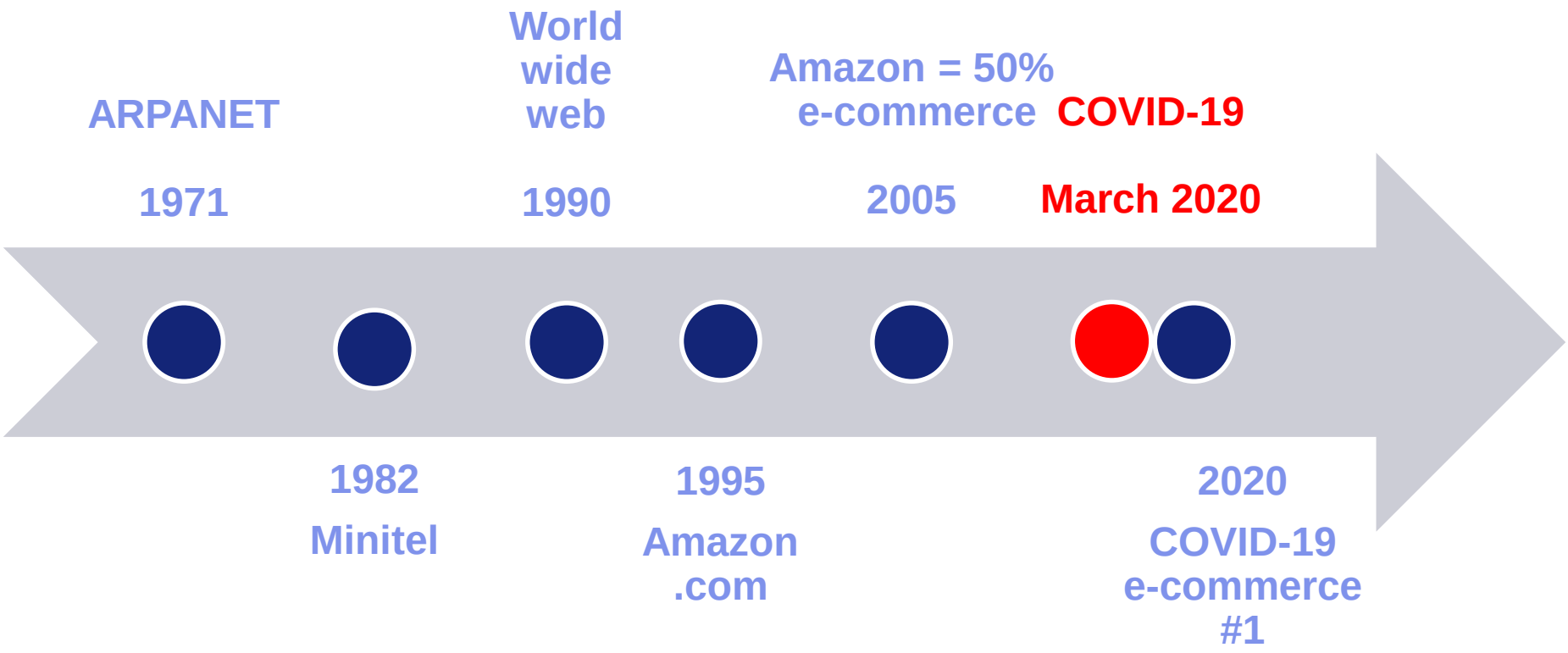
NEW ACCELERATOR STARTUP AFTER 18 MONTHS

USER MODE STARTS 25/8/2020

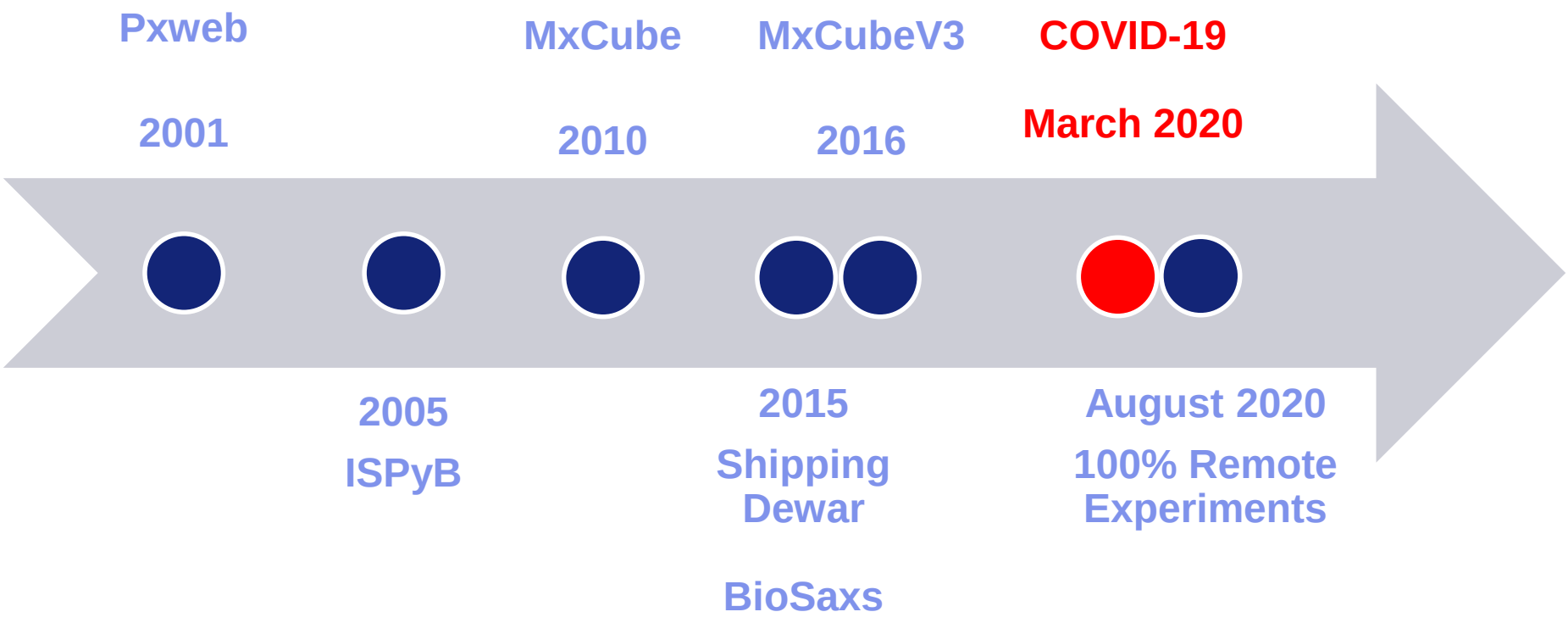
COVID-19 → NO USERS ON SITE IN 2020

1. **ONLY REMOTE EXPERIMENTS IN 2020**
2. **USERS SEND SAMPLES IN PARCELS**
3. **REMOTE ACCESS EXPERIMENT + DATA**

E-COMMERCE TIMELINE



E-SYNCHROTRON TIMELINE



POST-COVID-19 → HUGE IMPACT ON USERS @ ESRF

ENABLE REMOTE EXPERIMENTS ON ALL BEAMLINES IN 3 MONTHS

WORKING GROUP

1. USER OFFICE
2. SAFETY
3. SAMPLE TRACKING
4. REMOTE DATA ANALYSIS
5. DATA TRANSFER

POST-COVID-19 → HUGE IMPACT ON USERS @ ESRF

REMOTE EXPERIMENTS SOLUTIONS

1. SMIS – USER PORTAL
2. SMIS – SAFETY TRAINING
3. ICAT+ – SAMPLE TRACKING
4. ICAT+ – E-LOGBOOK
5. ICAT+ – DATA PORTAL
6. INFRASTRUCTURE – CHAT, SSH, REMOTE DESKTOP, JUPYTER, ZOOM

SESSION WORKFLOW BEFORE

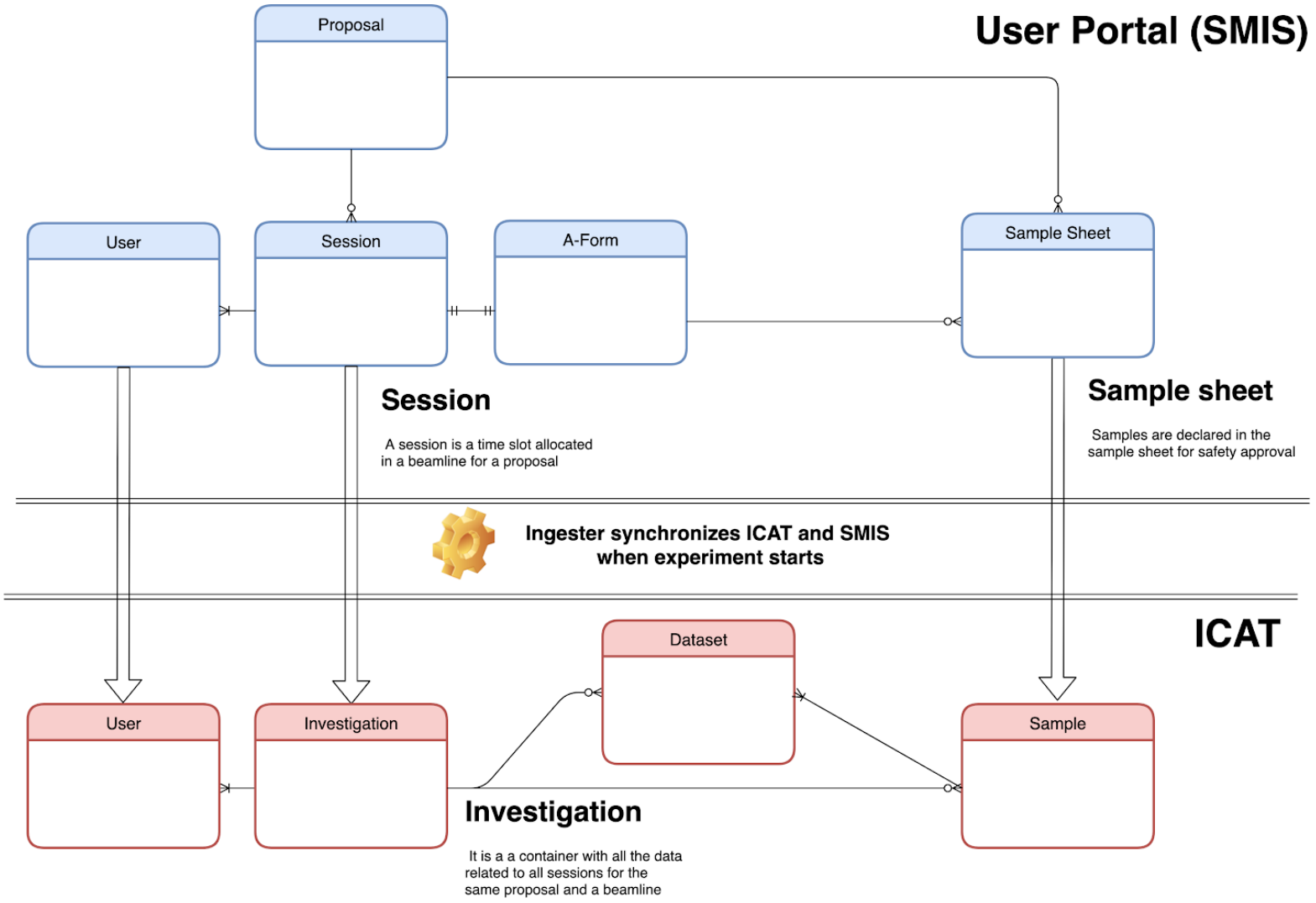


image credits: **Alex de Maria**

SESSION WORKFLOW AFTER

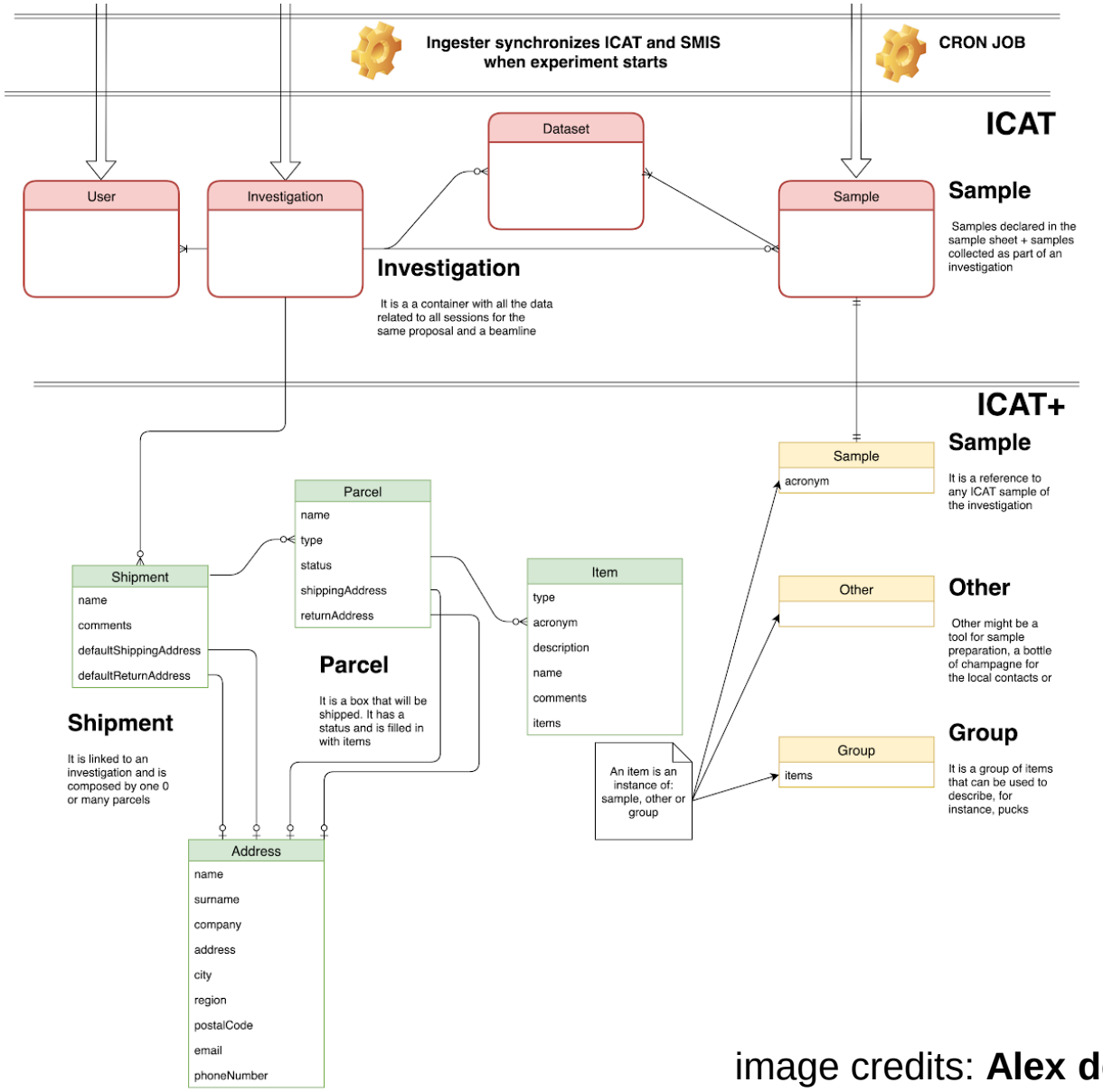


image credits: **Alex de Maria**

SAMPLE TRACKING DEVELOPMENT

Sample Tracking

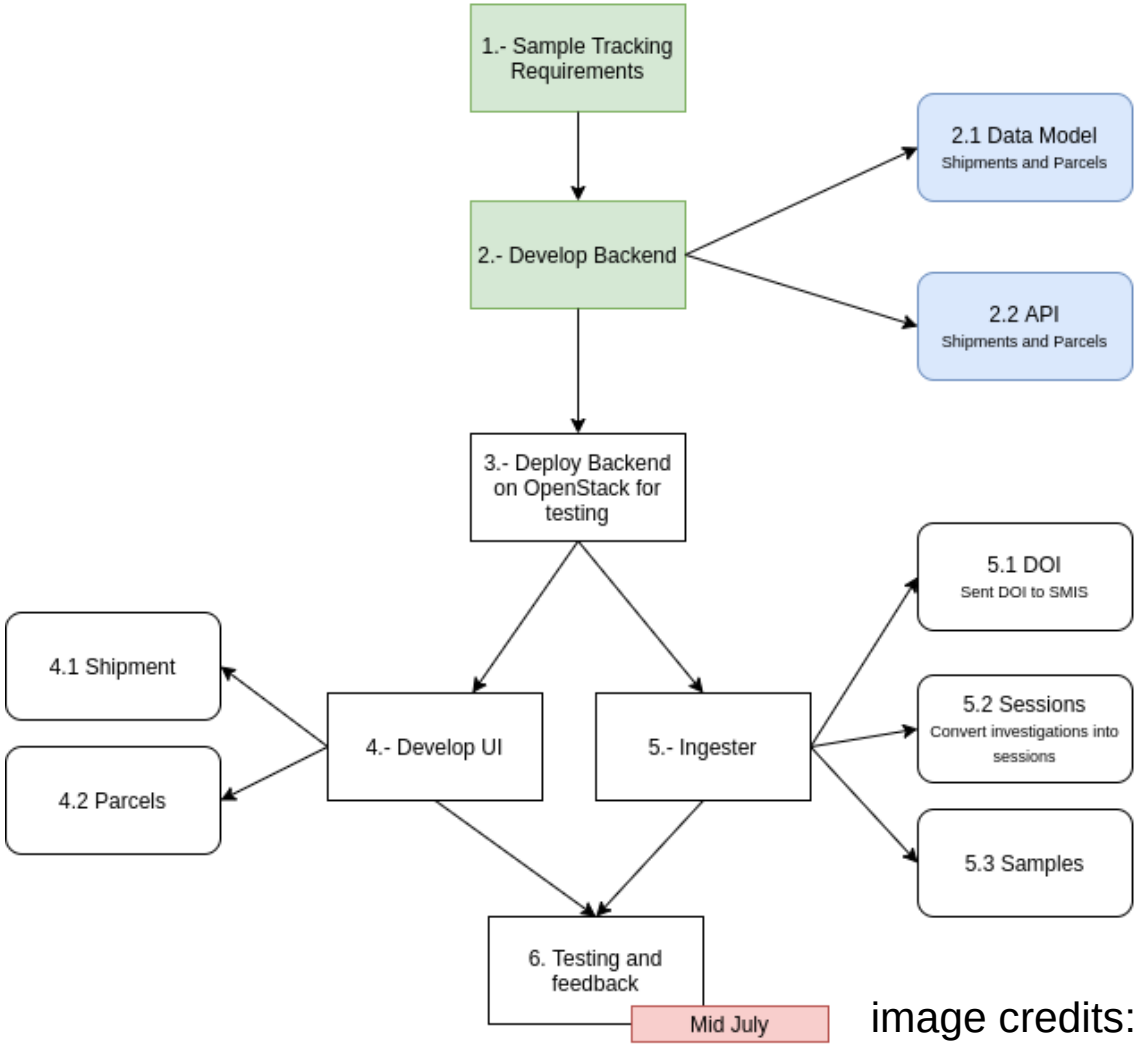


image credits: **Alex de Maria**

REMOTE DATA ANALYSIS

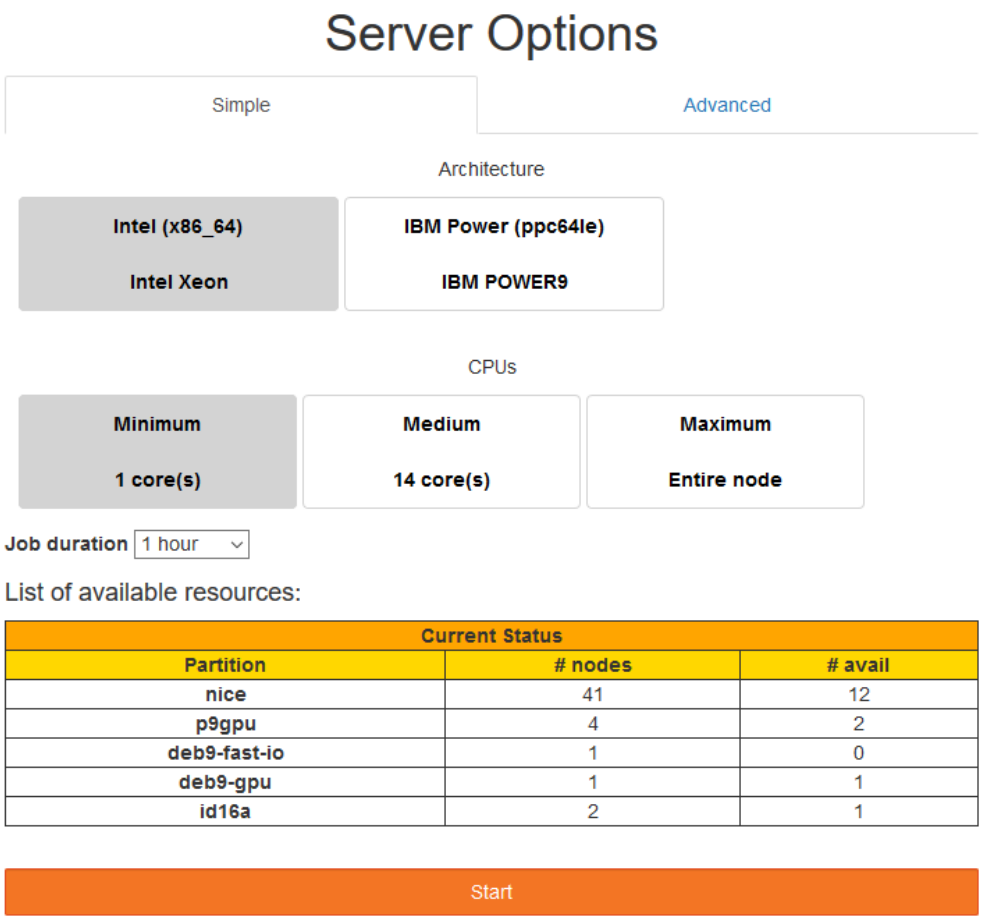
Users will have only remote access to their data

Services available:

SSH
Jupyter slurm notebooks
Remote Desktops
Data portal

Next step:

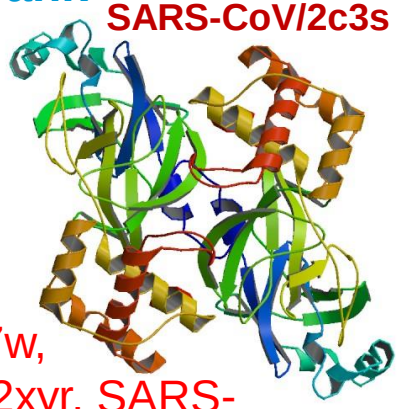
Web applications



Calipsoplus and **PaNOSC** are contributing to this activity

SHARING DATA

→ **e.g. ESRF has 15 Coronavirus structures in the Protein Data Bank but no raw data …**



SARS-CoV/2c3s, SARS-CoV/2beq, SARS-CoV/2bez, SARS-CoV/2h85, bovine-coronavirus/3cl4, bovine-coronavirus/3cl5, HCoV-OC43/6qfy, MERS-CoV/4ud1, MERS-CoV/6g13, murine_coronavirus/4c7l, murine_coronavirus/4c7w, murine_coronavirus/5jif, murine_coronavirus/5jil, 2cme, SARS-CoV/2xyr, SARS-CoV/2xyv, SARS-CoV/2fav, SARS-CoV/1qz8, SARS-CoV/1uw7

PDB entries credits: **Gianluca Santoni**

Data Policy is now in place for MX and almost all beamlines therefore in the future data will be archived and can be shared in case of next pandemic

PaNOSC, **EOSC** and **STREAMLINE** are contributing to this activity

POST-COVID-19 → HUGE IMPACT ON USERS @ ESRF

INFRASTRUCTURE TOOLS

1. KEYCLOAK – SINGLE SIGN ON
2. BASTION – DOUBLE PASSWORD
3. GUACAMOLE – REMOTE DESKTOP
4. ZOOM – USERS ←+→ BEAMLINE
5. VPN – BEAMLINE SCIENTISTS + SUPPORT STAFF

VPN STATISTICS

- 750 SSL VPN Peers maximum
- 280 concurrent connections
- 12 max new connections per second

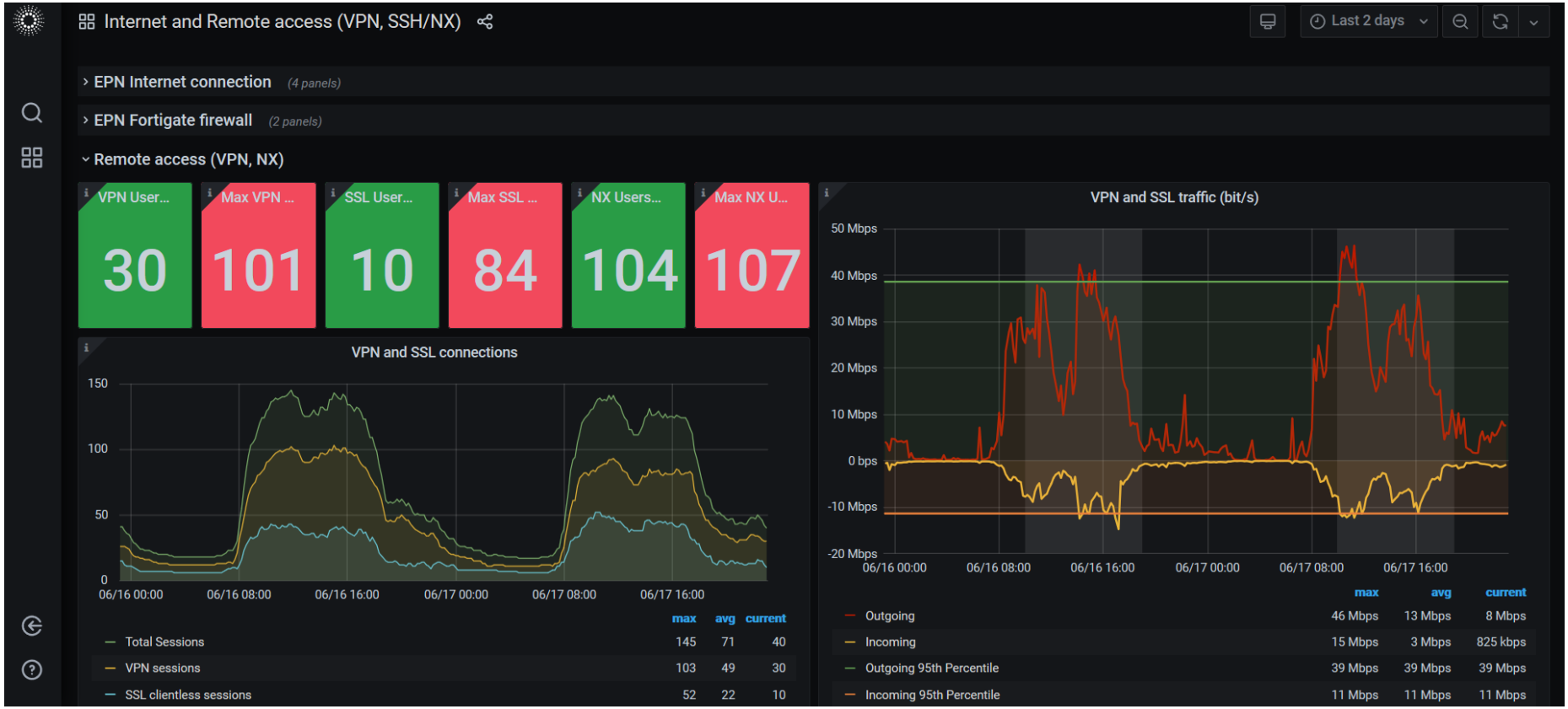
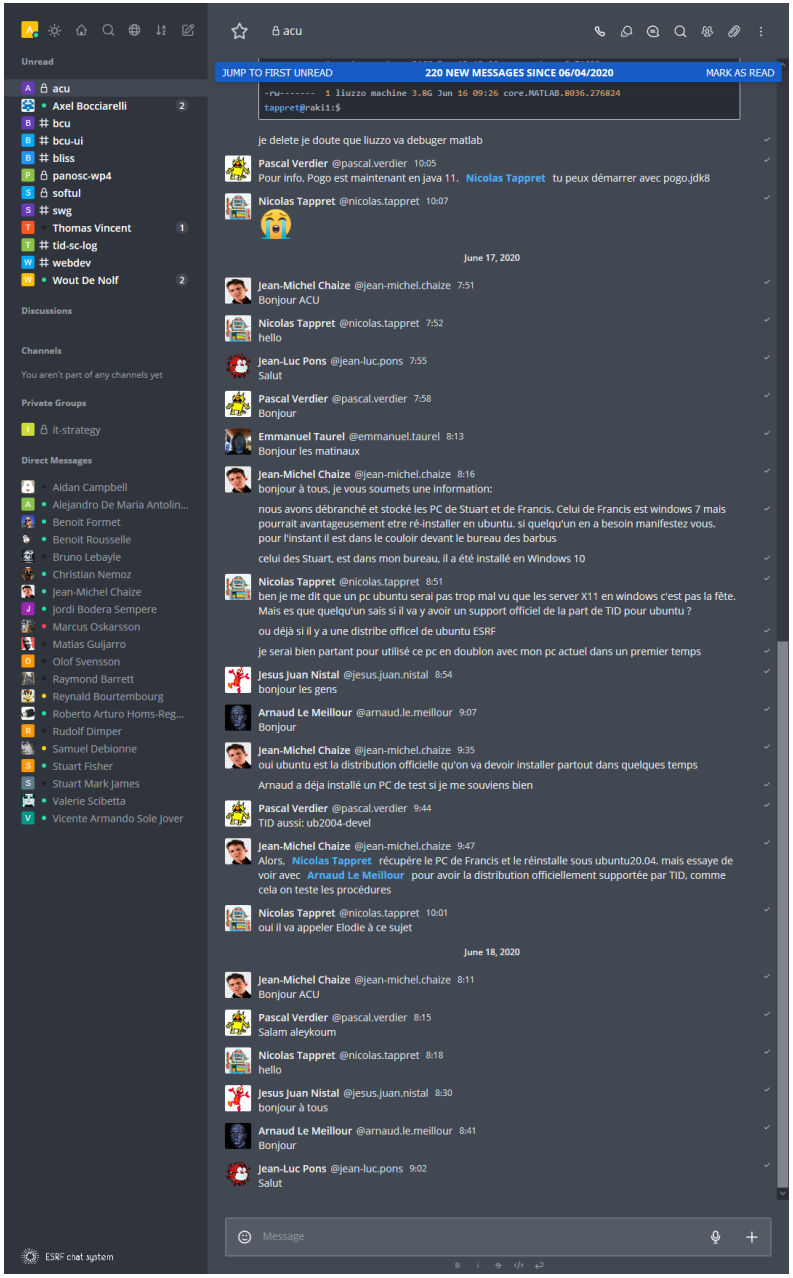
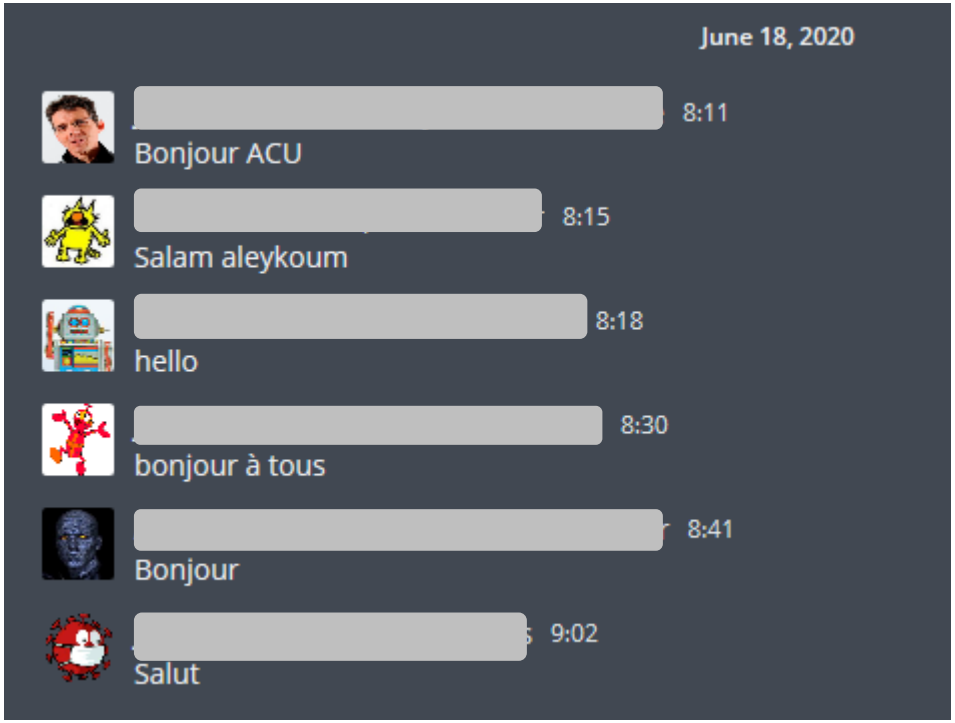


image credits: **Fernando Calvelo**

ROCKET CHAT = ESSENTIAL TOOL!





ZOOM MEETINGS @ ESRF

- 536 Users
- 8416 Meetings
- 1400 participants webinar
- 180 meetings on average / day

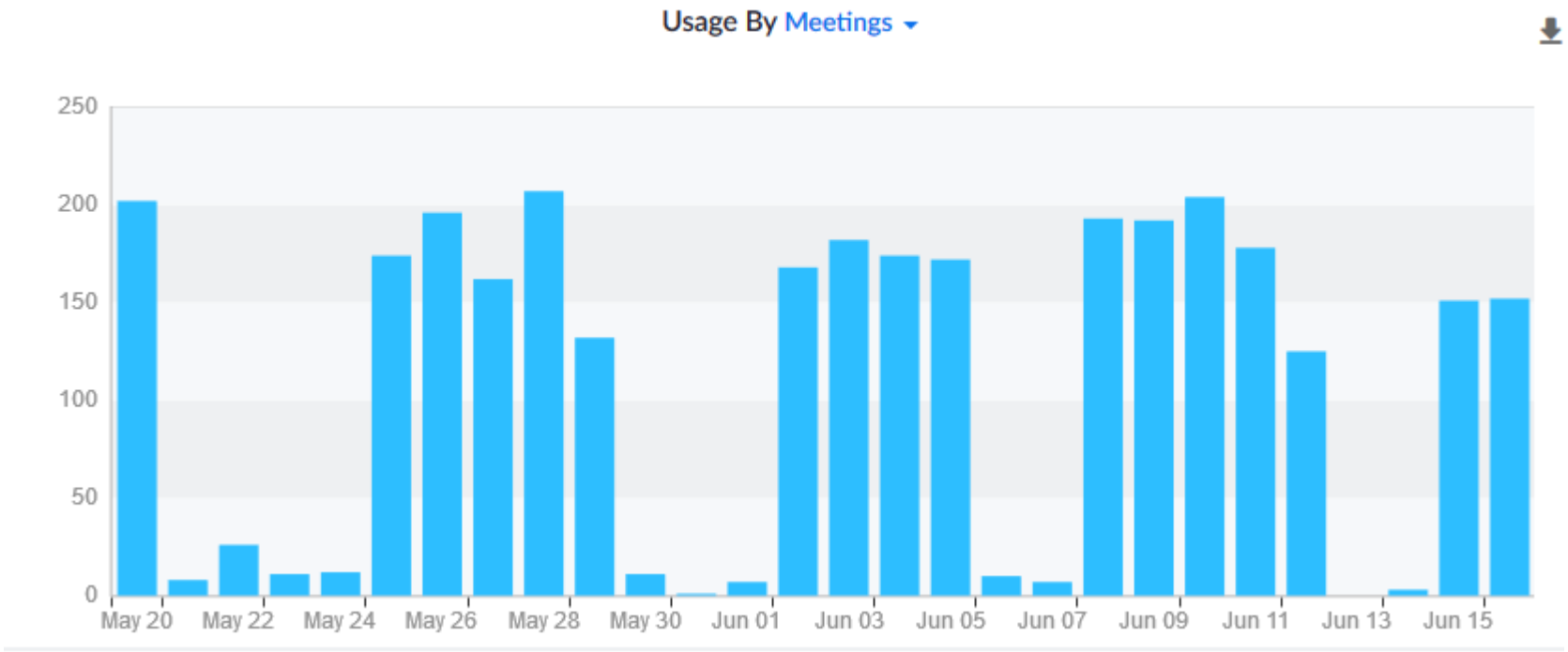


image credits: **Bertrand Dupré**

POST-COVID-19 → HUGE IMPACT ON USERS @ ESRF

NEGATIVE

1. **ZOOM + REMOTE WORKING → LEADS to OVER-WORKING**

2. **NOMACHINE (NX) → UNRELIABLE**

3. **CYBER-SECURITY → HIGHER PRIORITY**

CONCLUSION

1. COVID-19 has been a real test for our IT infra-structures, remote access, remote working, open data, innovation, ourselves

2. Collectively we have risen to the test and IT personnel (but not only) has done an amazing job!

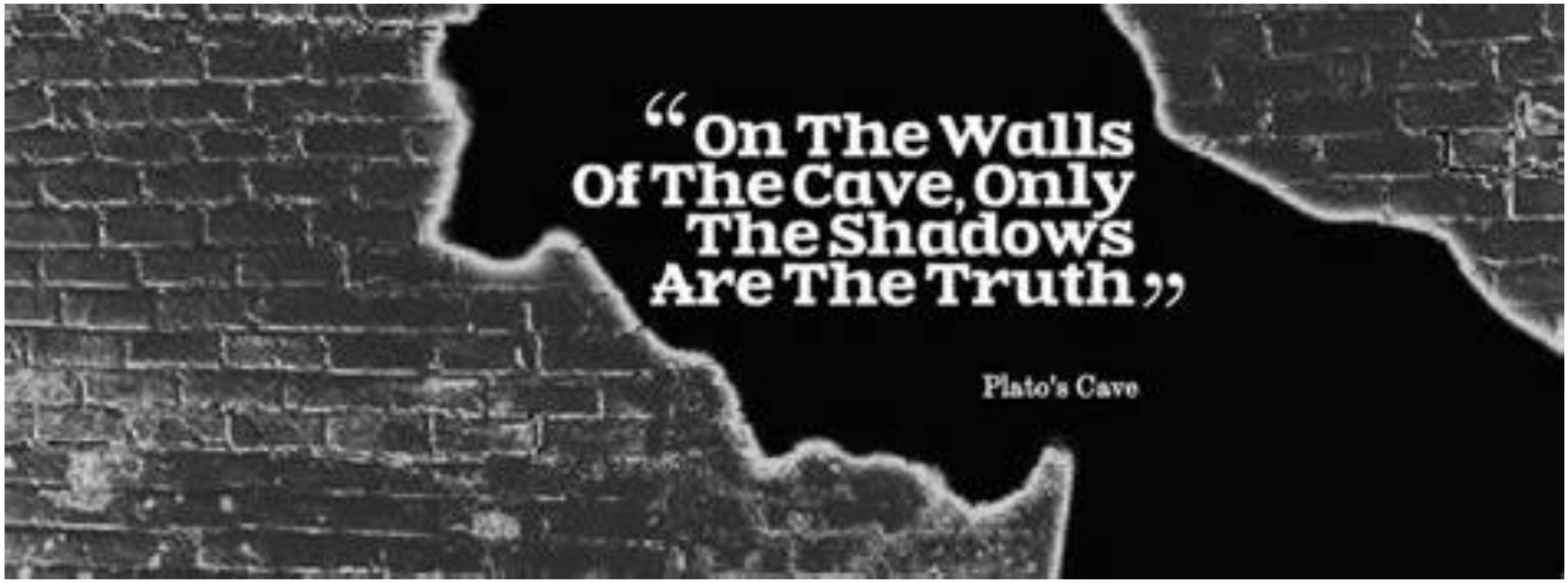
3. The impact on our way of operating has been huge

4. Users will be able to opt for remote access

5. Projects like Calipsoplus, PaNOSC, EOSC came at the right time

6. We look forward to running experiments on the e-synchrotron …

REFLECTIONS



> The Internet didn't get invented on its own. Government research created the Internet so that all the companies could make money off the Internet. The point is, is that when we succeed, we succeed because of our individual initiative, but also because we do things together.
>
> **Barack Obama**

What happens in the Internet is real

Journalist in The Atlantic