



Maintenance session

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TOPICS FOR TODAY

PART I WHAT TO MEASURE, HOW, AND WHAT IS THE PRICE TO PAY? (LG)

PART II LETTERS TO COMPANIES, OBJECTIVE PERFORMANCE TEST AND OBJECTIVE CLEANING (RN)

PART III MAINTENANCE CONTRACTS - FOCUS ON COMPUTER, WINDOWS AND SOFTWARE VERSION UPGRADE (RN)

TO DOWNLOAD LATER...

RESULTS OF THE POLL [HTTPS://MIAP.EU/SPECIAL/ELMI-CF-SURVEY](https://miap.eu/special/elmi-cf-survey)

LETTERS TO COMPANIES [HTTPS://MIAP.EU/SPECIAL/ELMI-CF-SURVEY](https://miap.eu/special/elmi-cf-survey)

AND THEIR ANSWERS

OUR PRESENTATIONS OF TODAY [HTTPS://MIAP.EU/SPECIAL/ELMI-CF-SURVEY](https://miap.eu/special/elmi-cf-survey)

PART I

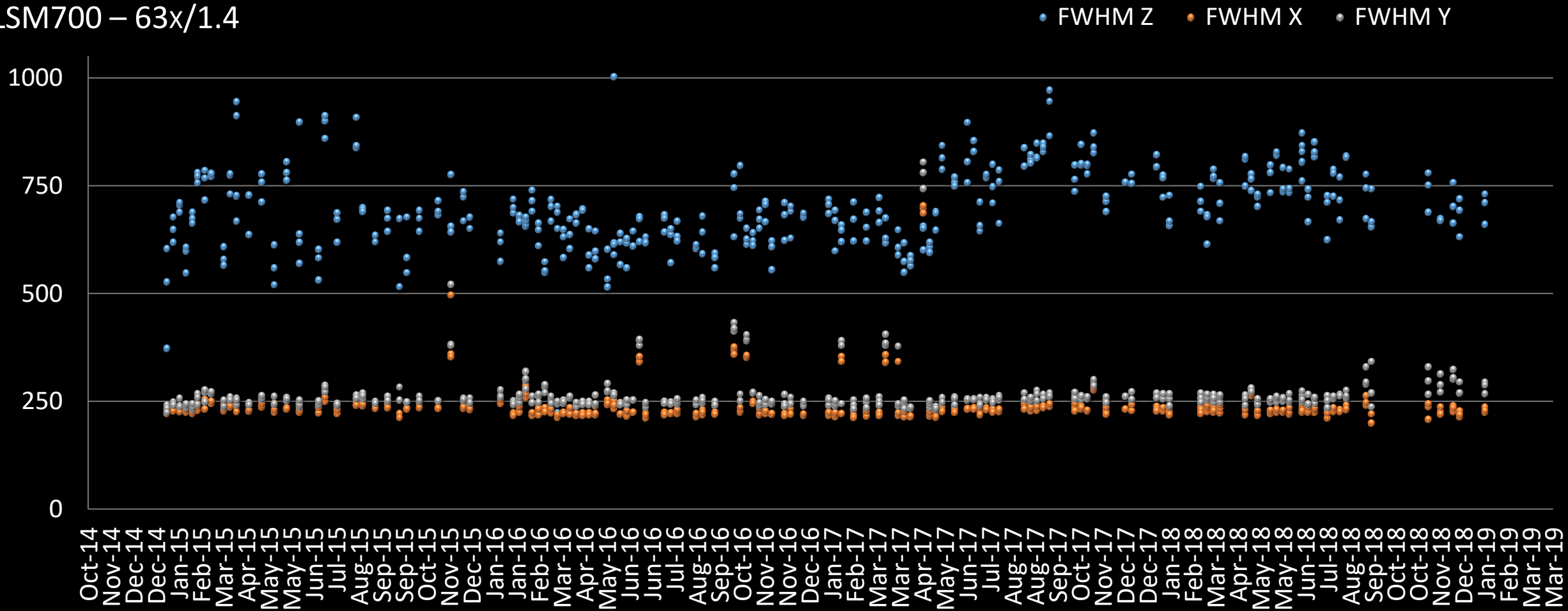
WHAT TO MEASURE, HOW, AND WHAT IS THE PRICE TO PAY?

ORGANIZATION OF MICROSCOPE MAINTENANCE @ FMI

- STUDENTS (AMONG MAIN USERS OF THE SCOPE) PAYED BY HOUR (APPROX. 22 €)
- MISSION (WEEKLY OR TWICE A MONTH):
 - CLEAN SCOPE, OBJECTIVES AND SURROUNDINGS
 - TAKE THREE PSFs FOR EVERY OBJECTIVE WITH $NA \geq 0.75$
 - MEASURE LASER OR LAMP POWER AT OBJECTIVE (10X).
 - TAKE A Z-STACK OF 16 GREY LEVEL MOTIF ON ARGOLIGHT SLIDE.
 - OCCASIONALLY: FIELD OF POINTS ON ARGOLIGHT SLIDE FOR SHADING.
- + MANY TESTS PERFORMED, RELATIVELY CHEAP (FOR 5 STUDENTS, APPROX. 4000 EUROS/YEAR)
- TRAINING OF STUDENTS, MONITORING OF WORK (FEW PEOPLE CAN BE TRUST 100%)

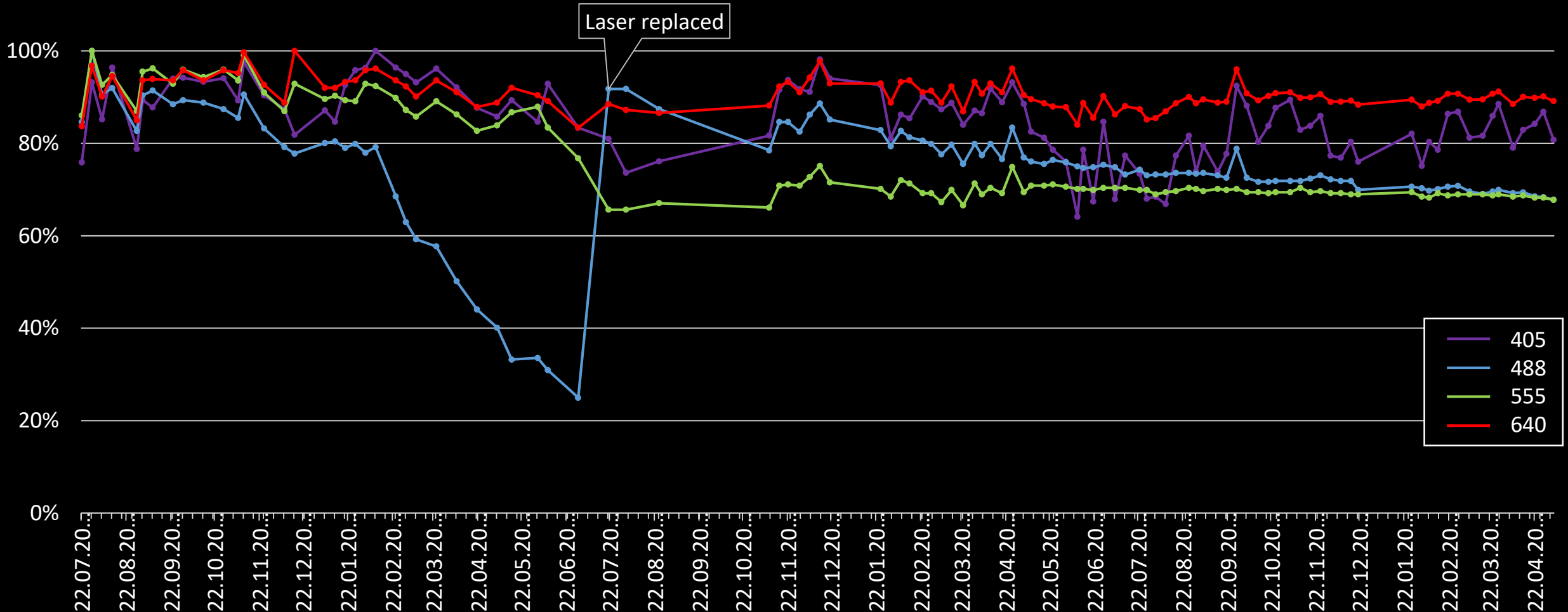
PSFs

LSM700 – 63x/1.4



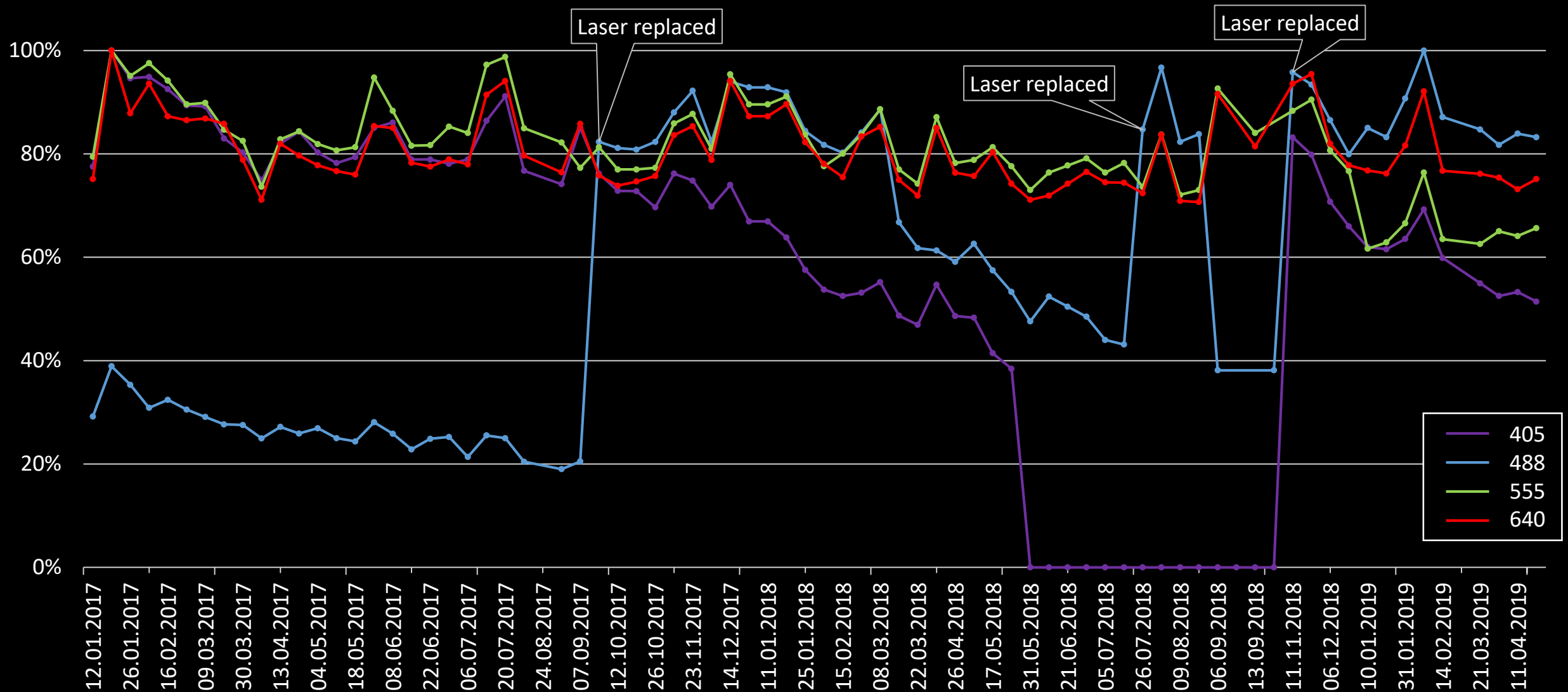
- Big variability between beads on the same day and between weeks. Most probably due to bad objective cleaning
- When to take an action?
- Users must be well trained to detect saturation, BG in the aging sample, must feel responsible

LASER POWER – LSM700 #1 WITH 10x/0.45



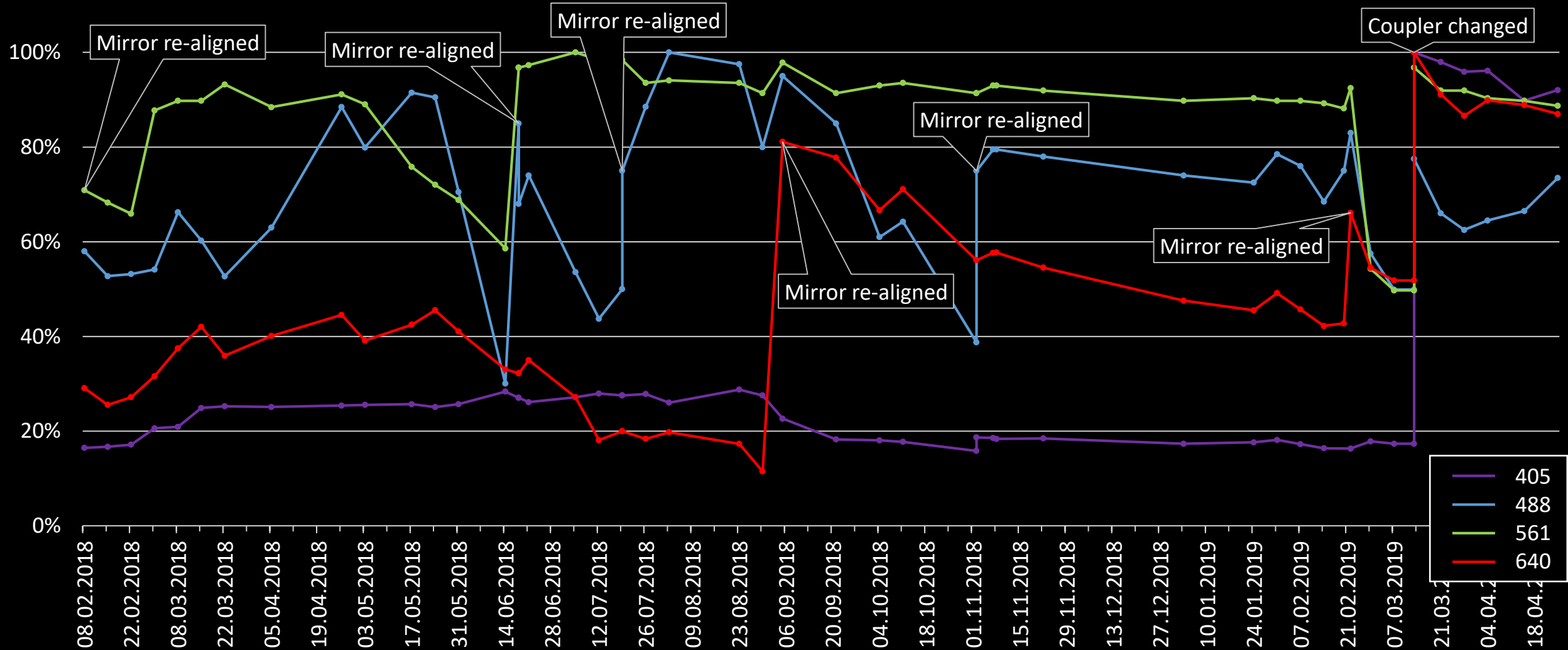
- Not all lasers die over a couple of weeks
- “Stable” does not mean much
- Some lasers dye over 6 months, others slowly but surely, others stepwise.

LASER POWER – LSM700 #2 WITH 10x/0.45



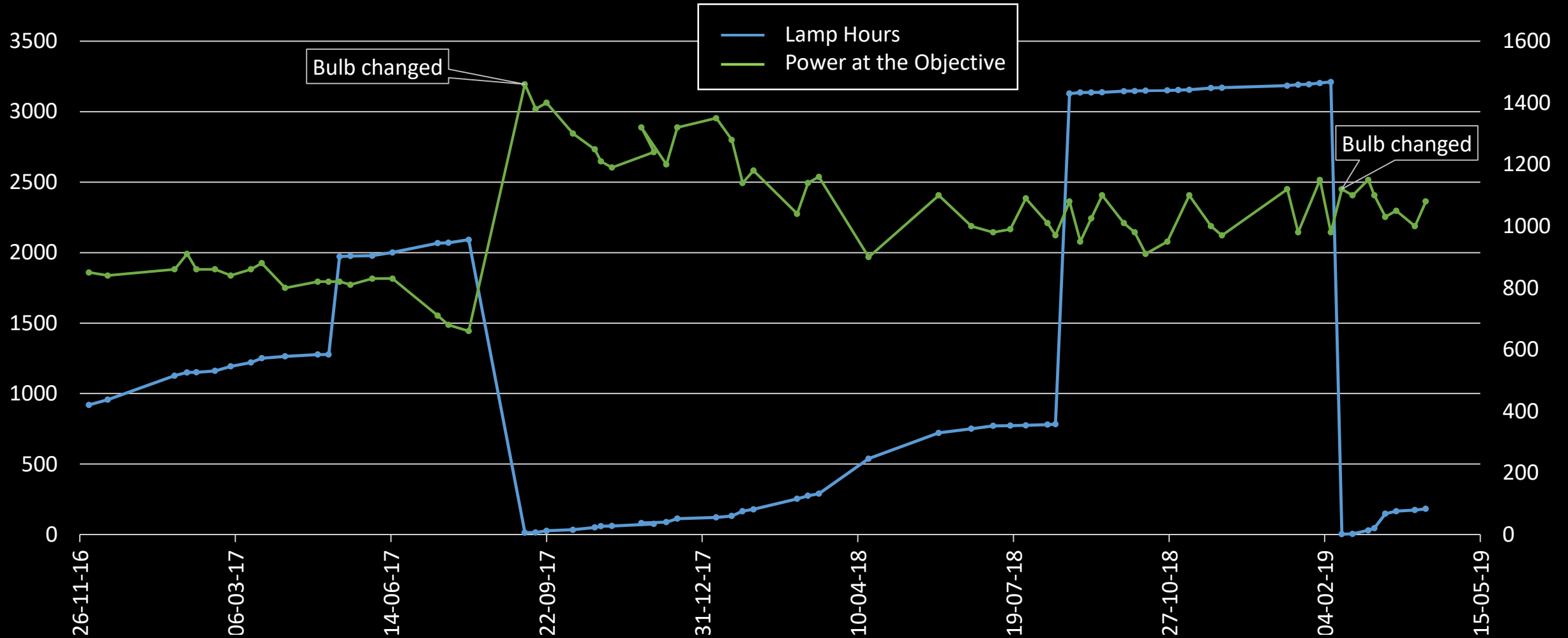
- Sometimes, one can be unlucky with lasers. Do not blame the user's sample...

LASER POWER – SPINNING-DISK #1 WITH 10x/0.45



- It takes time to convince companies that there is a problem with their system (mirror)
- If other customer do not complain, it may be that they do not measure.

LASER POWER – AXIOIMAGER Z1 WITH 10x/0.45 (X-CITE)



- Do not believe 100% curves about bulb aging.
- Do not take for granted that a new bulb will give more light.

CONCLUSION I

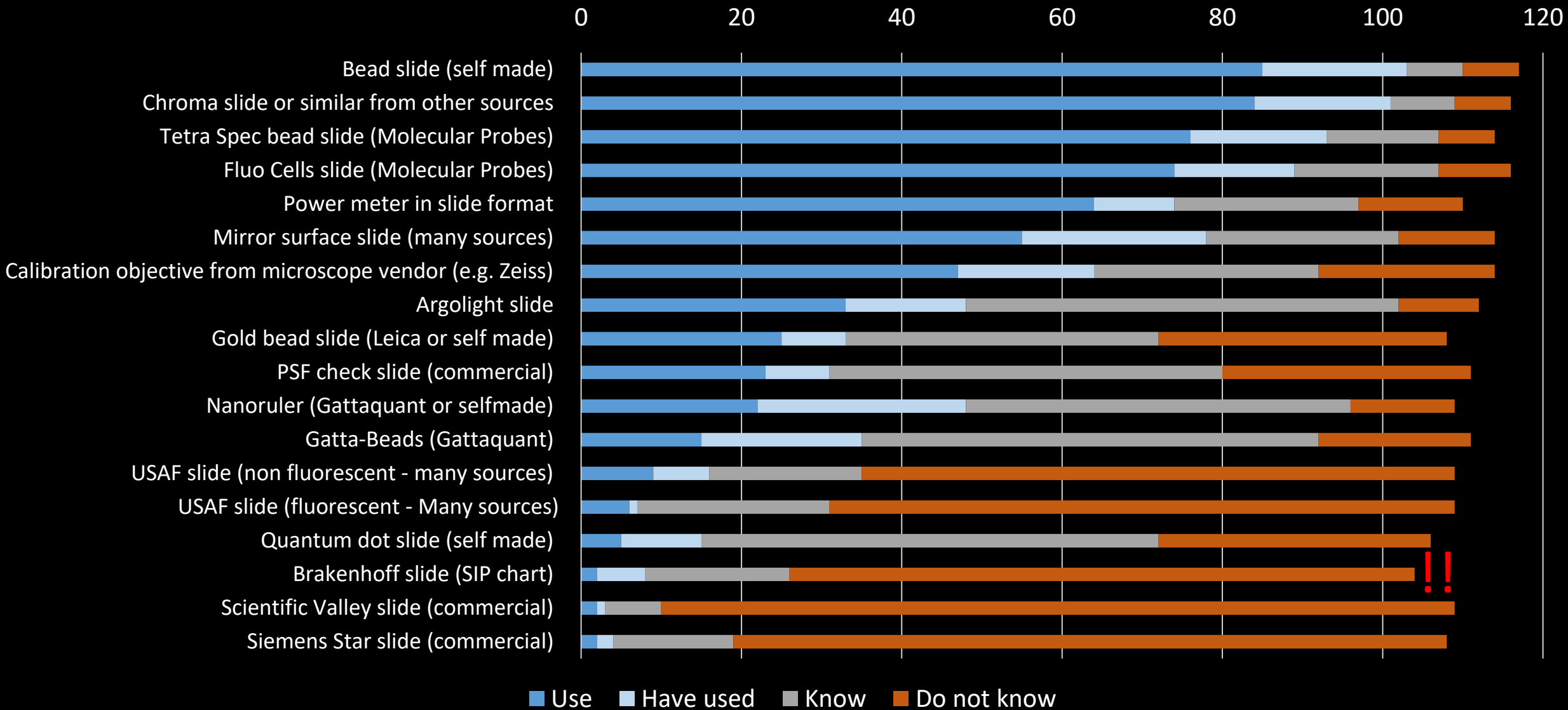
- CONCLUSION I: IT TAKES TIME TO TRAIN PEOPLE TO MAKE PSFs RIGHT. USERS MUST BE **TRAINED** TO DO MAINTENANCE.
- CONCLUSION II: HUMAN FACTOR TO BE AVOIDED AS MUCH AS POSSIBLE. SHOULD BE FULLY **AUTOMATIZED**.
- CONCLUSION III: THE VARIABILITY COMES TO A WIDE EXTENT FROM BAD **CLEANING OF OBJECTIVES** (ACTUALLY, DIFFICULT).
- CONCLUSION IV: THE SAMPLE MUST BE VERY **STABLE** OVER TIME; USERS DO NOT ALWAYS NOTICE AGING/PROBLEM. ONE NEEDS A REFERENCE !
- CONCLUSION V: NOT EASY TO SAY WHEN AN **ACTION** SHOULD BE TAKEN (E.G. REPAIR)

**IF YOU DO NOT MEASURE,
YOU CAN'T KNOW !**



Poll results

Q76. What tools do you know, use or have used for system checks and performance evaluation?





Poll results

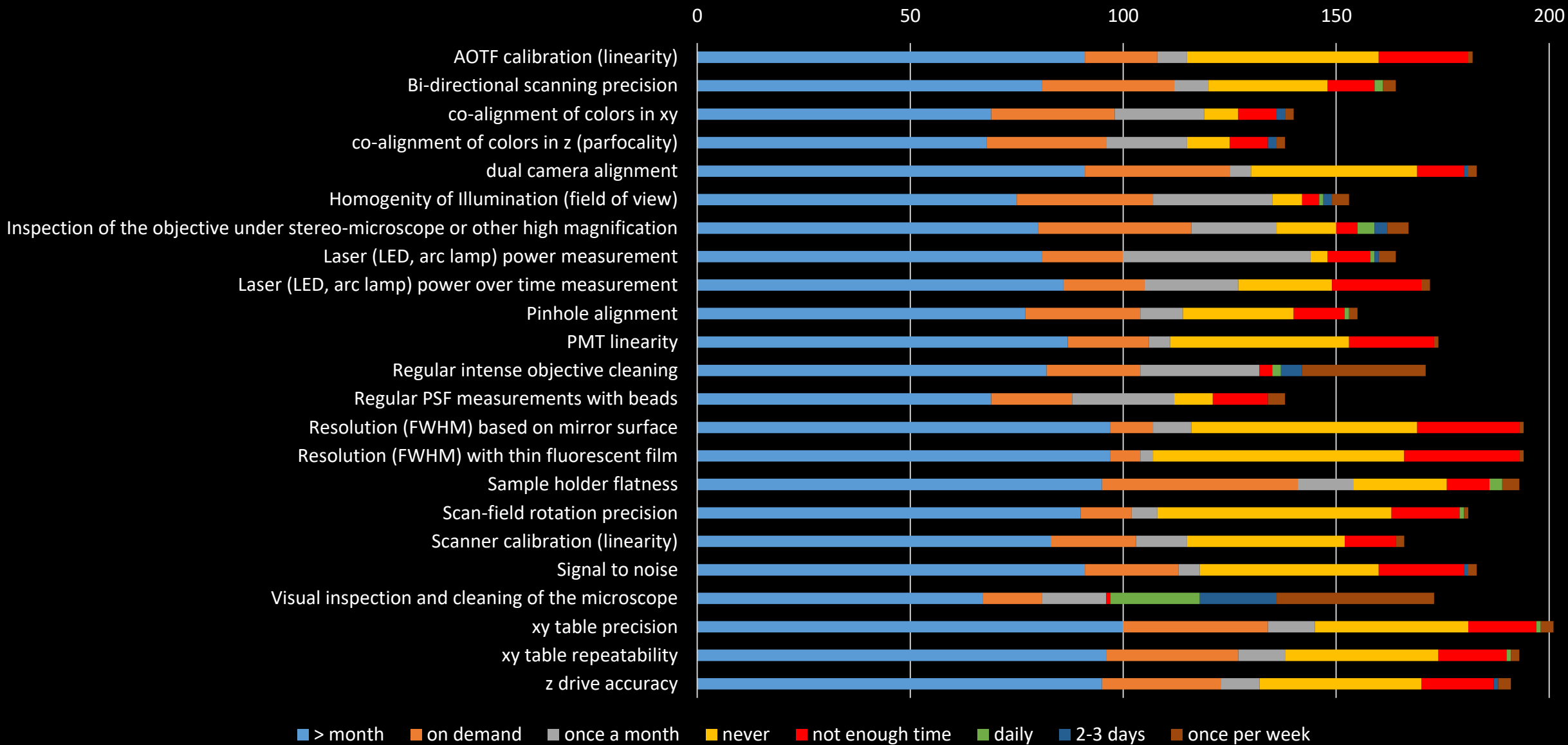
Q77. Other samples you know of or have used. Please give type, name and source, if you want to share with the community.

- We have a selfmade holder in a size of an object slide which holds the Power Meter measuring head in Position.
- fluorescent slides from ... MME? Thin-coated fluorescent paint, home-made Thin-coated highlighter, home-made
- Urea for measuring IRF in FLIM. Tin balls in SEM.
- Convallaria test slide (Zeiss), ApoTome test slide (Zeiss), Apotome calibration filter cube (Zeiss)
- Model protocol for preparing a flat field correction slide
- Grated mirror slide (galvo check)
- Convallaria - numerous sources
- Molecular Expressions BPAE slide
- Beam Profiler(Thorlabs), Interferometric Shearplate to check collimation (Thorlabs)
- Cells with microtubule label (antibody or nanobody), cells with nuclear pore snap-label
- Gatta-cells for STORM
- I often make my own stained biological samples e.g. phalloidin or endosomal markers for checking SIM and STORM. These can be useful as a sanity check for other systems. We use FISH slides for the deconvolution system as test slides are often too bright and don't represent our users samples well.
- multicolor phalloidin stained cells.
- Crimson bead, Biological reference samples (nuclear pore multi labeling)
- Kleenex
- Resolution Argolight slides



Poll results

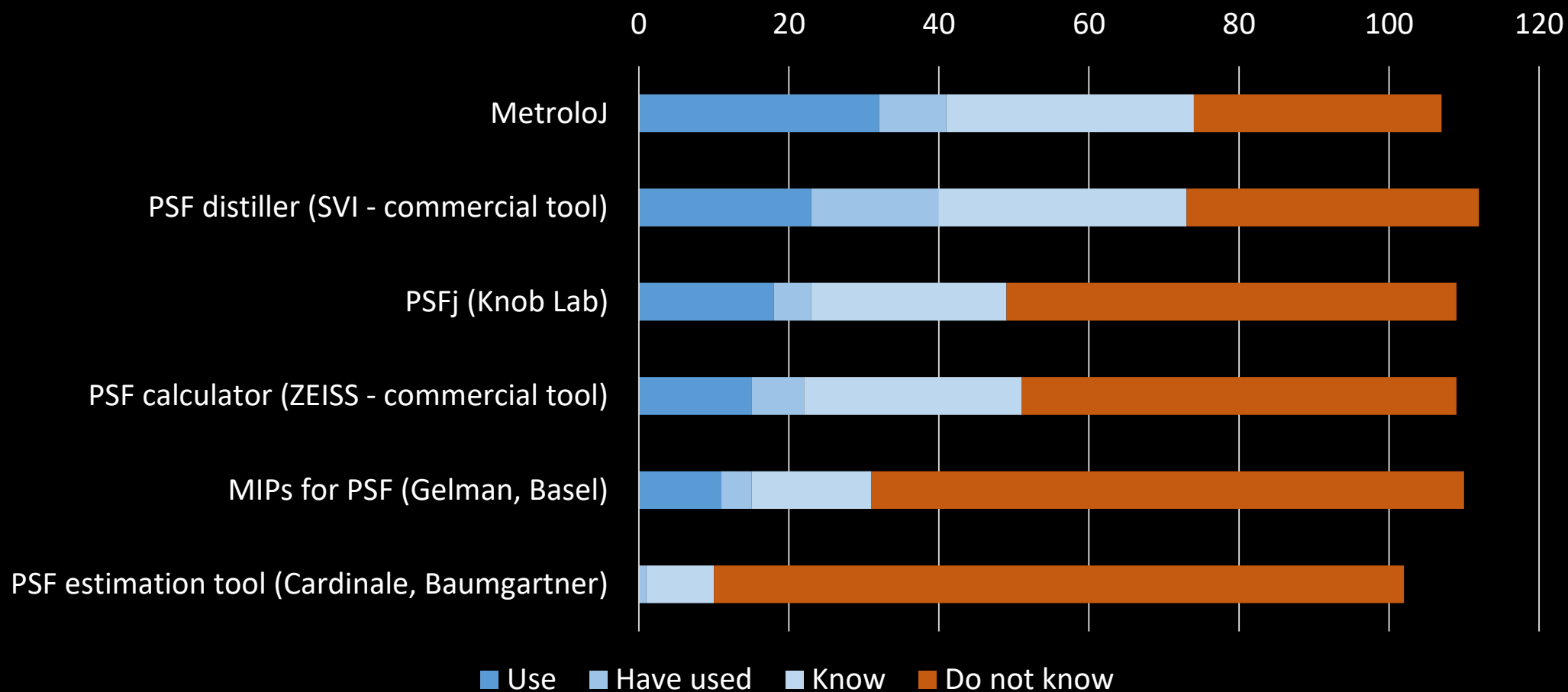
Q78. How often does your facility perform the following maintenance and/or quality checks (Please check all that apply):



Q79. Suggestion for other valuable measurements for system evaluation

- Environmental control

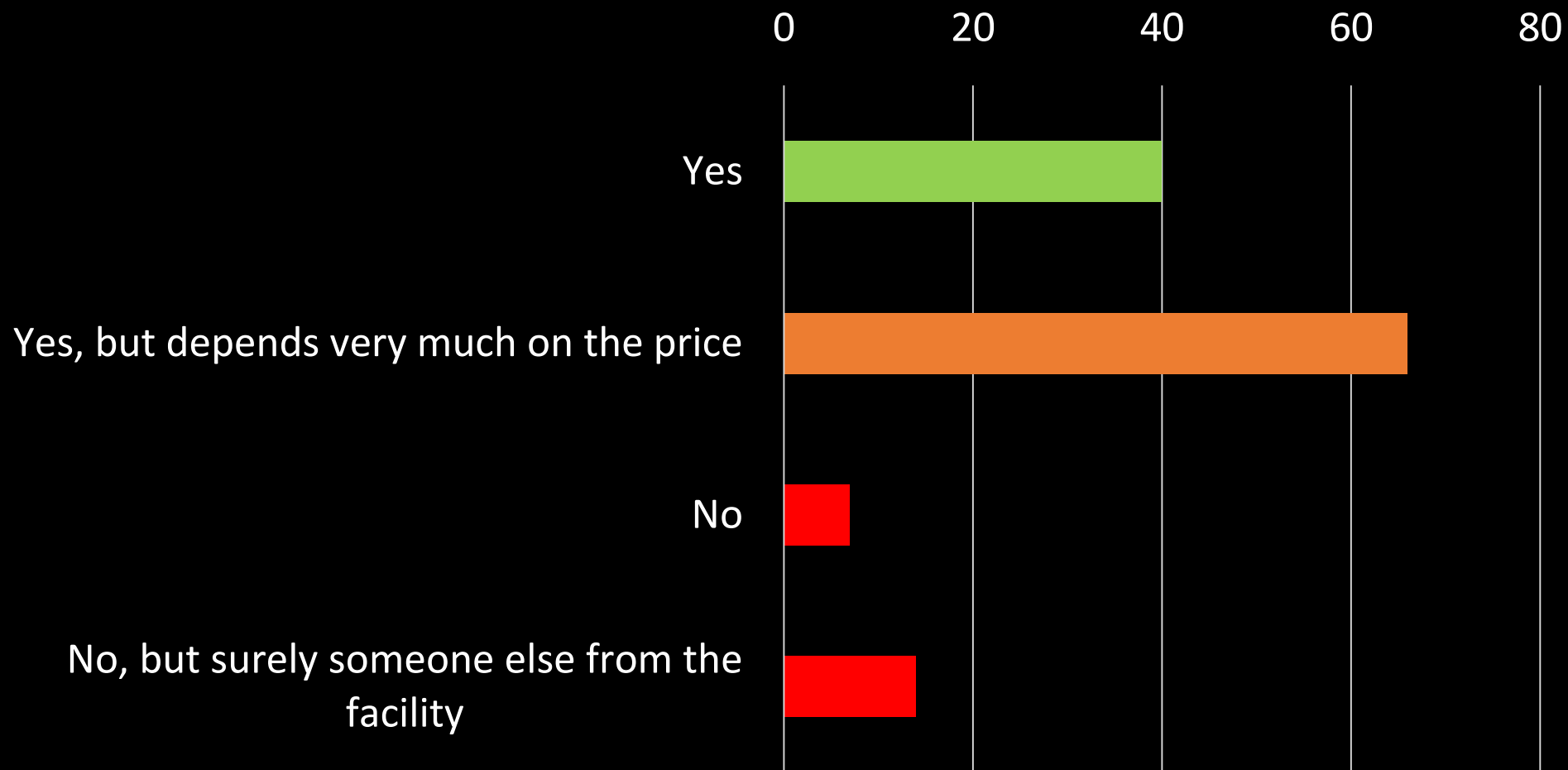
Q80. Which of the following software tools for PSF measurement evaluation you know and/or use?





Poll results

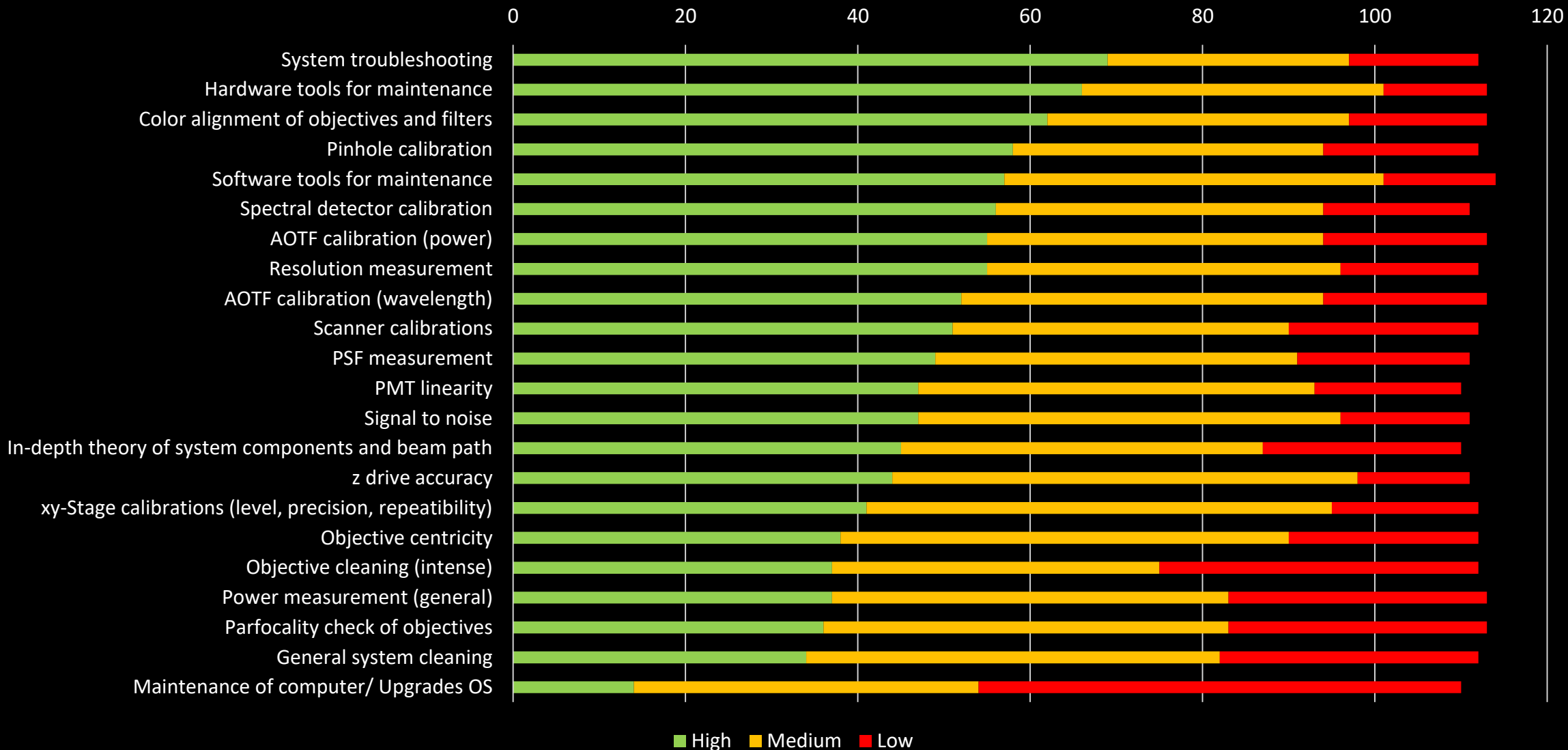
Q81. Would you like to attend an intensive course on "Advanced system maintenance" (e.g. from a manufacturer for a specific system)?





Poll results

Q82. Give your preferences what should be covered
(Preference: Low =1; Medium = 2; High = 3)





Poll results

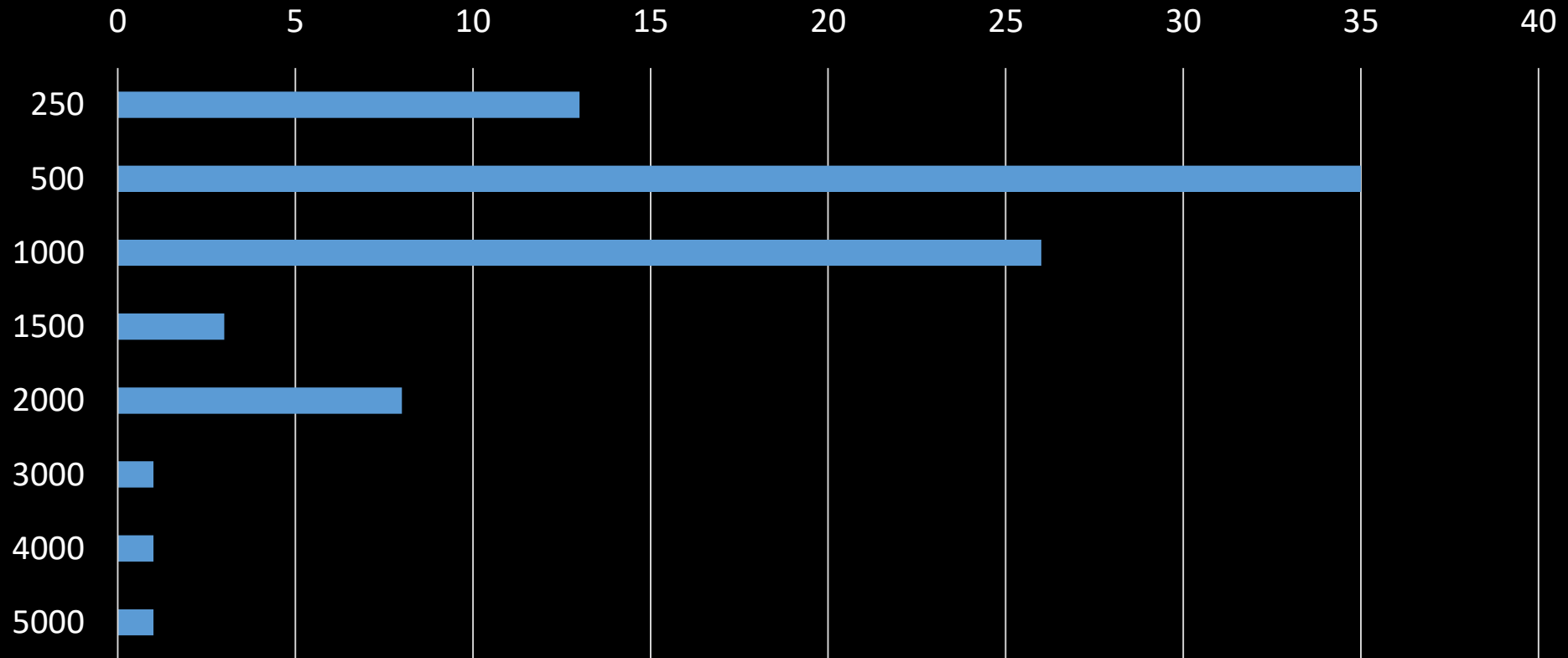
Q83. Further topics you would like to see covered in such courses?

- Decision tree to identify failures
- Laser install alignment
- ConfocalCheck
- Local network integration of system PCs
- Basic repair like laser replacement, laser alignment, etc.
- Exchange of parts outside of closed scanheads - e.g. T-PMT
- Calibration of FCS and FCCS setups - maintenance of hybrid detectors
- How to automatize system checks with software and hardware tools: Set up the test and let it run for as long as it takes.
- Tool overview
- Optical alignment procedures



Poll results

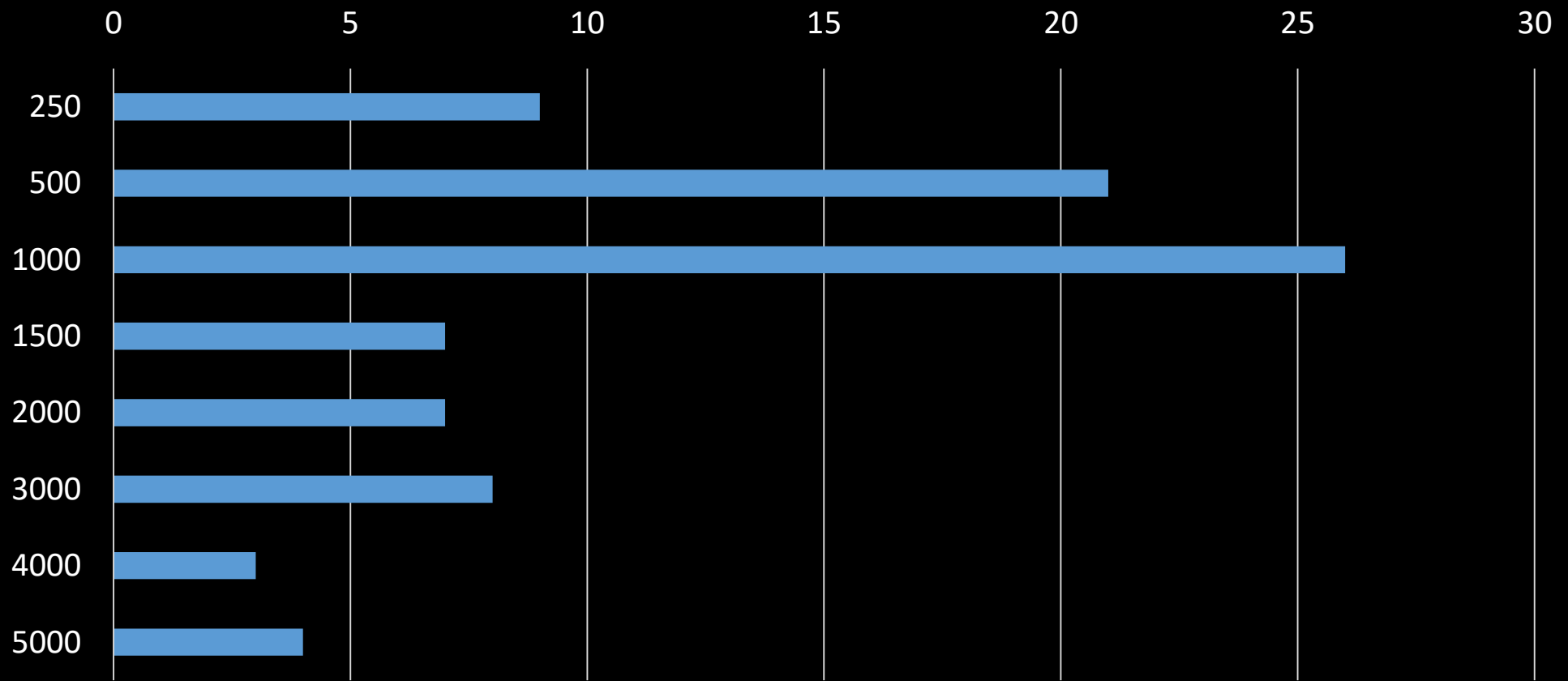
Q84. Maximum price you would be willing to pay for such a 2 or 3 day course (covering all checked topics above) with possibly 10 - 20 attendees in a company head-quarter?





Poll results

Q85. Maximum price you would be willing to pay for such a 2 or 3 day course (covering all checked topics above) given individually on-site in your institute for a small number (possibly 5-10) local attendees?





Poll results

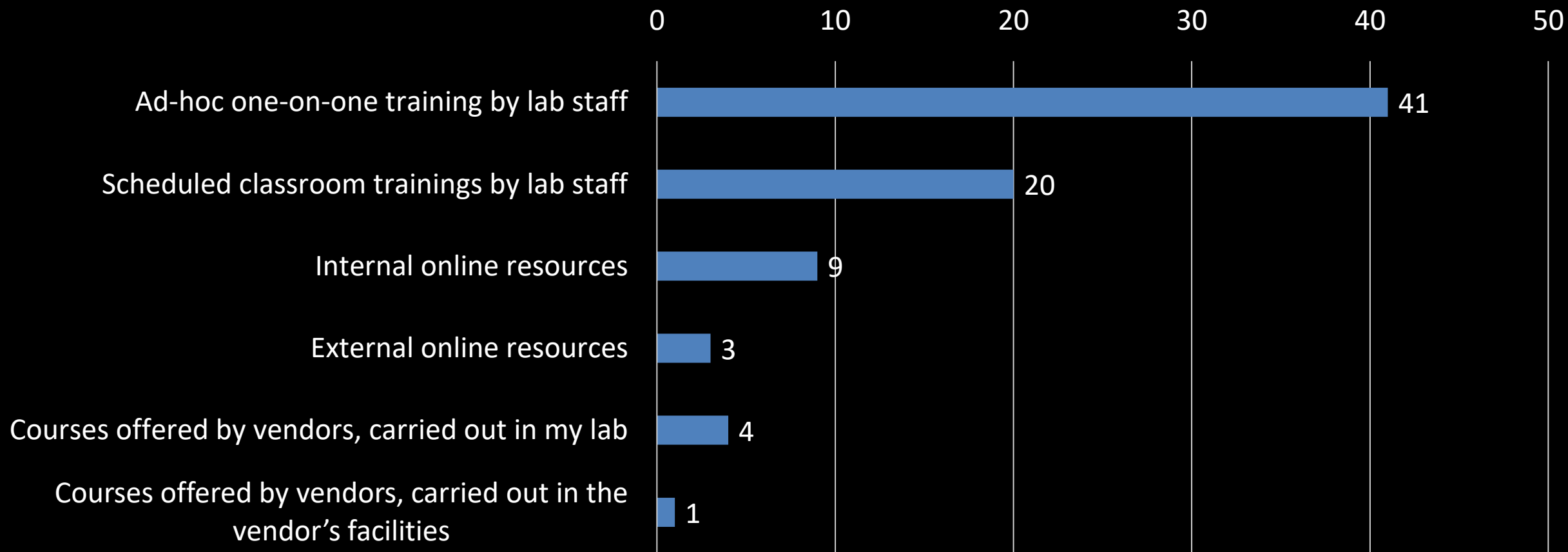
Q86. What option would you prefer independent from the price tag?





Poll results

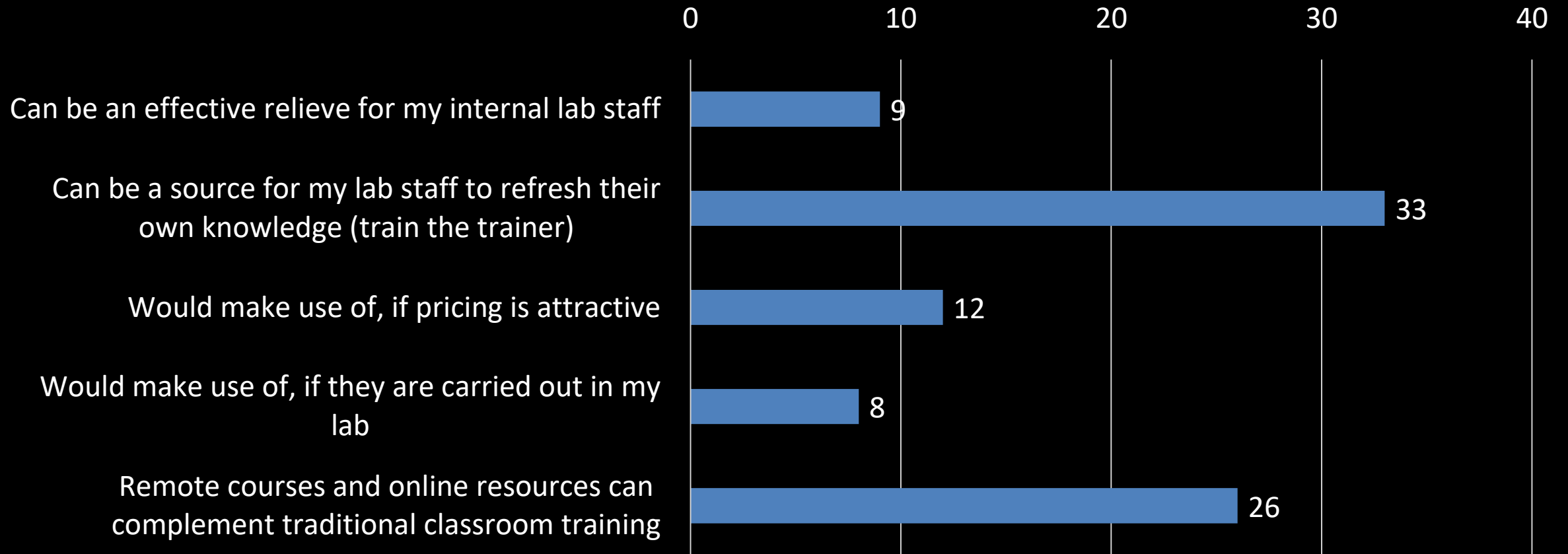
Q33. How do you train new users on handling of instrumentation and applications?





Poll results

Q34. Many vendors offer training courses.
Please check what you agree to





Poll results

Q34. Many vendors offer training courses.
Please check what you agree to

- I did my own YouTube course
- Most projects are service-based and external users do not request/need instrument training
- Useful for training new facility staff but users need to be taught the rules and quirks of the systems in place.
- Not convinced
- Make use of when offered by instrument or software supplier
- Vendors give lectures in our microscopy course
- Many workshops, no pricing so far

PART II

OBJECTIVE PERFORMANCE TEST AND CLEANING.

PART III

MAINTENANCE CONTRACTS - FOCUS ON COMPUTER,
WINDOWS AND SOFTWARE VERSION UPGRADE.