

I. IDENTIFICATION DATA

Thesis title:	Automation of Adjustment of the Spatial Filter
Author's name:	Gilberto Ramos Venegas
Type of thesis:	master
Faculty/Institute:	Faculty of Mechanical Engineering (FME)
Department:	Department of Instrumentation and Control Engineering
Thesis reviewer:	Ing. Jiri Vlk
Reviewer's department:	Meopta – optika, s.r.o.

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment	ordinarily challenging
<i>How demanding was the assigned project?</i>	
Challenge of this project was in a short time (5 months) find out the principle of the pinhole adjustment together with proposed procedure experimental verification, including design of station and selection and procuring of all components (purchased and manufactured).	

Fulfilment of assignment	fulfilled with minor objections
<i>How well does the thesis fulfil the assigned task? Have the primary goals been achieved? Which assigned tasks have been incompletely covered, and which parts of the thesis are overextended? Justify your answer.</i>	
There is an inconsistency between thesis title ("automation of adjustment") and goal stated in abstract ("providing the GUI for the automation of spatial filtering"), nevertheless, determined goals of the thesis are mostly covered.	
Research of properties and functions of spatial filter in optical systems is carried out at pages 1 to 21. Mechanical design allowing control of the spatial filter and realization of mechanical motions is described at pages 25 to 34 followed by pages 34 to 39, describing performed experiment in step-by-step detail. Possible algorithm and iteration steps enabling best pinhole position localization is described at pages 39 to 40. Proposal of Airy disk evaluation is stated at pages 44 to 45 and its automation isn't in scope of this work.	
I'm missing more information about necessary mechanical motions analysis stated in 2 nd task. What led to individual components selection (ranges, resolution), choice of pinhole diameter (eq. 4.2.1) - missing inputs for this equation (mainly focusing objective focal distance and input beam diameter leading to diffraction-limited spot size diameter enabling proper pinhole diameter choice - fundamental parameter for relevant experiment results.	
Station and Graphical User Interface include also objective lens z-axis positioning stage Mipos 100 whereas automatic motion sequence and image capture description don't include the z-axis iteration process or the description why this axis was finally not used.	

Methodology	correct
<i>Comment on the correctness of the approach and/or the solution methods.</i>	
Chosen method is feasible and leading to desired goal. As described in conclusion, for full functionality there is plenty of more work and analysis (not in scope of this work) which should be still done for full-automatic pinhole adjustment.	

Technical level	B - very good.
<i>Is the thesis technically sound? How well did the student employ expertise in the field of his/her field of study? Does the student explain clearly what he/she has done?</i>	
Student proved he understands to chosen field in theoretical and practical part of this thesis.	

Formal and language level, scope of thesis	B - very good.
<i>Are formalisms and notations used properly? Is the thesis organized in a logical way? Is the thesis sufficiently extensive? Is the thesis well-presented? Is the language clear and understandable? Is the English satisfactory?</i>	

Structure of thesis is logical. I'd suggest switching chapters 5 and 6 to close theoretical part first, then determine goals and continue with main content of work. I'd also like to have more detailed information about "certain requirements" which should be met as part of chapter 7 introduction (determination how the pinhole should be manipulated - needed adjustment motions, ranges, etc.). Own realization of the assembly and adjustment process description then starts by chapter 7.1. Extent of thesis is sufficient, language clear and understandable with minor typing errors.

Selection of sources, citation correctness

B - very good.

Does the thesis make adequate reference to earlier work on the topic? Was the selection of sources adequate? Is the student's original work clearly distinguished from earlier work in the field? Do the bibliographic citations meet the standards?

Bibliographic citations meet standards. Two citations are missing:

- Text in Introduction (page 1) – <https://www.edmundoptics.com/knowledge-center/application-notes/lasers/understanding-spatial-filters/>,
- Fig 3.4 - J. E. Harvey, A. Krywonos, and D. Bogunovic, "A tolerance on defocus precisely locates the far field (exactly where is that far field anyway?)," Appl. Opt. 41, 2586–2588 (2002).

Additional commentary and evaluation (optional)

Comment on the overall quality of the thesis, its novelty and its impact on the field, its strengths and weaknesses, the utility of the solution that is presented, the theoretical/formal level, the student's skillfulness, etc.

Thesis deals with important issue of spatial filter position adjustment. There is shown the possible way how to make the time-consuming manual adjustment process automatic what's very required capability nowadays. In case of continuing studies, it would be beneficial to follow in this topic.

III. OVERALL EVALUATION, QUESTIONS FOR THE PRESENTATION AND DEFENSE OF THE THESIS, SUGGESTED GRADE

Thesis meets master thesis requirements. As described at evaluation criteria above there are some topics which could be described more detailed and some information are missing. In connection with this fact I'd like to ask:

1. *Which criteria led to individual components selection? Meaning ranges and resolution of stages, choice of the pinhole diameter.*
2. *Station and GUI include also objective lens z-axis positioning stage Mipos 100 whereas automatic motion sequence and image capture description don't include the z-axis iteration process. Could you be more detailed in this fact?*

The grade that I award for the thesis is **B - very good.**

Date: 4.9.2020

Signature: Ing. Jiri Vlk (Meopta – optika, s.r.o.)

