



as of 01_2016

Case Study

Miniaturized camera for endoscopy

Miniaturized camera for endoscopy

Demands of minimally invasive surgery

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Scope

Development and production of a miniaturized camera with maximum resolution and flexibility.

The dimensions of the components that enter the body are said to be as low as possible in order to shorten the healing process and to ensure the accessibility to the smallest vessels.



Technical specifications

Phase One

With the definition of the image sensor a big part of the requirements in the miniaturized camera already were transmitted:

- Lowest possible outer diameter of the housing
- Optics with an object angle of 85° , individually aligned to the camera sensor
- Electronic data transfer and data processing for displaying on the monitor

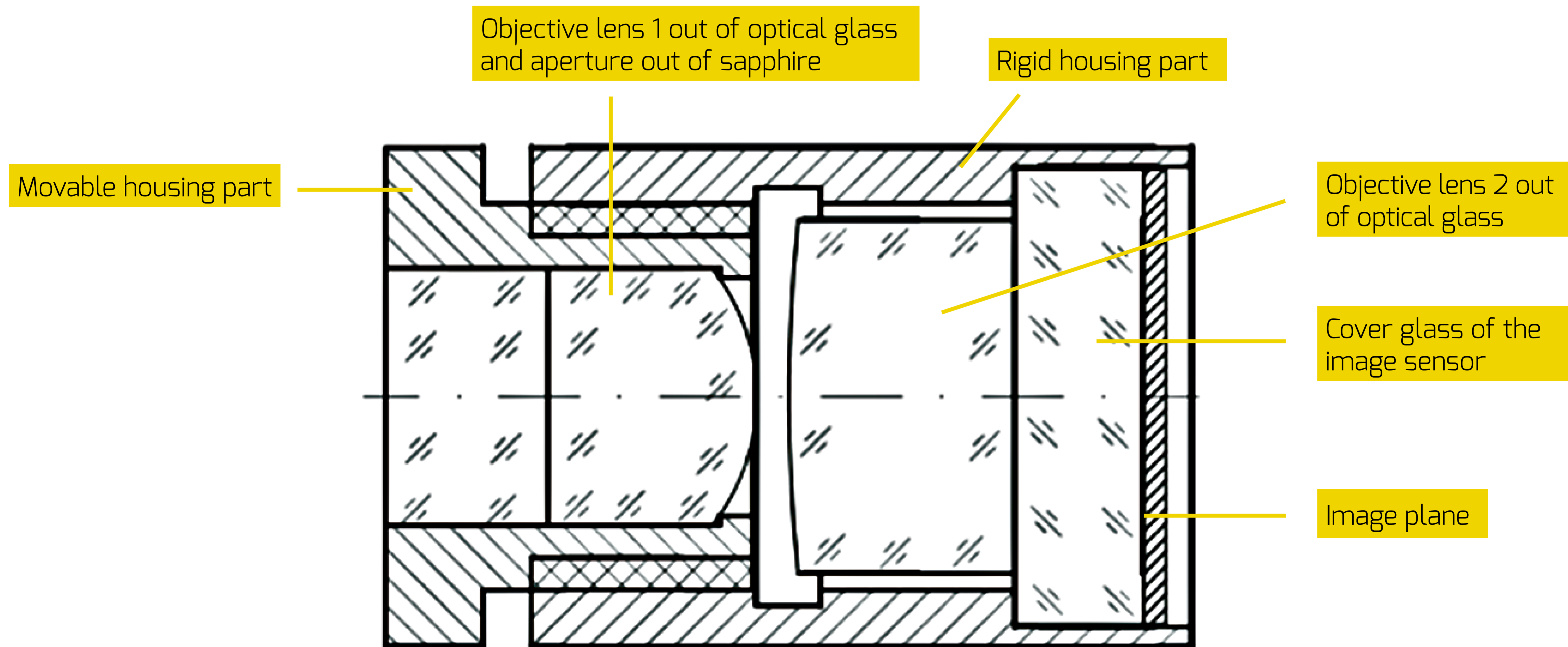


No.	System	Requirement		Specification	
		Property	Value	Property	Value
1	Objective	Object distance	20,0 mm	Focal length objective	1,10 mm focusable
2		Field of view	80 – 90°		
				Main beam-angle	25°
3				Shape of the last lens surface	Plan
4	Housing	Diameter	Preferably small	Outside- ø	1,55 mm
5		Length	Preferably short	Length	2,35 – 2,9 (focusable)
6	Electronics / SW	Image quality on the screen	Excel state of the art	Detailed specifications electronics / SW	Detailed specifications electronics / SW



Effective realization

Phase Two



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The individually adaptable optics along with the corresponding camera
provide the essential part to a whole new ranges of applications.



Maximised resolution with minimal size

Endless possibilities

With the development and production of this miniaturised camera was shown, that very small construction size ($\varnothing 1.55 \times 2.5$) are sufficient to view and evaluate the picture of hard-to-access areas on a display screen – whether inside the human body or in a non-human cavity.

Technical data		
Field of view		80 - 90°
Focal length objective		1,10 mm
Main beam-angle		25°
Construction size		$\varnothing 1.55 \times 2.5$
Resolution		62.500 Pixel



Partnership

Synergies cleverly used

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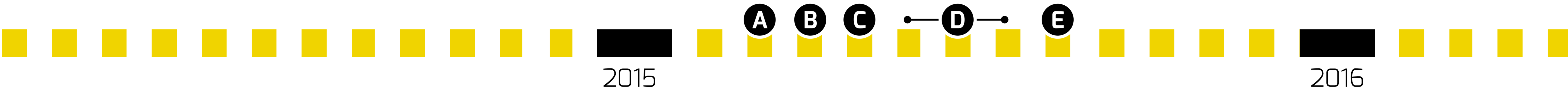
Project analysis

With the successful handling of this project, which is characterized by its interdisciplinary, we achieved another milestone towards product development and production of complex miniaturised systems.

The excellent customer feedback confirms the project results and the quality provided by feinwerkoptik zünd.



Time line



- A February 2015:** Selection of the image sensor
- B March 2015:** Defination of standards and specifications (optic and mechanic)
- C April 2015:** Development of optic and mechanic
- D May - July 2015:** Production of optic and mechanic
- E August 2015:** Testing and evaluating

Content

R & D (Research and Development)	Produktion	
Defining requirements	Spherical optics	Non- optical glass
Defining specifications ·	Rod lenses	Color glass ·
Development of optical system ·	Optical assembly	Camera ·
Development of optomechanical system ·	Optomechanical assembly	Prototyping ·
Development of production process ·	Electrooptomechanical assembly	Serial production

