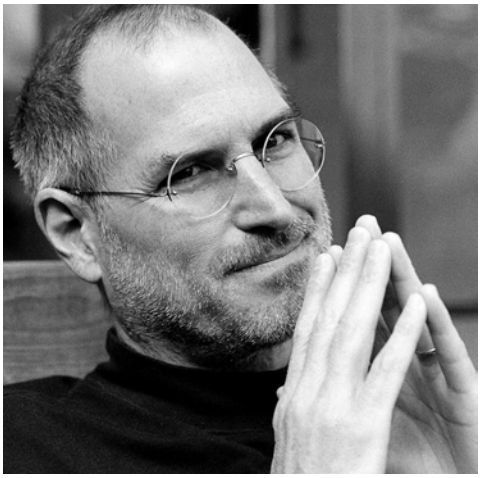
Optomechanix

April-June 2019

Technical journal of OMiD, Opto-Mechanical Institute of Design

The front taxi line to Lasers and Photonics show 2019 in Munich with flags of some of the participating countries

Contents



This issue Dedicated to:

Steve Jobs (1955-2011) was an American entrepreneur, and visionary businessman behind Apple, and Next corporations. I find it so relevant to the goals of this magazine to dedicate an issue to this man, and what he stood for. Designing with elegance puts products in a different category. Most people consume what conforms with fashion whims. What Apple created was what so many people learned to love.

One of the reasons Jobs was kicked out of Apple was because he had a spiritual search early in his life, and he considered himself more as a hippie. “That’s the spirit that makes people want to be a poet than becoming bankers. If that spirit is put into products, people could feel it. If you talk with people who use Mac, they just love it, and you don’t hear people loving products that often. People work with computers because they want to transmit a feeling that you have, and be able to share it with other people.”

It would take a lot of passion to promote a product that has feelings in it, basically, giving your more to receive your less. It reminds me of how Marc Twain defines Forgiveness: “It is the fragrance that the violet sheds on the heel that has crushed it”. It’s who you’d become as a human being that’s worth perusing it. Becoming extremely wealthy is just too weak of a pay off, and it’s for this reason Mark Zuckerberg didn’t sell out his Facebook for $1 Billion to Google.

Steve Jobs said in an interview: “In spite of Microsoft’s huge success, they simply lack good taste. The IBM deal made them very good business opportunists, but they don’t think of original ideas and they don’t bring much culture into their product. Their products have no spirit into them, they are very pedestrian. It’s just Mac Donald’s.”

Video references: https://youtu.be/IKxOywaoUKo, https://youtu.be/IKxOywaoUKo, https://youtu.be/EGezPCRYv44

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Optomechanix is a quarterly journal of Opto-Mechanical Institute of Design (OMiD), with technical articles for practical, hands-on opto-mechanical engineers. This magazine is privately funded.

Cover page photo: See-through section of a goniometer stage by GMT Europe GmbH
Inside page photo: Participating country falgs at Lasers and Photonics 2019

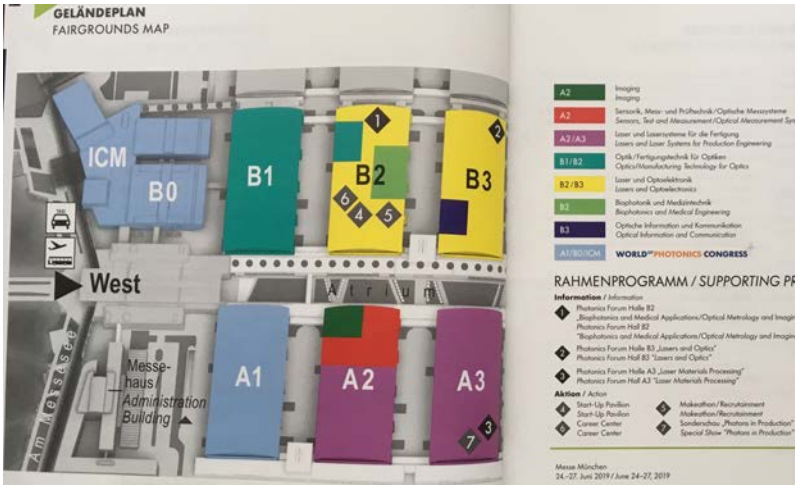
Attending Lasers and Photonics 2019 (June 24 ~ 27)

Messe Munchen plays the central role in bringing together many similar events every year, including the Analytica show that was covered last year in this magazine. This year, the show brought 1,325 exhibitors from 40 countries. Out of 34,000 visitors, 60% were from abroad. There were four main halls for the photonics companies (B1, B2, B3), and three halls covering laser production engineering (A2, A3). The housing in Munich was all sold out for the show. The show hours were from 9 to 6, which lasted 4 days (Monday till Thursday).

There was also world of Photonics Congress event which consisted of technical conferences, and poster sessions accompanied by students discussing their research in halls A1, B0, and ICM. I heard complaints about the distance atten-

Entrance hall to the show was packed with visitors. I had never seen a bigger show with so many qualified attendees.

To avoid $65 euros entry fee, a huge number of visitors had received free invitation tickets to attend the show.



Photonics Exhibition occupied Halls B1, B2, B3, Laser Machining, and production Engineering in Halls A1, A2, and Technical Sessions at A1, B0, and ICM.

dees had to walk between halls to catch up with these technical sessions which were spread too far from each other. I saw one attendee's iPhone display showing he had walked 26 Km in an entire day!

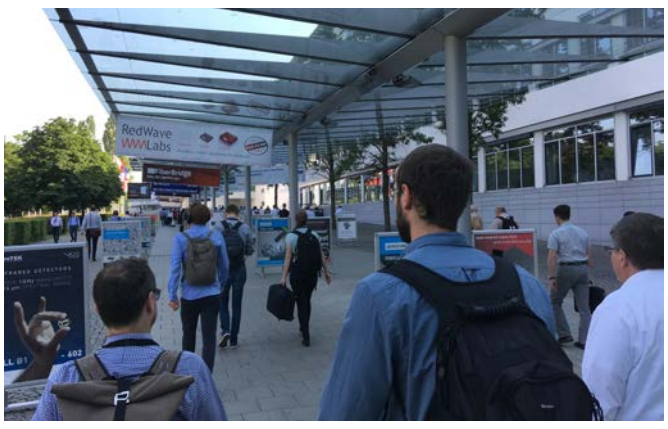
A Start-Up Pavilion was held with innovation awards given to the most innovative start-up companies. The makeathon student competition was also held this year at the show that gives a work bench, and tools to students to build, and present their photonics related projects (mostly in robotics), and to present it to a panel of judges to win prizes.

There was a talk held by Nobel prize winner Nobel Laureate Gérard Mourou, alongside his colleague Donna Strickland, who jointly won last year's Physics Nobel Prize for the invention of chirped pulse amplification. I found myself locked out by the 5,000 attendees that got there before me. The talk was broadcasted for the remaining crowd of people listening while standing outside the conference hall.

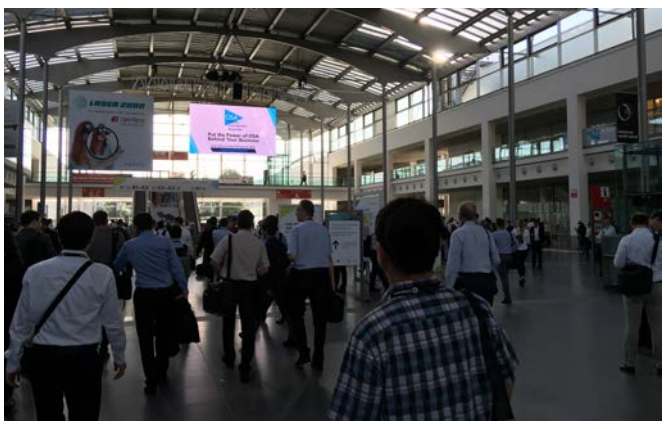
Being at this show was a great experience for me because I was invited to display my new Optoform line at Laser 2000 booth, and I ended up with many leads from this show. Laser 2000 had spent over 380,000 Euros on their 400-meter booth. This was the second largest booth at the show (2nd to Trumff GmbH). I also spent 3 days at their office after the show, and got acquainted with their friendly company culture. I'll have an entire page covering their booth on page 10.

International business is the most influential means to bring about world peace. I have always favored it throughout my life because I have been invited to visit many places that I could have never seen being just a tourist, and I have had warm conversations with people whom I would have never been able to get acquainted with. I was accompanied by a few friends that after a few days we were together, they all went their own direction, visiting Paris, Madrid, and Lopar, in Croatia. I also had a fairly rough experience with Airbnb because the apartment I had rented, the host left town without giving me a key. Every small cafe I visited didn't accept credit cards. So I ended up walking around Munich pushing my luggage, without Wi-Fi access, looking for a place to stay. Airbnb was so reluctant to refund my money, and I had to call their customer service three times, and every time I called, they kept asking me if I was enjoying my stay at the first apt! Next time I make such arrangements, I'll be so careful picking where I will stay.

Ali Afshari, OMiD Contributor

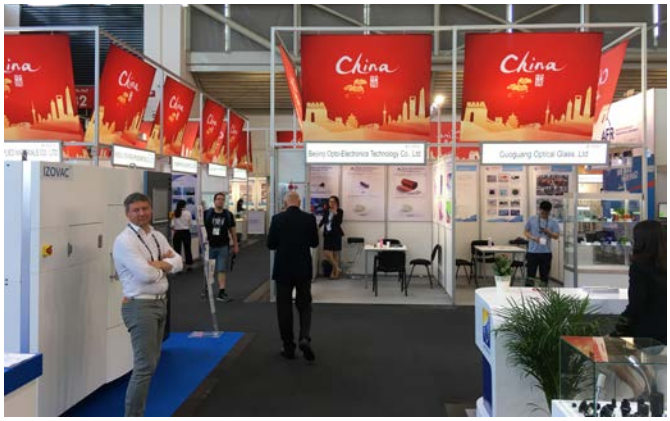


Entry path to Messe Munchen from U2 train. Every morning, there was pleasant accordian music by a street musician that entertained the attendees.



The usual crowd enters to scan their badges at the end of entry hall.

An International Showdown



China had (124 in Pavilion + 94 stand-alone) = 218 companies

France had the second largest pavilion.

Japan Pavilion

Finland Pavilion

Germany Innovation pavilion

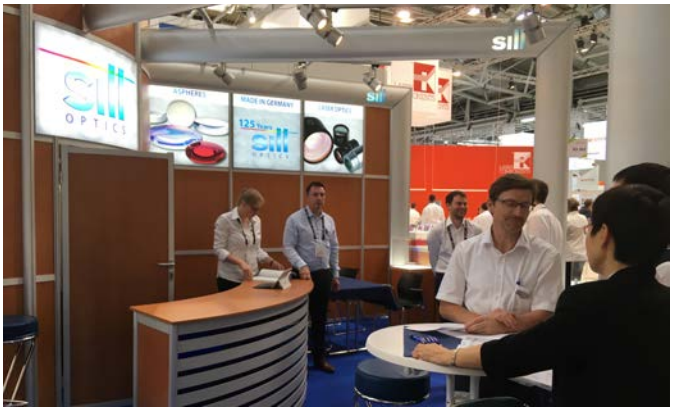
Canada Pavilion

The information booth handed out guid book / floor map.

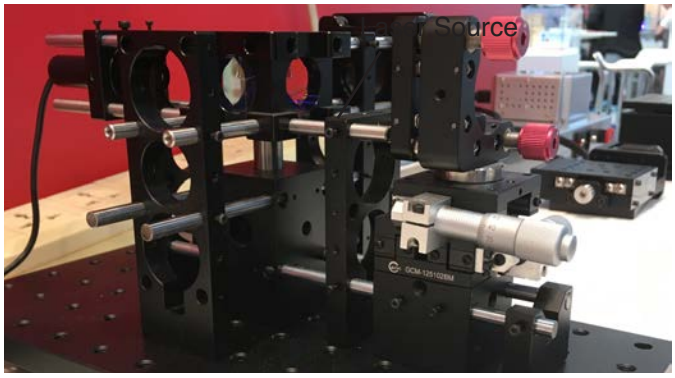
The show was bigger than previous years with a huge presence by China (it had its own reasonably sized show guide). Rumer has it that over 12,000 start-up companies are registered in China every day. It used to be each company had a unique product but now there are many repeat products as they are there to compete for business (218 participated at this show). In general, Chinese booths were not as corowded as the rest of the show.

Other country which had a reasonably huge presence was France, and then Japan. Canada, Finland, and German innovation pavilions were next down in size. This doesn't really reflect the number of participating countries as there were other companies that had stand alone booths.

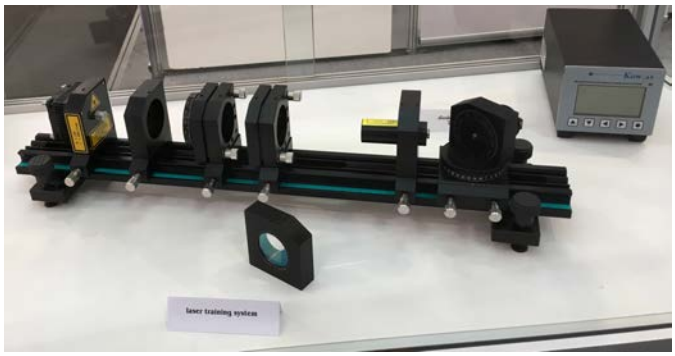
Lasers and Photonics 2019 show floor



Berndt Zingrebe managing director of Sill Optics (left) having a conversation with a customer. With 225 employees, Sill has been a custom-made optics provider, and Germany's a well known optical manufacturers since 1894.

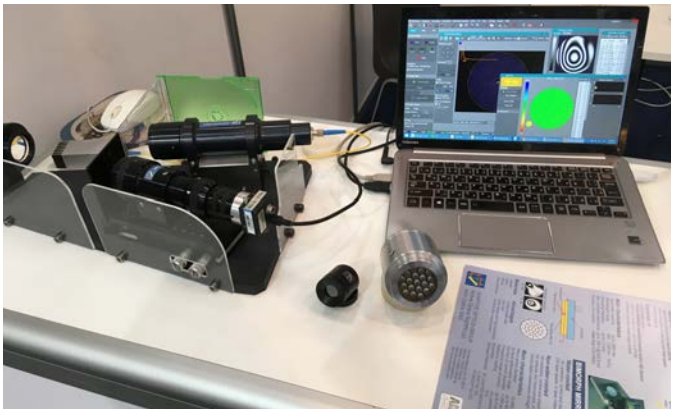


Beijing Lyseiki has been making the cage system copy of Thorlabs, and now sarting to develop some ideas of their own.



Laser training system made of Arbacus components, and rails developed by Micos GmBH is still offered by Canlas.de

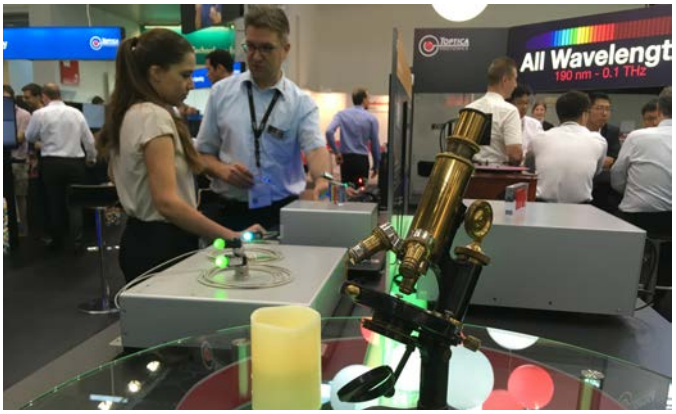
Owis booth (left), and Edmund optics booth (right) offered their usual opto-mechanical components, and cage system.



Closed loop adaptive optics by Adaptics Optics Group (left), and the classic Microbench at Linos booth (right).

Precision opto-mechanics displayed at Schneider booth.

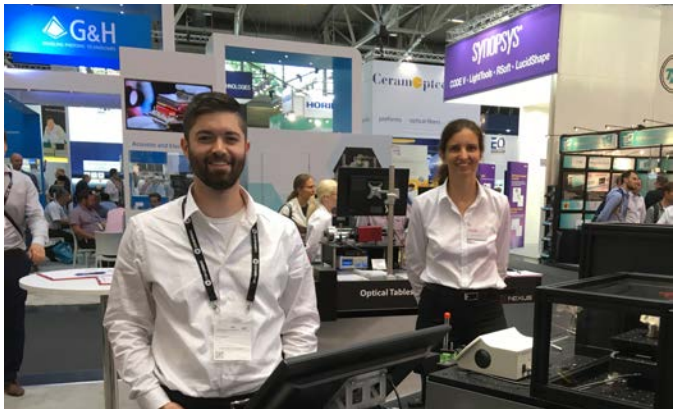
X-Cite introduced their LED light source since a year ago.

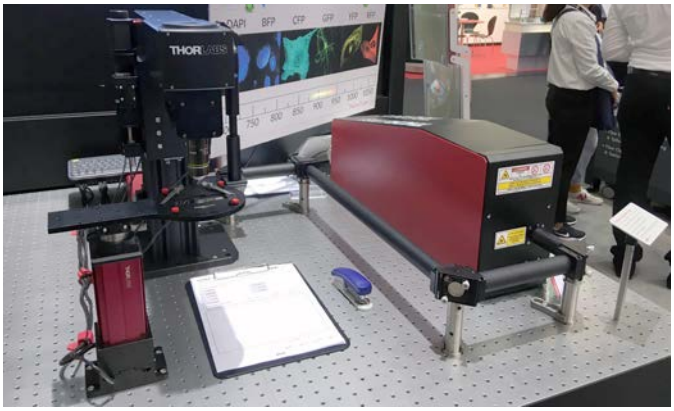


Toptica's booth this year was decorated like a museum.

Schott diplayed their high-end glass for optics fabrication.

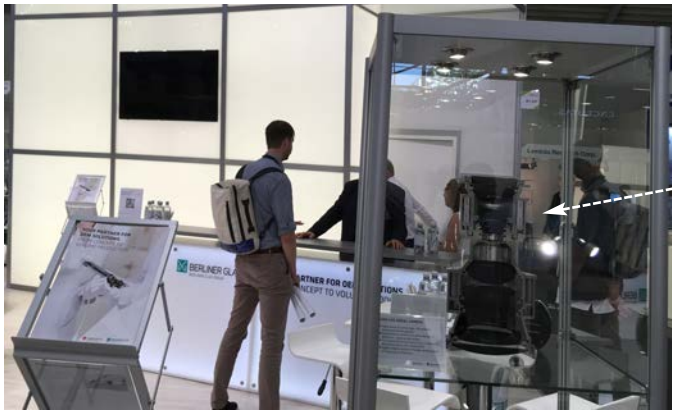
Laser Components had a walk-in tunnel at their booth for optical illusion. Corning optics (right) displayed new materials.,

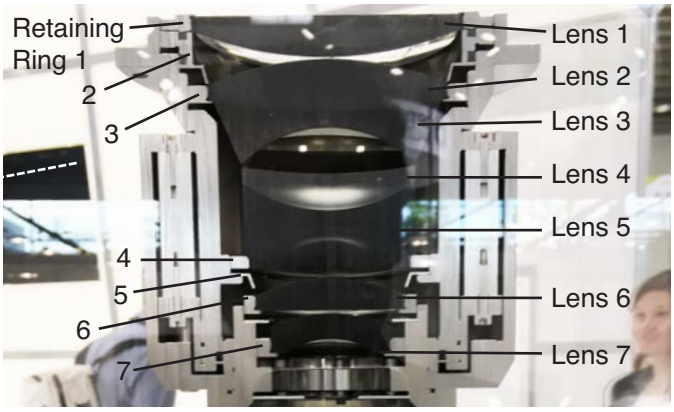




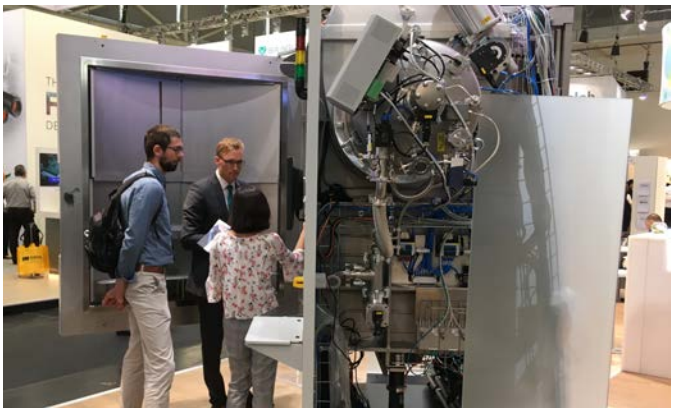
Christopher Sallitt posing in front of Thorlabs booth diplayed their optomechanics, and optoelectronics components, and Flourescent laser source (right). Thorlabs branch in Dachau/Munich employs 250 engineers, and support staff.

Pan Yuebing sales director, and engineer at Novel optics displays their new manufacturing capabilities. Plan-Apo objectives (right) are now being manufactured by Novel optics, making microscopes for Zeiss, Leica, Nikon, and Olympus.





Diffraction limited optics/precision mechanics by Swissoptic on display. Note the retaining rings for each lens (right).



Huge optical coating chamber on display at Buhler Alzenau GmbH booth. Right, vacuum pumps/control electronics.

Roller bearing section of a goniometer stage by GMT Europe GmbH. They offer precision micrometer options (right)

Multispectral camera by Senop Oy Optronics Finland, provides 400-1000 nm spectral scan 1 Mega Pixel resolution.

With Charly Maucher from PI-Micos (left). Micos linear, and rotary stages still being manufactured by PI-Micos (right).

Satisloh displaying their latest lens polishing machines, and OZ optics booth with their ice cream giveaway attraction.

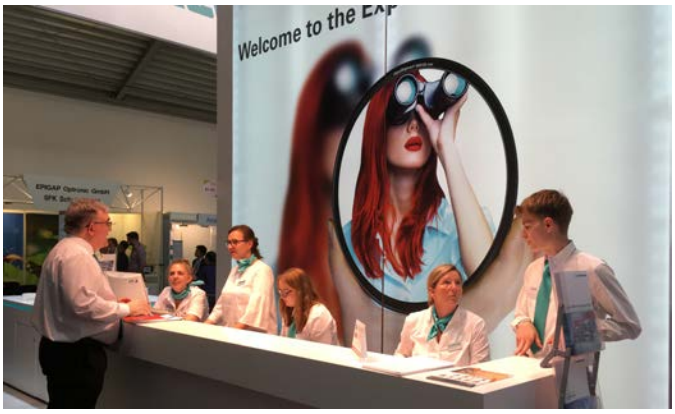
At Laser 2000 Booth

My stand at Laser 2000 booth, introducing the new Optoform concept for the first time to university, and research labs.

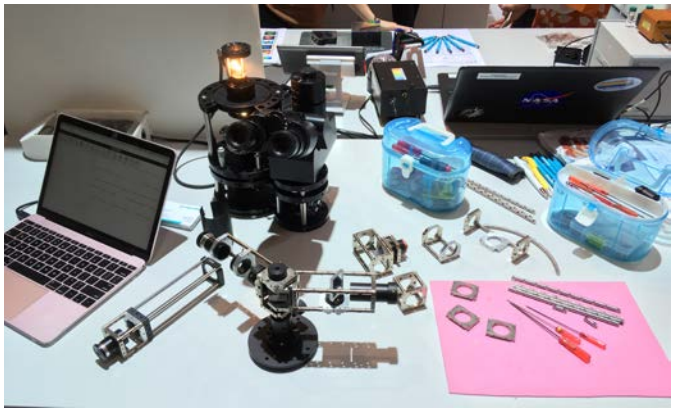
With Marc Golla (left), sales manager of Laser 2000. Armin luft with Jun Kang of Spectrolight, a Korean supplier (right).

Met my friends Dr. Latifi, and Dr. Omid Ranjbar. Magician with smiling Dr. Katrin Kobe, curent president of Laser 2000.

Warm lunches prepared by friendly staff Tanja Depner (right), and Regina Kerbs (left), they are the love behind every meal.



With friends John Proudlove, and his wife Helen. Laser 2000 pavilion, and front reception was as big as a small hotel.



Customers loved the look of the new Optoform, specially when I promissed them to soon deliver $10 a piece mounts.

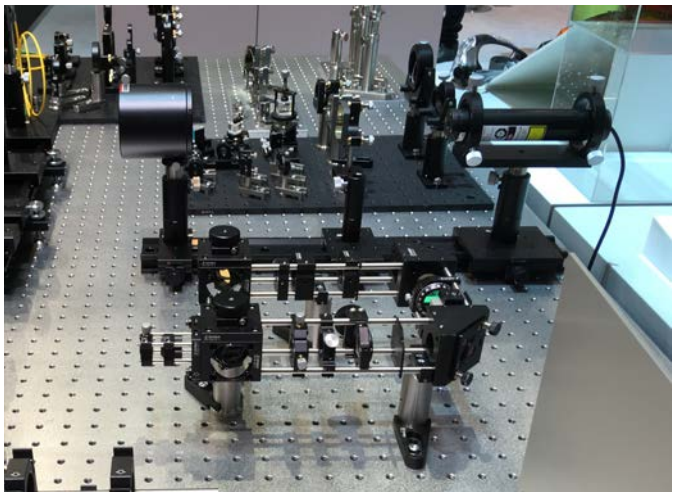
The juice bar was the center of pavilion at Munich's hot weather. Optosigma occupied a major portion of the pavilion.

With Franz Brandl (above), and Axel Haunholter who kindly gave me a ride to train station. With Victor Blanco (Spain representative), and Peter Notermans (right).

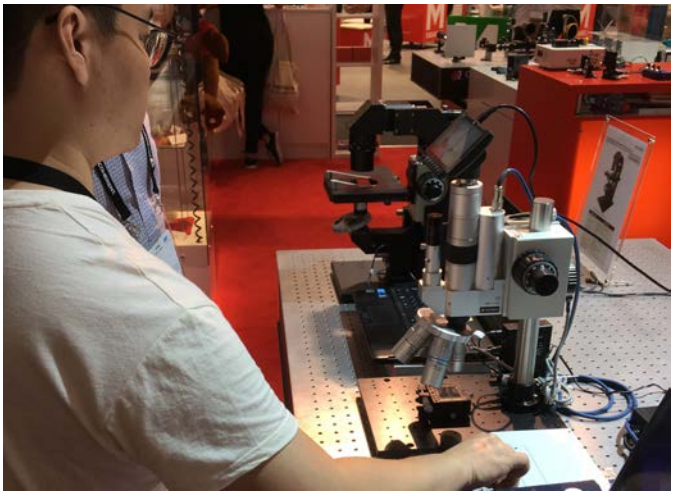
OptoSigma's Three-Rod Cage System

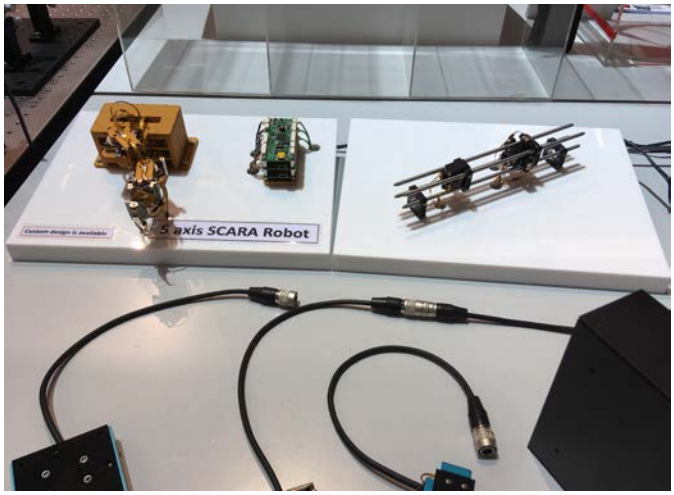
Opto-Sigma came up with their three rail cage concept (below, right), introduced two years ago at Lasers and Photonics 2017. They have since kept at it, completing its line of accessories. Their idea is by utilizing only three support rods, it would be much easier to arrange optical setups, and the user could always add the fourth rod to secure their assembly.

Sigmakoki has been manufacturing precision rail systems, and stages for many years. The straight line contours of their stages follows the J-Design concept which goes back many years with the introduction of Nikon-F cameras, designed by Yusaka Kamekura. Kamekura was a graphics designer that used symbols from Zen Buddhism (the circle, the square, and triangle) to come up with the shape of modern SLRs with a penta prism. The triangular cage system, square mounts, and Nickel plated circular knobs that stands out in Opto-Sigma stages stems from the same design roots.



I met Guy Ear, president of Optosigma (right) sitting next to Yosuke Kondo, CEO of Sigmakoki at a picnic held at Hirsch-Garten by Laser 2000 the day before the show. It was a friendly gathering for everyone to get to know each other.



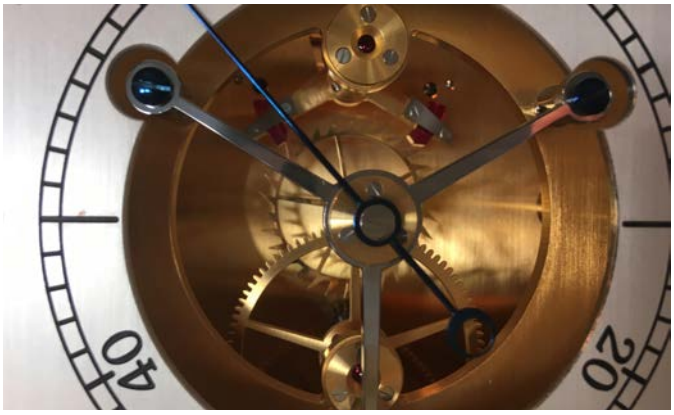


New modular microscope concept (left) allows quick/flexible setups. Piezo driven stages for the cage system (right).

Minimalist design rail based system (left) allows modular setups. Yosuke Kondo, and Guy Ear posing for group photo.

A precision clock made in Munich in 1904 (115 years old) with optical scope pointed at the stem of its pendalum. I saw this on many old clocks, including the Erwin Latter clock (bottom, right) that has a precise scale at its base.

An interferometric comparator by Carl Ziess Jeno, 1921

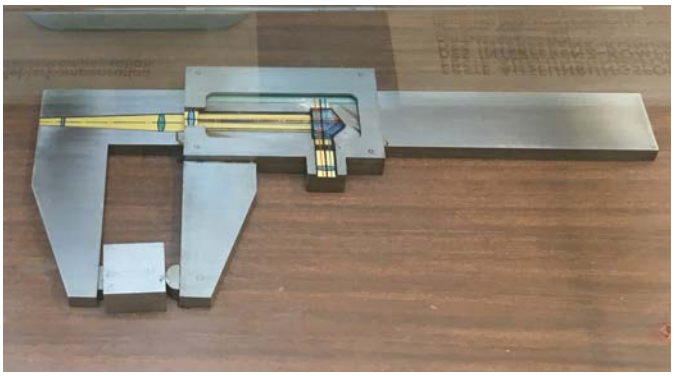


Close up of the escapement mechanism in the up right clock (right), and its hand made wheels and pinions.

Munchen Museum

This was my fourth visit to Munchen museum, and I spent my time in the physics, and watches and clocks section. Visiting museums is really a big responsibility because I wouldn't want to see things in a rush. These show cases have been prepared with so much care and one should spend enough time, and give each of them the right attention it deserves. So in a rushed world like ours, it brought me a bit of sadness because it felt like being an old man that had nothing else to do, and had time to waste! This is specially true when you see uncurious children who keep pushing buttons, and say "Mommy look!"

In any case, I still enjoyed my time there. It kindled the curiousity of my inner child, and empowered it.



A measuring caliper by Hensoldt-Werk, Wetzlar with an optical aid with 0.005 mm measuerement accuracy.

Erwin Latter pendalum clock is driven by solid brass weight (right) bears "made in Munchen".

The Black Forrest Trade

The black forrest was a clock region. Around 1871, the clock factories in the Black Forrest produced 1.8 million clocks annually. Mass production relocated to state of Baden to Wurttemberg where the largest factories were built in Scharmberg. In 1905, clock production in Black Forrest was estimated at 5.8 million clocks of which 70% were alarm clocks.

The time keeping section displays watchmaking tools, and various oversized watch escapement mechanisms to show their advancement. Right, a gear driven model of the solar system simulates motion of planets, and their moons.

Old time keeping instruments, and pocket watches were wound by winding keys (left). Portable time keeping pieces started by small pendalums inside the case, then converted to a balance wheel using a hairspring to simulate earth's gravity.

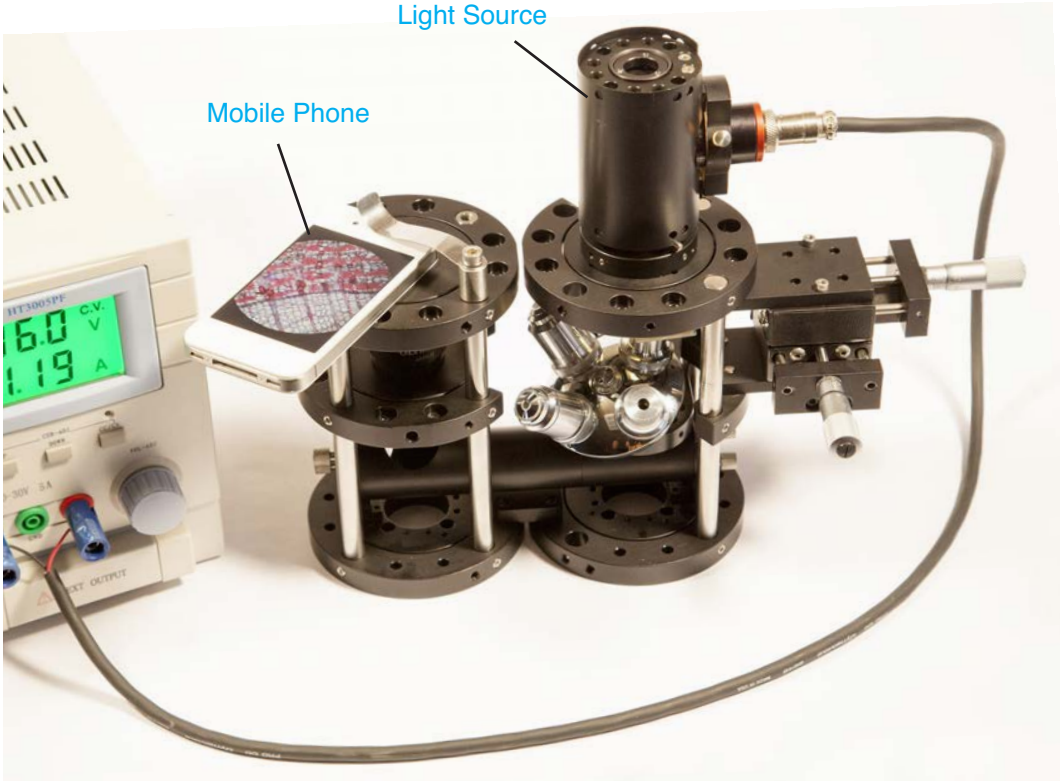
Before pocket watches, there were portable clocks (left). Lange Sohne made watches for over a century in Germany, such as the ship clock (right) until they became world famous. Old Lang Sohne watches looked so similar to Glashute.

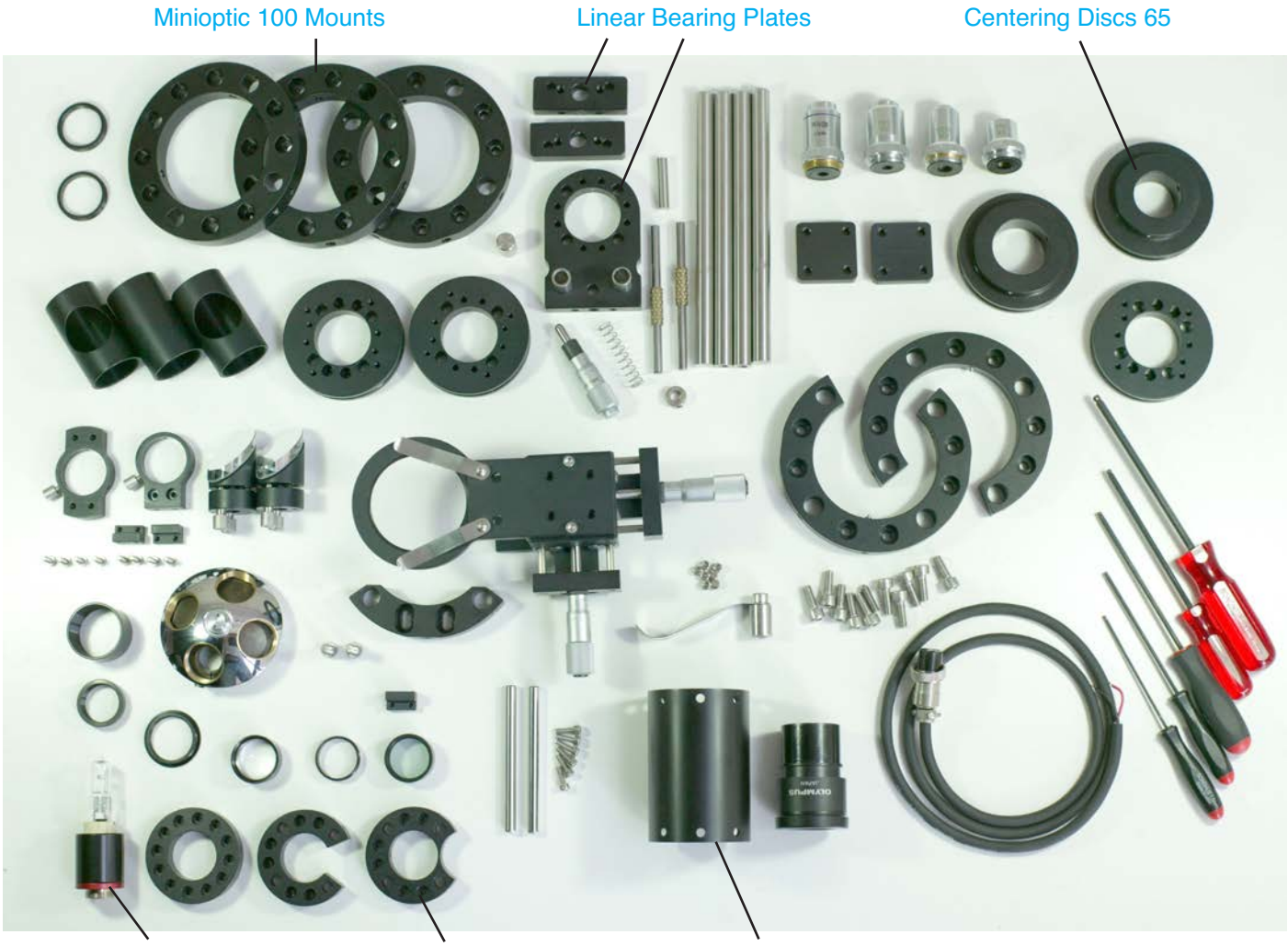
It took many years of advancement in micro-mechanics craftsmanship, and radical design innovations to advance the state of clockmaking industry. There was first the cylinder escapement, replaced by modern escapment still used today.

Designing an introductory kit for Optoform II

In the 2nd issue of Optomechanix magazine (July-Sep 2017), we covered the design, and assembly of this inverted biological microscope.

This is a good example of an opto-mechanical design for a specific application. But to design a general purpose kit, one has to consider as many applications that comes to mind. The most common optical components in optical setups is a 10X eyepiece, 10X microscope objective, and say a f = 150 mm focusing lens. In this setup there is still an eyepiece hidden beneeth the mobile phone.





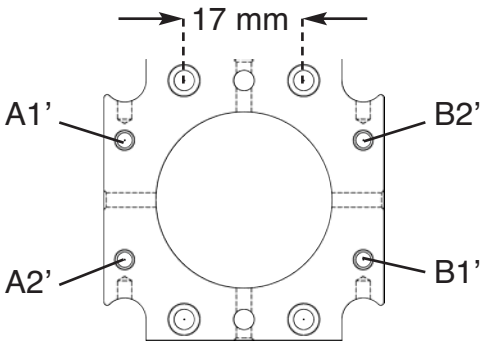
How is the new Optoform Design different ?

There are a few design features in new Optoform that you need to know about so you could use it more effectively. To get more hands on experience, we offer a basic kit to go with your current Microbench line of accessories. First, the bore spacing on the rods as well the bolt pattern on the mounts is based on a minimalist design concept that offers you various mounting possibilities.

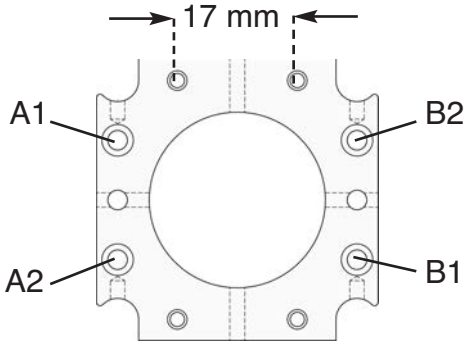
1) The counter-bored patern on the rods are for securing mounting plates along the rods.

2) Tapped bores on the side of support rods are intended for securing mounting plates layed against them (bottom of opposite page).

3) Every rod starts with a horizontal tapped bore H, and ends with a vertical tapped bore V (opposite page). When four rods are secured in alternate orientations, bores V, and H will line up to allow four mounting plates to be secured around a single position along the rods (bottom assembly on the opposite page).



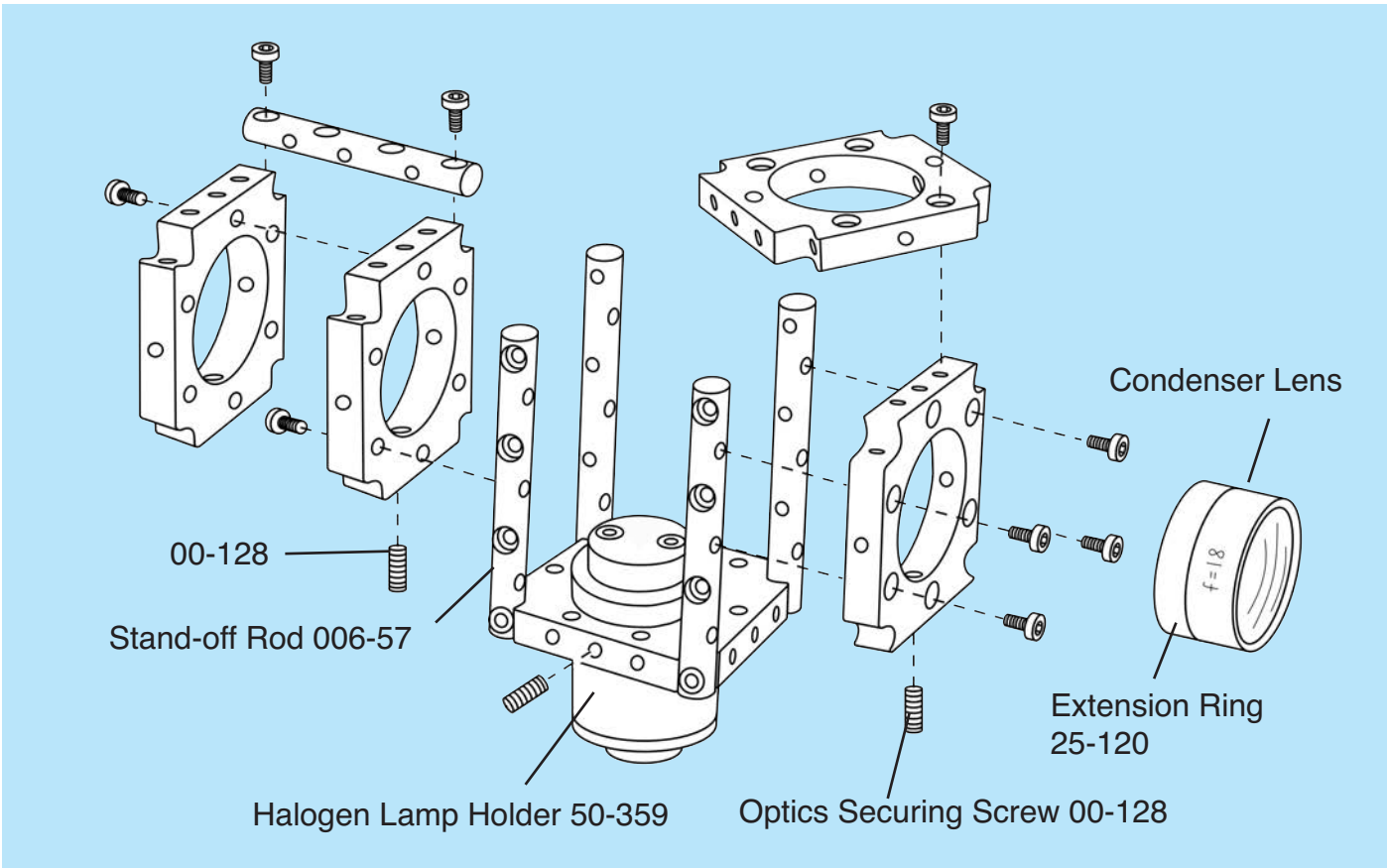
40-100



40-106

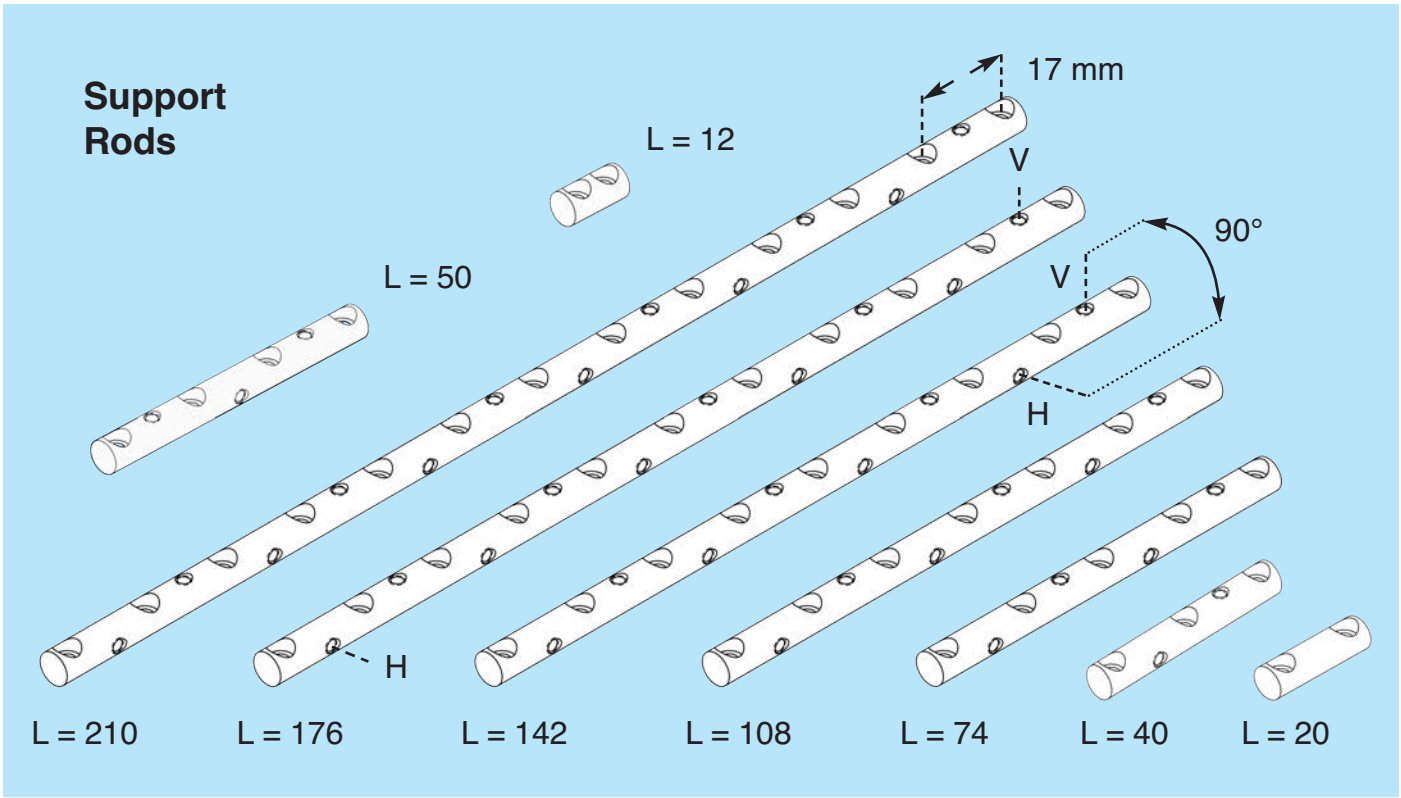
Mounting Plates

Mounting plate 40-100, and 40-106 (right), have matching counterbores A1'/B1', and tapped bores A1/B1 to allow securing them face to face, i.e, for joining two sub-assemblies. These are some basic features of Optoform that will become more clear as we cover more examples.



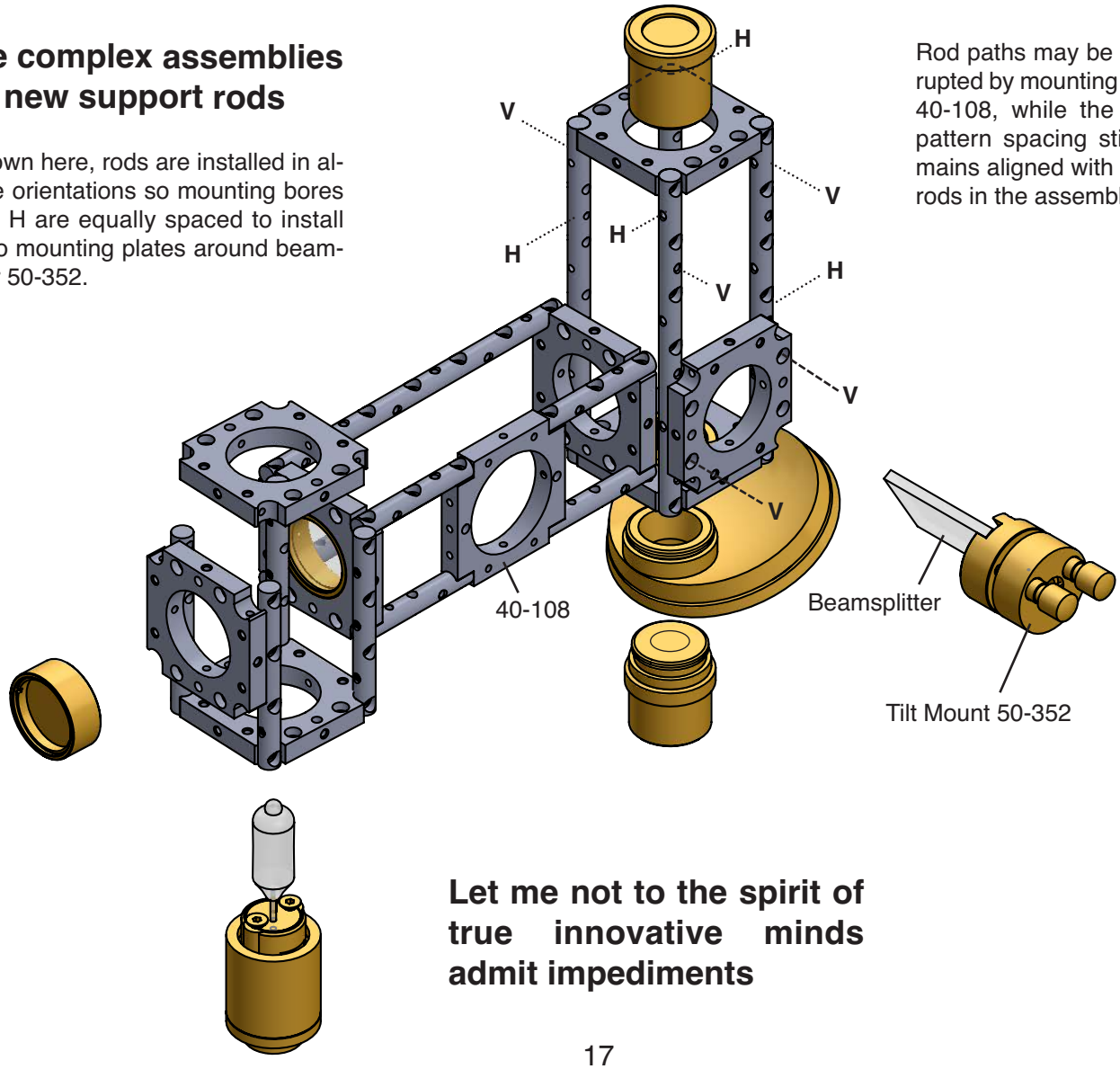
Stand-off rods 006-57

These rods are designed for center height alignment of lamp filaments inside new Optoform's 40 x40 mm platform. you'll see more applications for these rods when making swivel mounts for spectroscopy or when building a slanted viewfinder base for microsocpy. 006-57, 006-20, and 006-12 have even number of counterbores. All other rods have odd numbers.



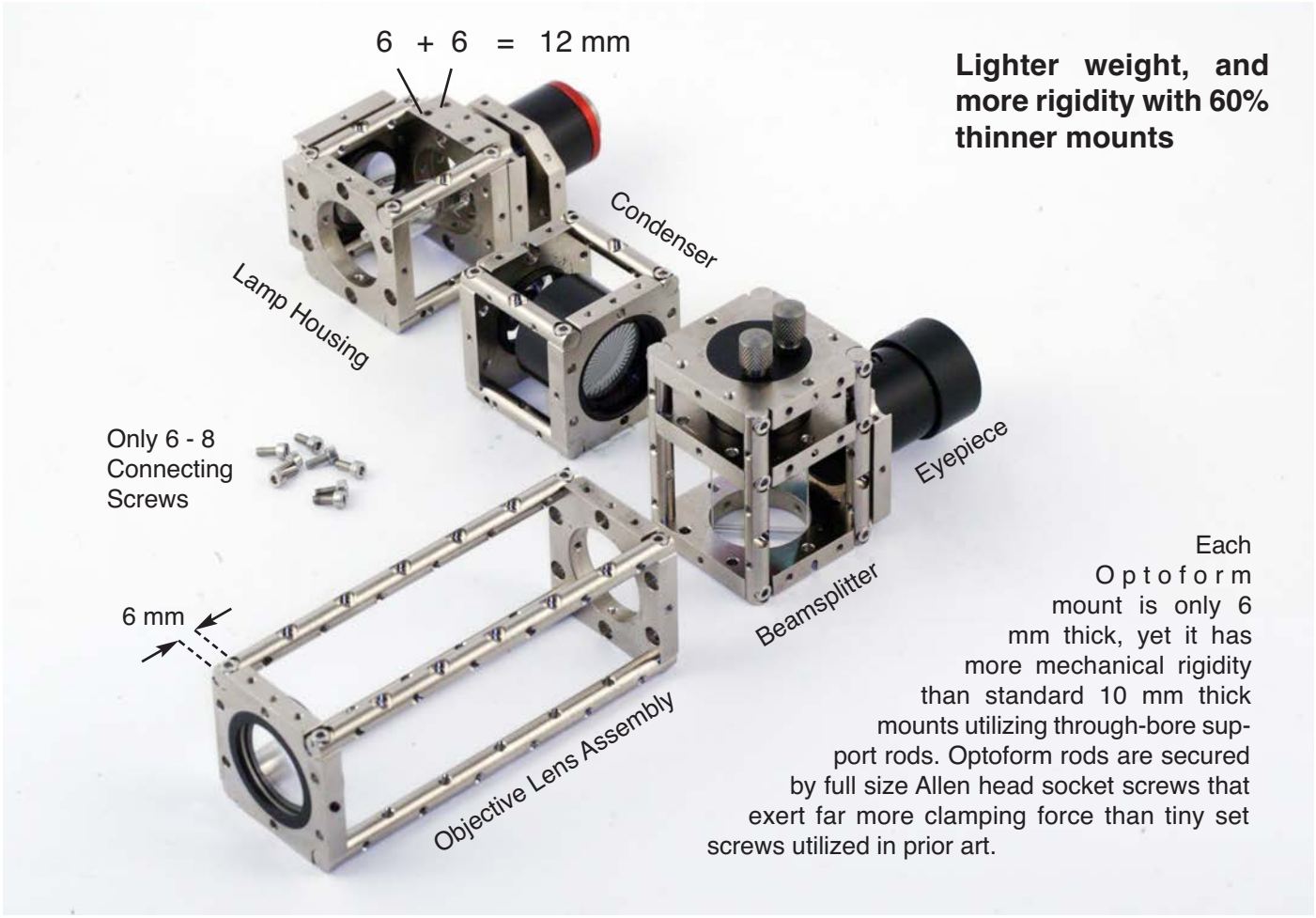
More complex assemblies with new support rods

As shown here, rods are installed in alternate orientations so mounting bores V, and H are equally spaced to install the two mounting plates around beamsplitter 50-352.



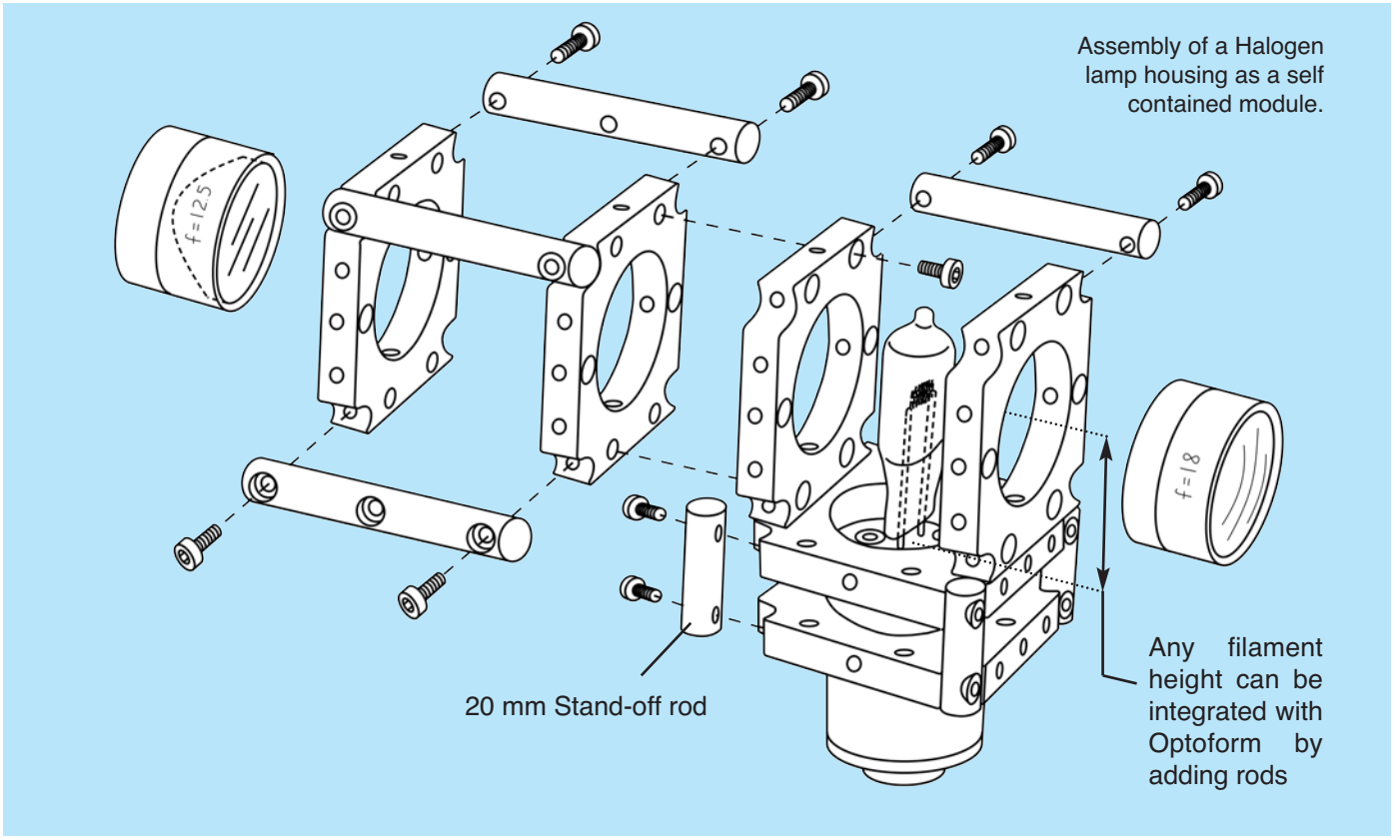
Rod paths may be interrupted by mounting plate 40-108, while the bore pattern spacing still remains aligned with other rods in the assembly.

Let me not to the spirit of true innovative minds admit impediments



Lighter weight, and more rigidity with 60% thinner mounts

Each Optoform mount is only 6 mm thick, yet it has more mechanical rigidity than standard 10 mm thick mounts utilizing through-bore support rods. Optoform rods are secured by full size Allen head socket screws that exert far more clamping force than tiny set screws utilized in prior art.



Assembly of a Halogen lamp housing as a self contained module.

Any filament height can be integrated with Optoform by adding rods

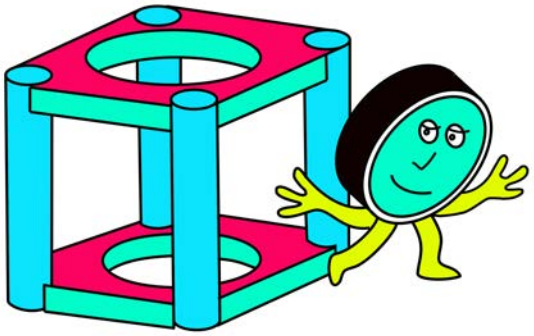
The most intuitive way to focus optics

While building your laboratory experiments, focusing of optical elements is accomplished by positioning each lens cell within the mounts. You could also adjust the filament height inside a lamp housing (above). Mounting plates may be translated along the rods, and locked in position. An interface plate is also available to utilize Microbench rods/optics.

Orther Cage Sysems

Out of the cage system:

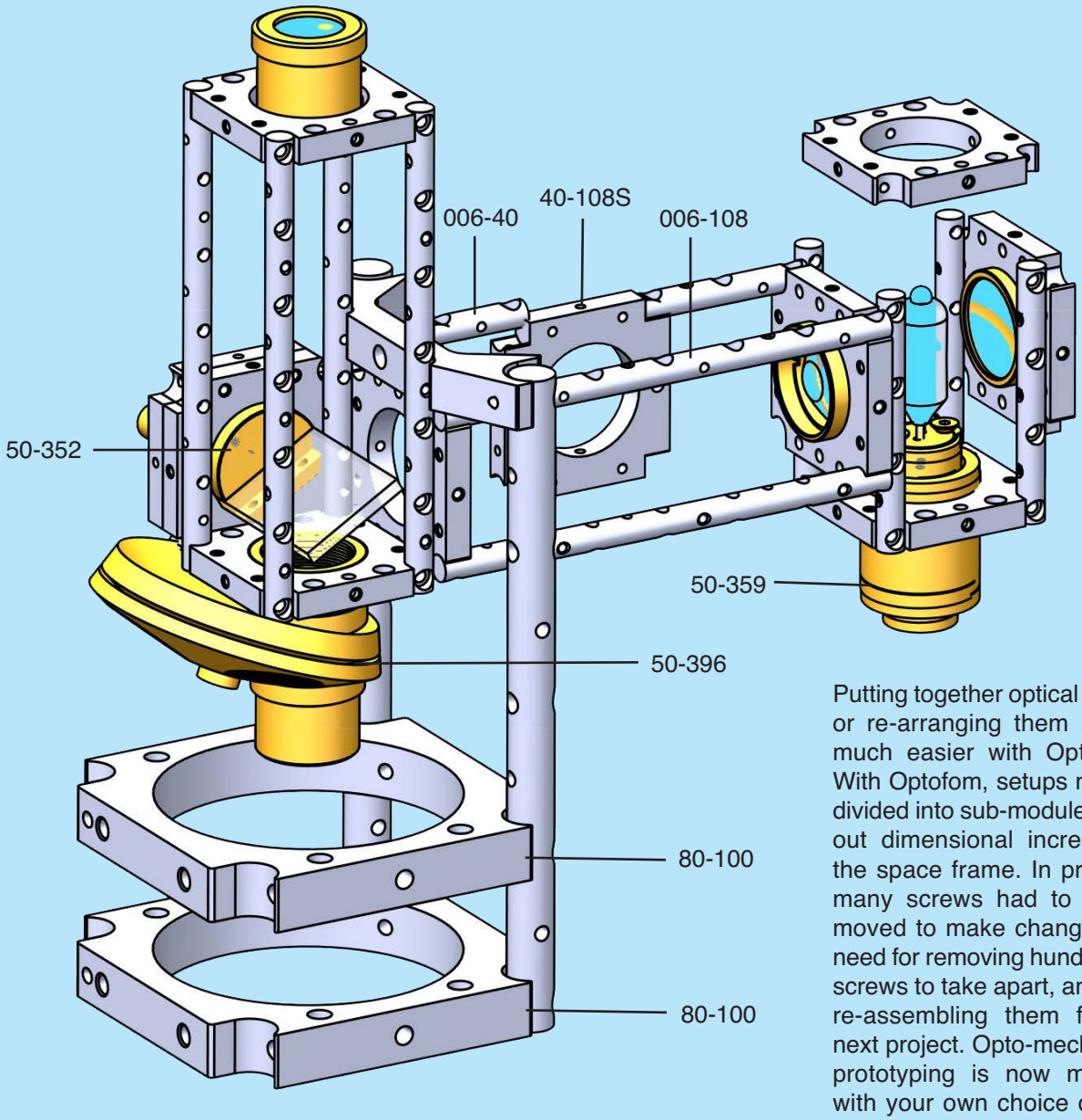
You can now use larger optics



New Optoform

Placing support rods on the outside corners of Optoform mounts allows 25/30 mm mounted optics to be easily inserted, and taken out without obstruction. Up to 40 mm optics may now be fitted in between the rods.

Take apart, and re arrange your designs without limits



Putting together optical setups or re-arranging them is now much easier with Optoform. With Optofom, setups may be divided into sub-modules without dimensional increase of the space frame. In prior art, many screws had to be removed to make changes. No need for removing hundreds of screws to take apart, and then re-assembling them for the next project. Opto-mechanical prototyping is now modular with your own choice of sub-assemblies.

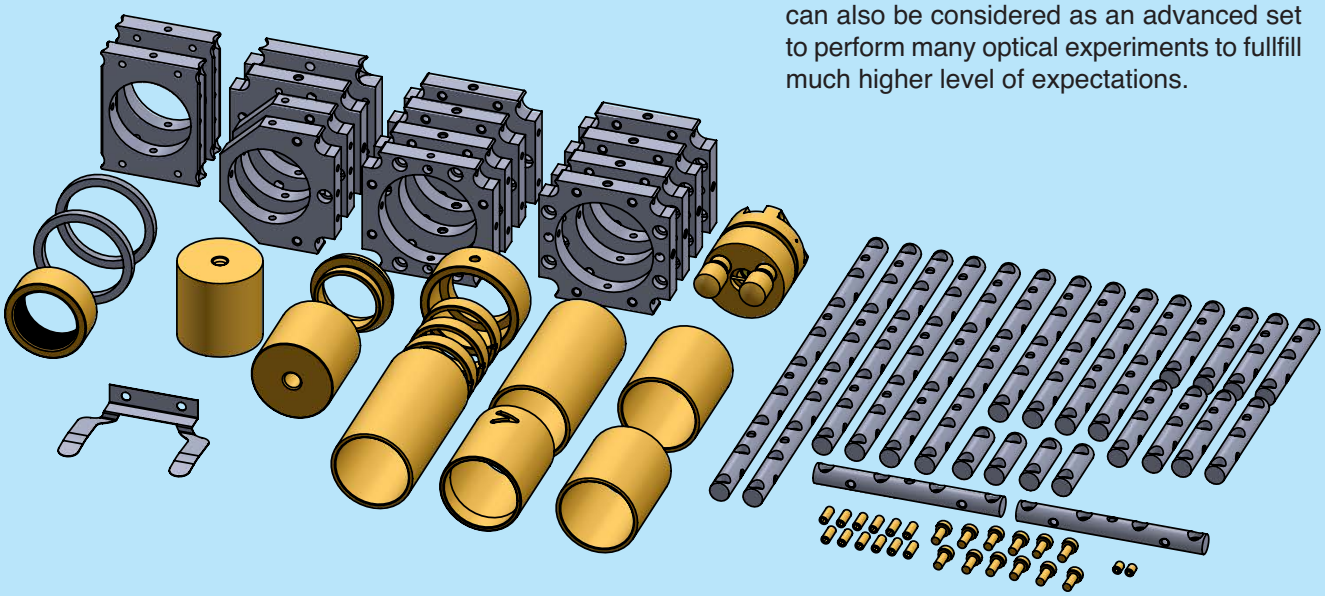
Optoform II Introductory Kit 40-706

The new Optoform Basic kit is designed to allow the end user to setup a multiplicity of optical experiments. The kit allows hands-on assembly of several optical instruments so its opto-mechanical capabilities could be studied. The rest is up to the user's own imagination, and cretivity to build their own projects. First lets examine what's in this introductory kit, and then we'll start constructing from basic experiments such as a telescope, and we'll do more complex setups such as an autocollimator, and a spectroscope.

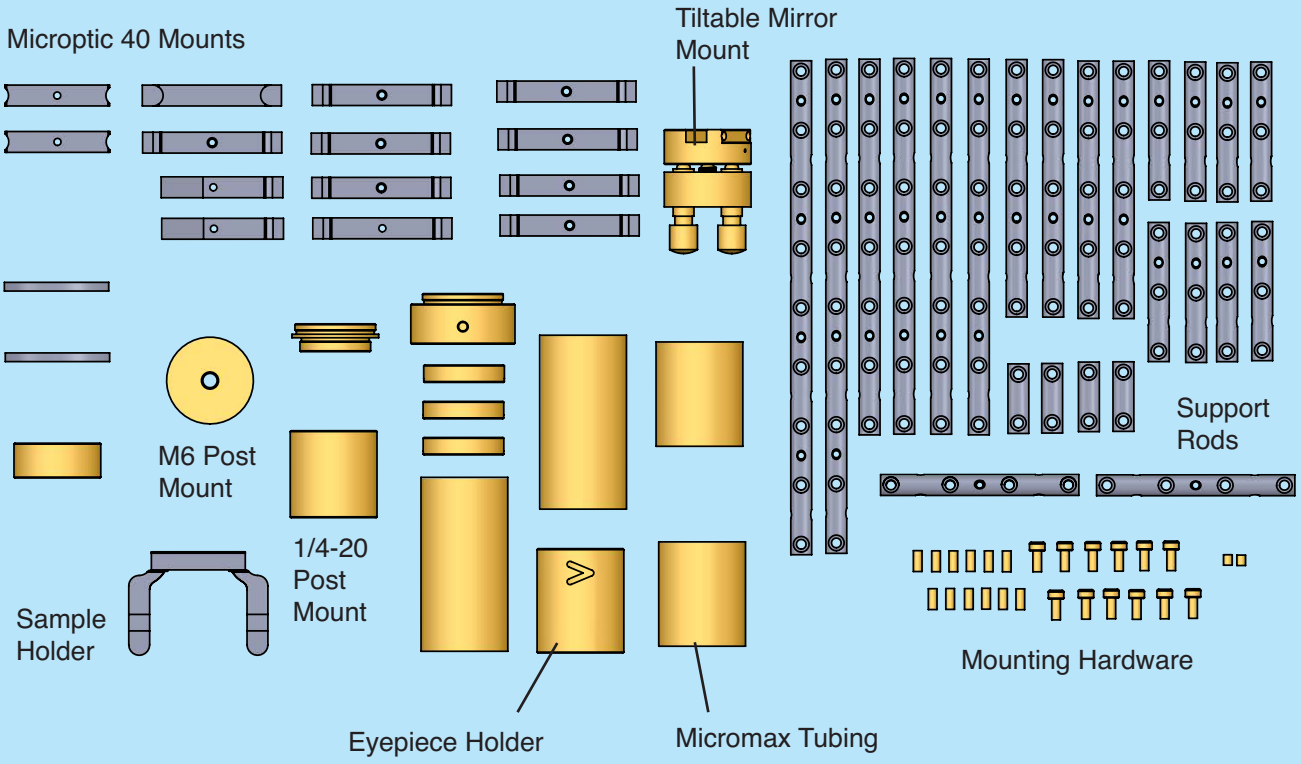
This kit is a mixture of parts from the Micromax system, some of Microptiic 50 accessories, and the new Optoform 40 mounting plates. There are plenty of rods to do many complex setups. Micromax tubing is utilized mainly for focusing of optical elements or to extend the optical path.

Part No	Description	Price	Quantity	Total
40-100	Standard Mount 25	$16	3	48
40-100S	Standard Mount 30	$16	1	16
40-102	Compact Mount 25	$16	2	32
40-104	Angle Mount 25	$16	4	64
40-106	Mating Plate 25	$16	3	48
40-106S	Mating Plate 30	$16	1	16
40-108	Intermediate Mount 25	$22	1	22
40-110	Sliding Mount 25	$25	1	25
40-130	Microbench Adapter 25	$16	1	16
50-352	Titable Mirror Mount 25	84	1	84
50-331	Microscope Objective Mount 25	19	1	19
25-128	Tube 25, L = 30	25	2	50
25-130	Tube 25, L = 50	28	1	28
25-332	Microscope tube adapter	26	1	26
25-354	Eyepiece Holder 25	23	1	23
25-306	Extended Retaining Ring	9	3	27
25-198	Lens Cell Adapter	25	1	25
50-333	Post mount adapter M6	21	1	21
50-341	Post mount adapter ¼-20	21	1	21
00-852	Sample Securing Spring Plate	25	1	25
006-20	Support Rod, L = 20	4	4	16
006-40	Support Rod, L = 40	5	8	40
006-56	Support Rod, L = 56	6	2	12
006-74	Support Rod, L = 74	6	4	24
006-108	Support Rod, L = 108	7	4	28
006-142	Support Rod, L = 142	8	2	16
00-125	M2.5x6 Socket Head pack 0f 100	25	1	22
00-126	M2.5x3 Set Screws pack 0f 50	16	1	16
00-128	M2.5x6 Set Screws pack 0f 50	16	1	16
00-248	Ball Driver set 1.25, 1.5, 2 mm	12	1	12
40-128	Spacer set 25/30x2.5 mm	12	1	12
20-SP2	Kit Case	25	1	25
			Total Price	$874

New Optoform Kit is moderately arranged to allow performing various optical experiments. This kit is not only a starter kit but it can also be considered as an advanced set to perform many optical experiments to fullfill much higher level of expectations.



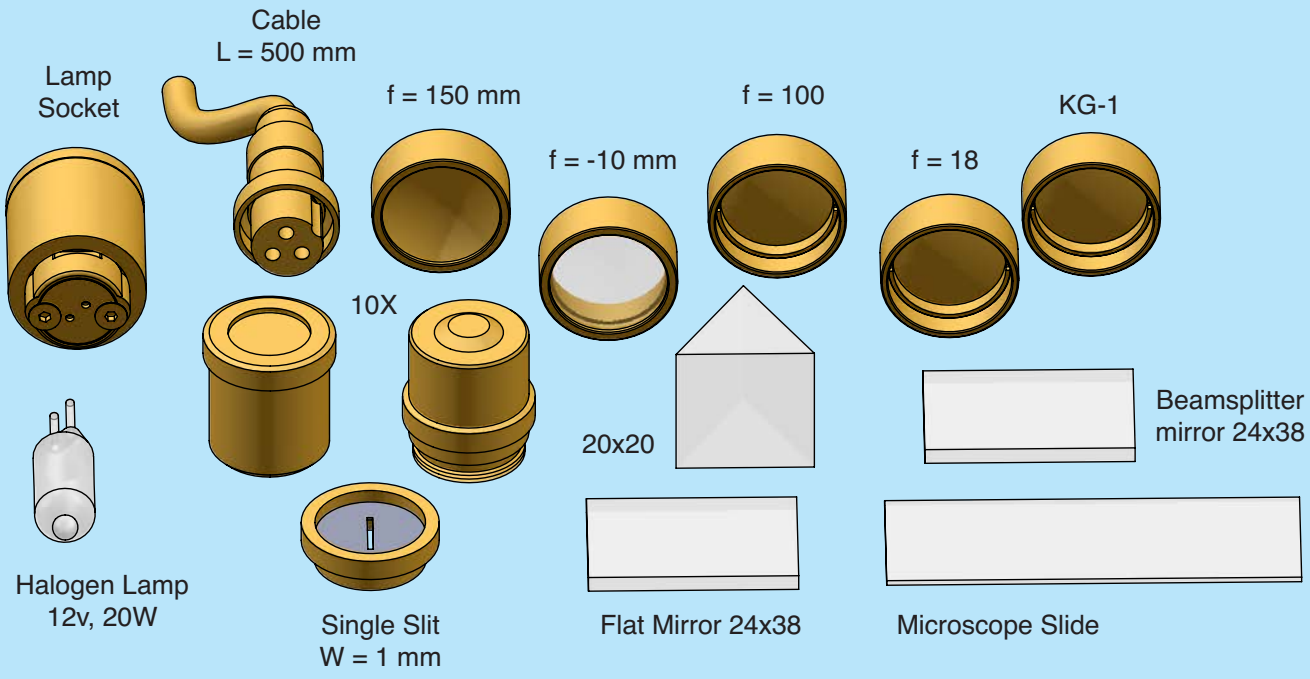
40-706 Optoform Starter kit contains 60 parts. Various lab setups can be performed such as building simple telescopes, or an autocollimator, and other applications such as microscopy, spectrosopy, etc.



In the next pages, and the following issue, we will show how to set up these experiments, but the main goal is to prepare you to setup your own ideas, and be able to do problem solving in your own lab.

Small Optics Set 20-914

Part No	Description	Price	Quantity	Total
50-359	Lamp Socket 20/50W	105	1	105
130-102	Halogen Lamp 12v/50W	14	1	14
20-761	Slit, 1 mm	25	1	25
20-823	Eyepiece 10X	50	1	50
20-812	Microscope Objective 10X	120	1	120
20-442	Flat Mirror 25x38x3	30	1	30
20-450	Beamsplitter Mirror 25x38x2	34	1	34
20-412	Equilateral Prism 20x20x20	52	1	52
20-250	Condenser Lens f = 18	65	1	65
20-020	Plano Convex Lens f = 100	53	1	53
20-022	Plano Convex Lens f = 150	58	1	58
20-480	Concave Mirror f = -10	83	1	83
20-640	KG-1 Heat Absorbing Filter	44	1	44
20-SP	Kit Box	25	1	25
			Total Price	$758

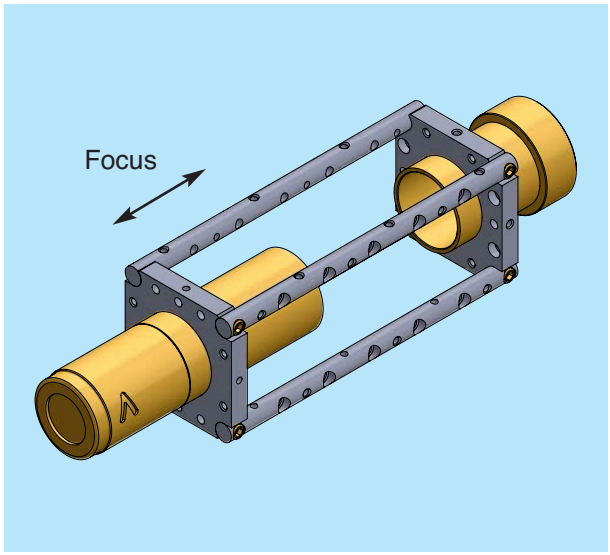


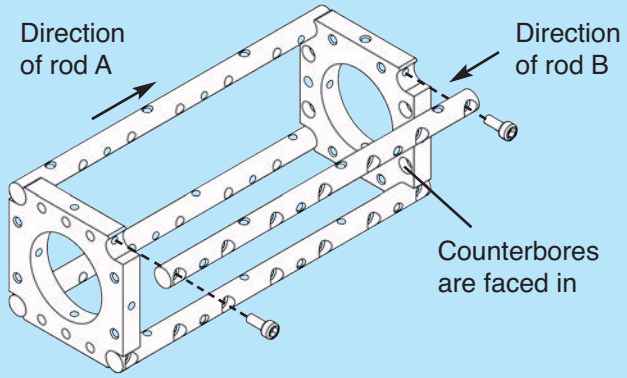
The accompanyig optics set 20-914 is designed to supply necessary optical elements to perform laboratory experiments. There is a condenser lens with matching reflector to collimate the Halogen lamp output. There is a single slit for spectroscopy (and perhaps Fourier Transform) experiments. There are the standard 10X objective, and eyepiece set. There is also a beamsplitter, and mirror set to build interferometers, and auto-collimators, and an equilateral prism for spectroscopy. The lamp socket 50-359 is connectrized with a connecting cable for standard 4 mm power supply sockets.

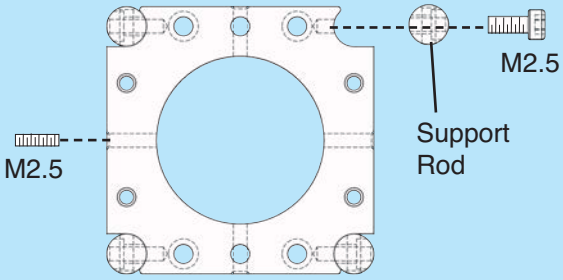
Building a Telescope

You could build a simple telescope with Optoform by using an eyepiece holder (25-354), and an objective holder (25-198) from the kit. The objective holder secures 25 mm mounted lenses such as f = 150mm (20-022) from the optics set (below). All our 25 mm lens cells can screw directly to Micromax tubing (25-128 or -130) but the 150 mm plano convex lens faces the wrong direction. This is how the lens cell adapter becomes useful. Other tubes can also be mated together via retaining rings 25-306, such as eyepiece holder 25-354, and tube 25-128 as shown below.

We'll use two mounting plates 40-100, and 40-106 to secure the eyepiece on one end, while securing the objective at the other. Optoform 40 assemblies are built like stackable rectangular cages, to allow their reconfiguration in the most modular way. The focusing is performed within the mounts via Micromax.

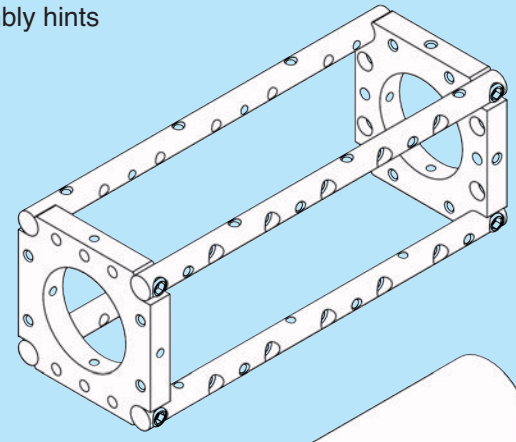




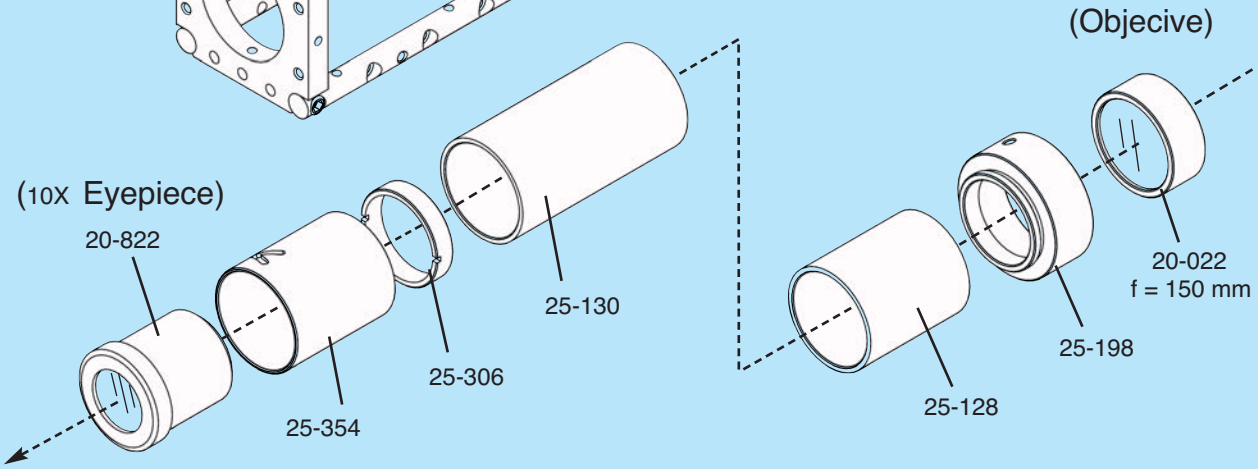


Cross section of mount 40-100

Two basic mounting plate assembly hints



Follow this scheme in your assemblies if you want maximum flexibility in your setups.

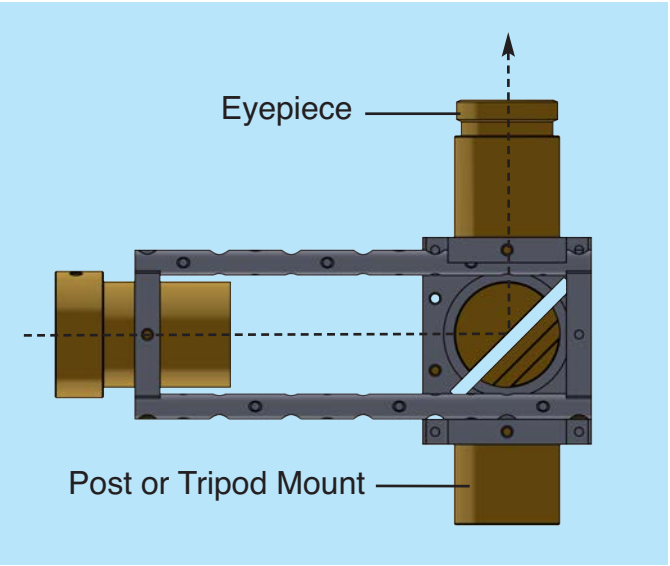


Telescope with right angle viewing

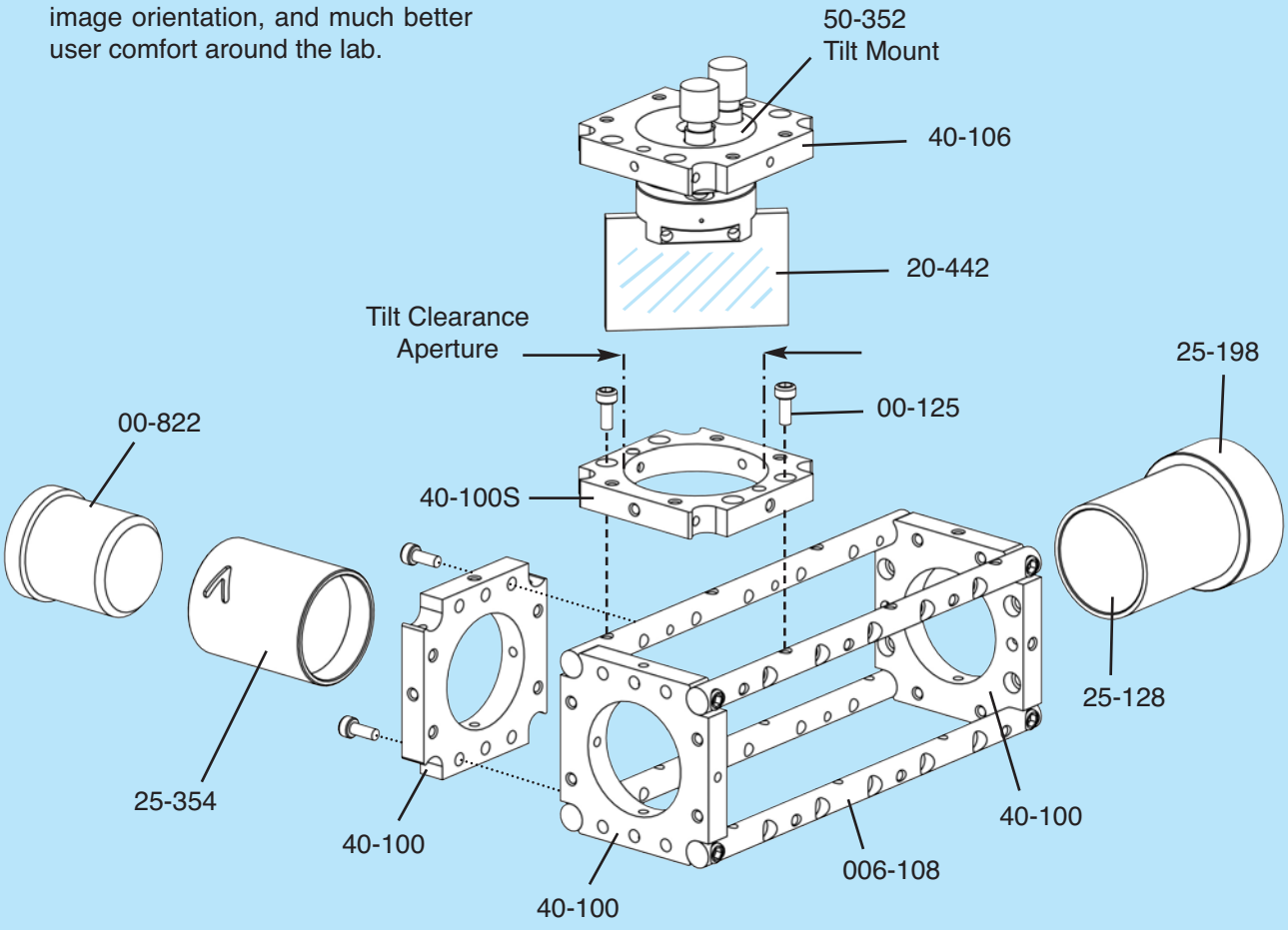
The advantage of Optoform's modularity can now be examined when building this simple telescope with right angle viewing. Basically, we'll take out the eyepiece of the first telescope we built, and build a cube around it and a mirror holder to bend the light 90 degrees.

Optoform 40 is so compact that we need to extend it on one end to secure the mirror holder 50-352, and be able to center the mirror on the main optical axis.

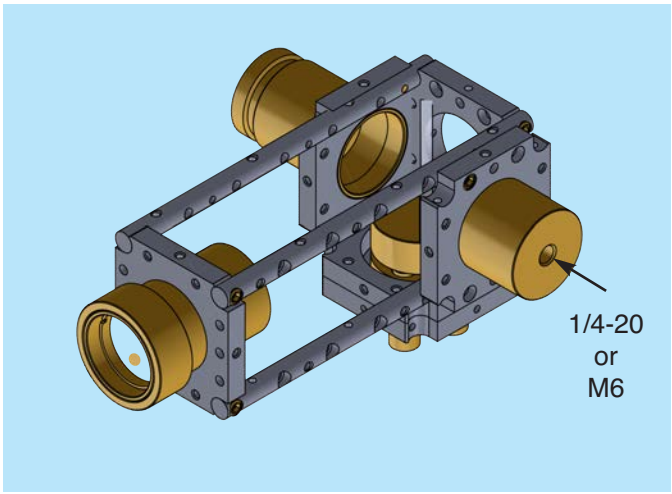
There are several ways to accomplish this (see also P.16, and 18). We'll try the quickest method (Shown below), and that is to stack two mounts together: 40-100S, and 40-106. The 40-100S provides the tilt clearance for mirror mount 50-352 while the stationary end is behing held by 40-106.

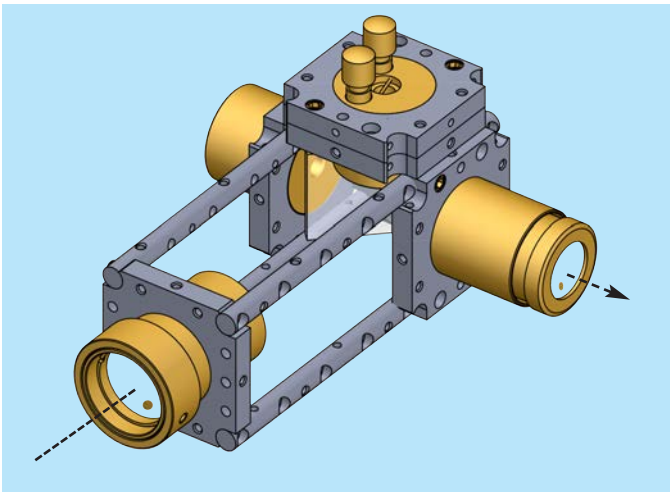


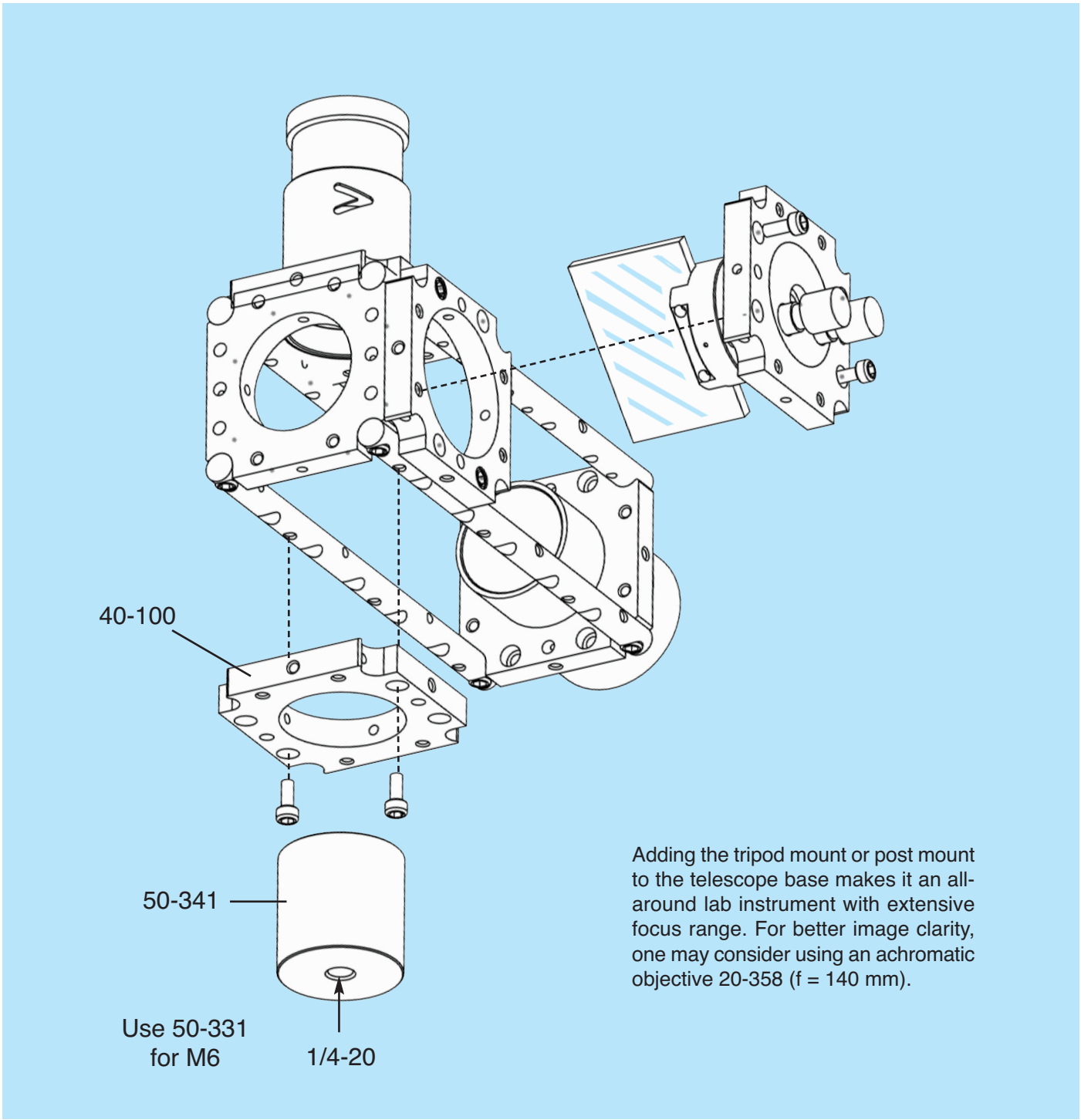
This telescope gives an upright image orientation, and much better user comfort around the lab.



The back end of tiltable mirror mount 50-352 is held by 40-100 while its front end is given some space for tilt adjustment inside 40-100S' 30 mm clearance aperture.





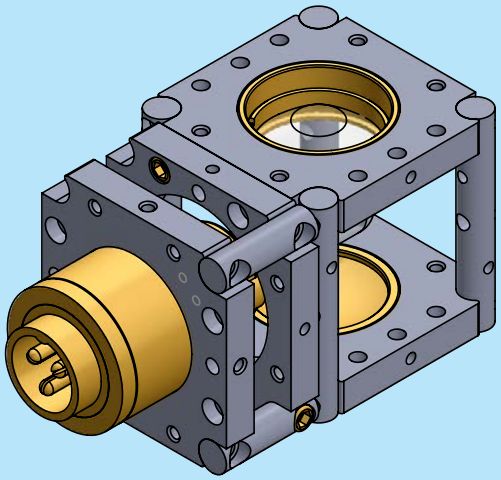


Adding the tripod mount or post mount to the telescope base makes it an all-around lab instrument with extensive focus range. For better image clarity, one may consider using an achromatic objective 20-358 (f = 140 mm).

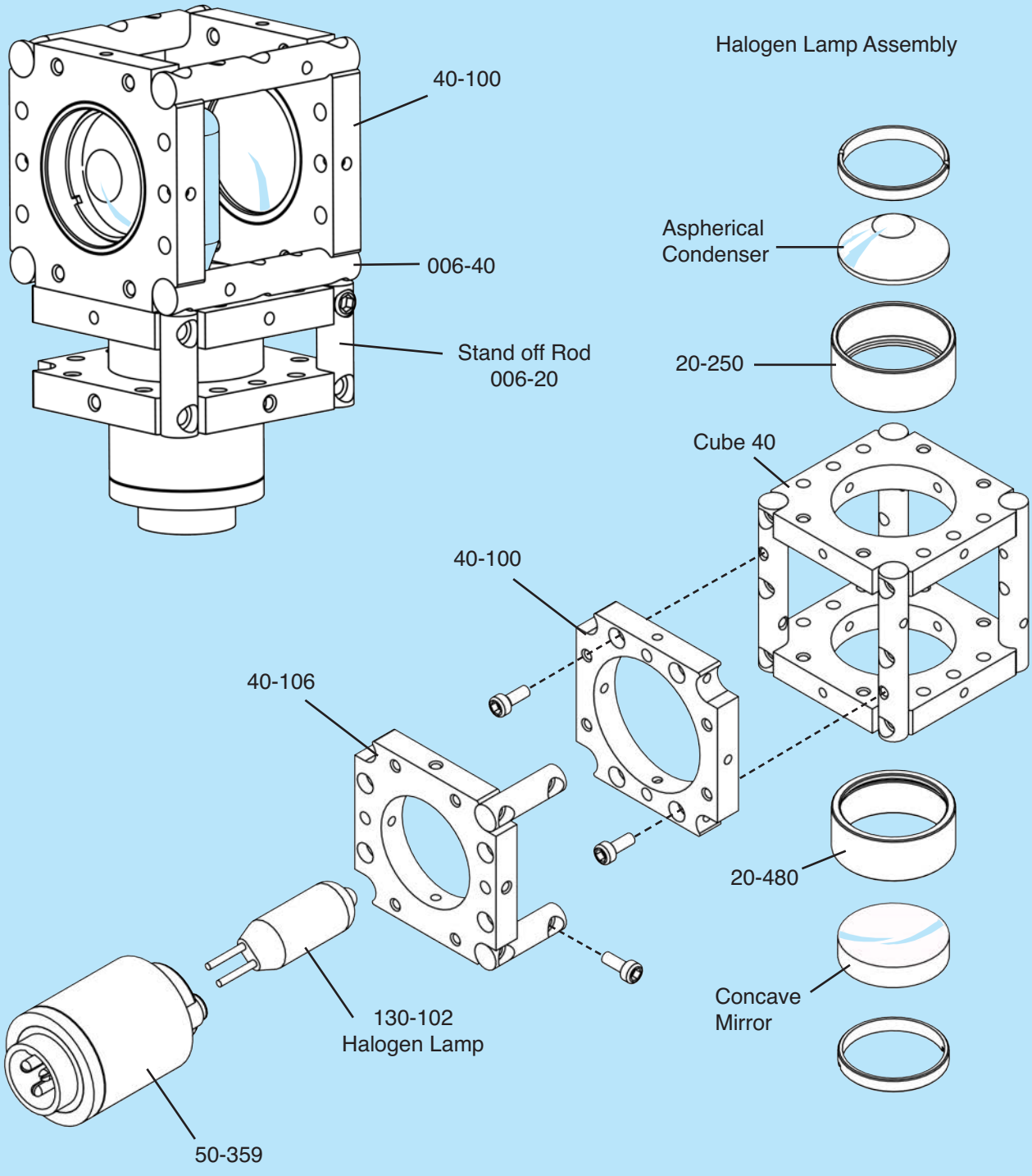
Building a Halogen Lamp Housing

Before building microscopes, we'd better start with a lamp housing. Halogen is the most widely used light source other than LEDs.

The collimating optics 20-250, and reflective mirror 20-480 are oriented in their lens cells such that Micromax etension tubes may be added to them to position them closer to the lamp. The Halogen beam is collimated, then focused to the sample by an additional lens (An optional double convex lens 20-108, f = 16 mm is recommended).

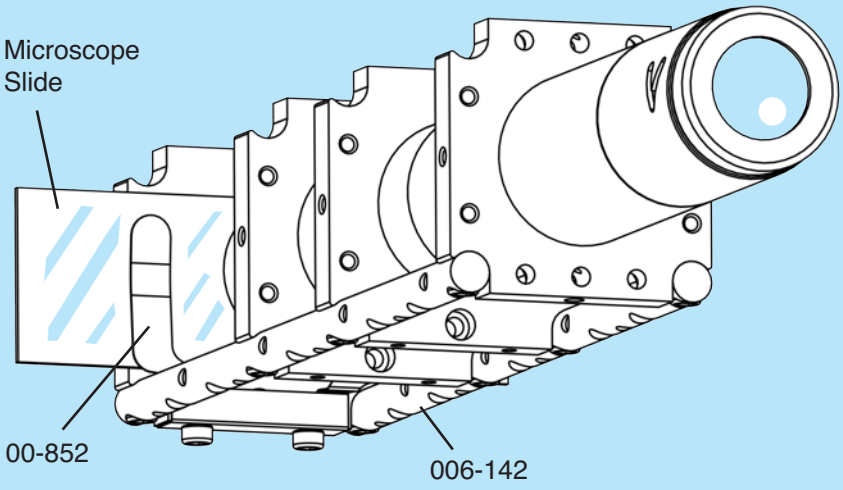


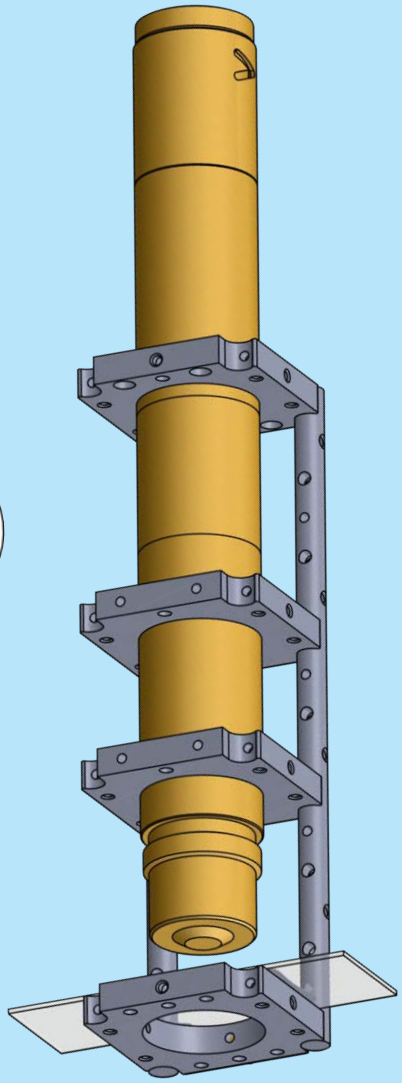
Halogen Lamp Assembly

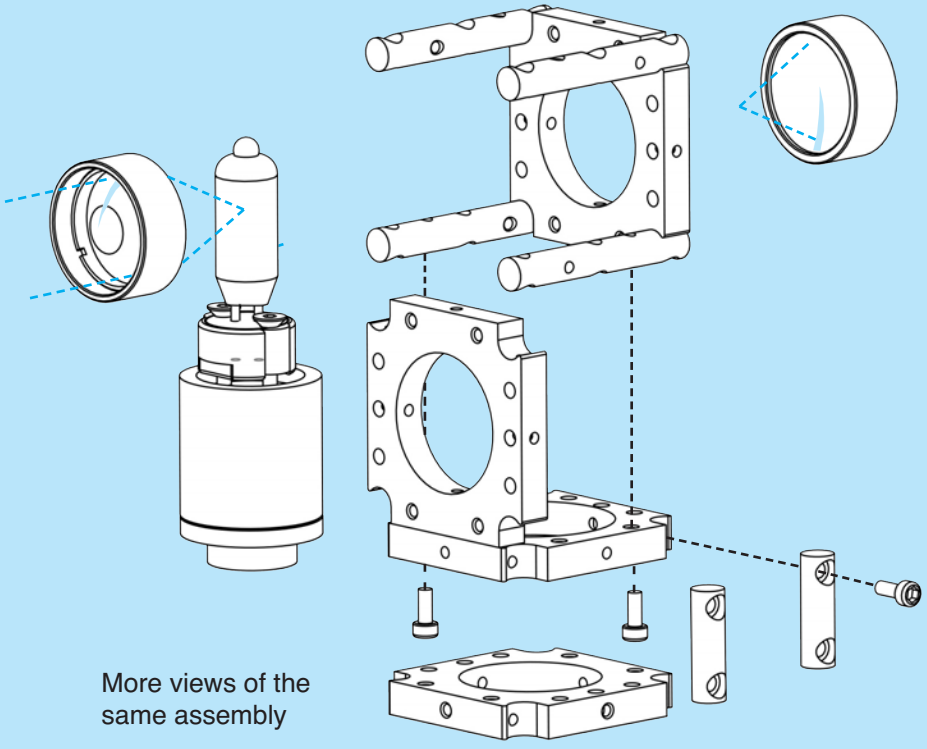


Building a Biological Microscope

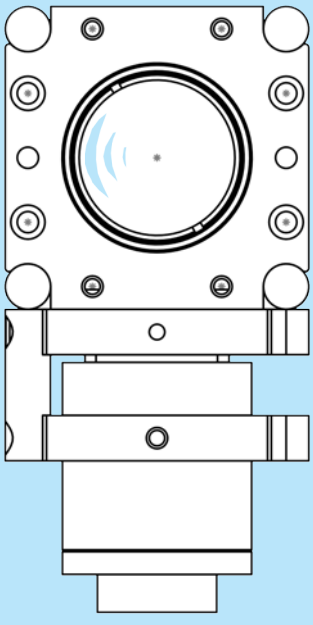
Now that we have a proper ligh source, lets construct the microscope body. For standard microscope objectives, we need a 160 mm long tube. This is constructed by adding Micromax tubes 25-128, 25-130, and the eyepiece holder 25-354. The four tubes are joined together by three extended retaining rings 25-306. The objective mounting ring is assembled by adding 50-331, and 25-332 to the bottom of the tube. Sample holder spring plate 00-852 secures standard microscope slides.





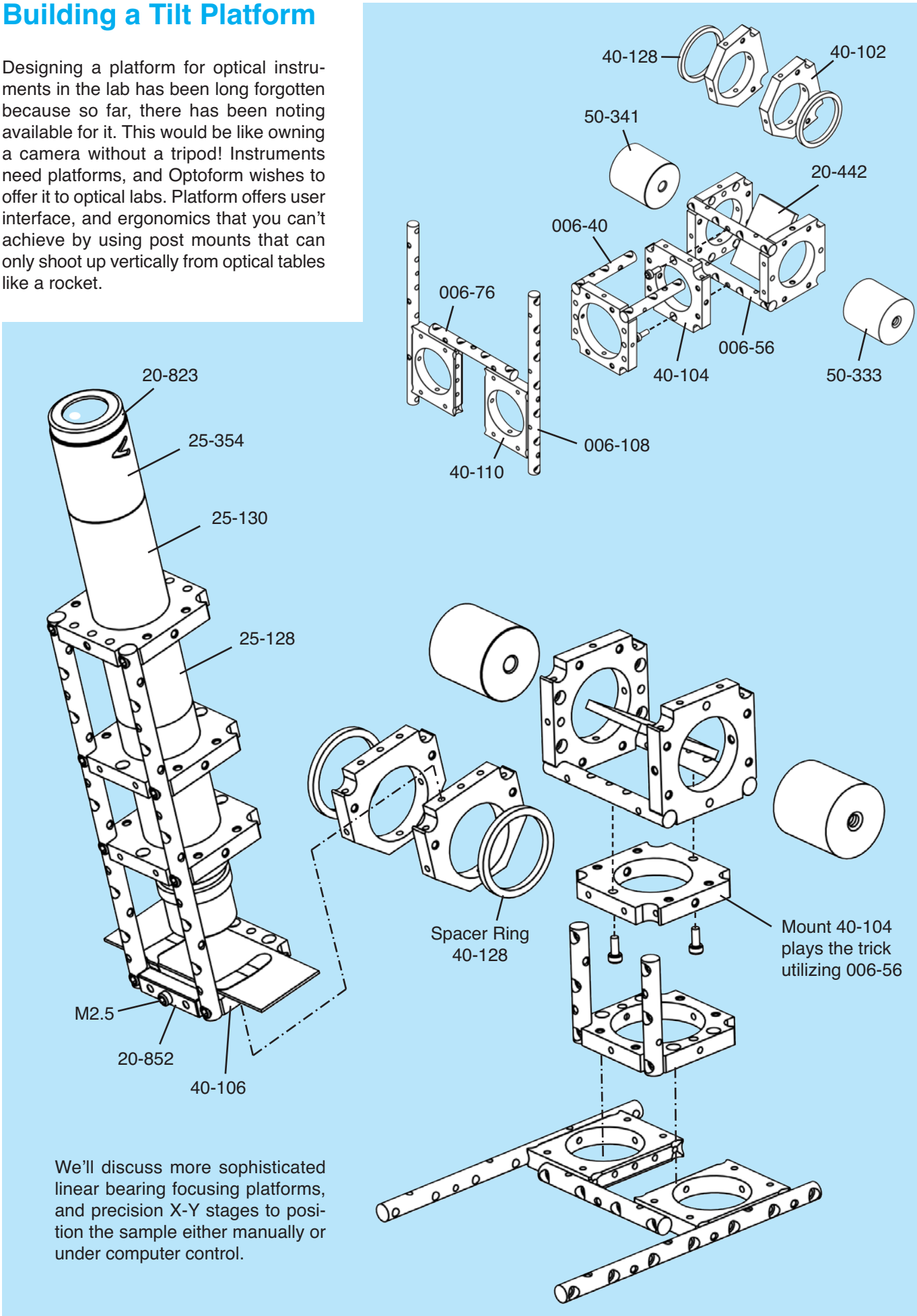


More views of the same assembly



Building a Tilt Platform

Designing a platform for optical instruments in the lab has been long forgotten because so far, there has been noting available for it. This would be like owning a camera without a tripod! Instruments need platforms, and Optoform wishes to offer it to optical labs. Platform offers user interface, and ergonomics that you can't achieve by using post mounts that can only shoot up vertically from optical tables like a rocket.

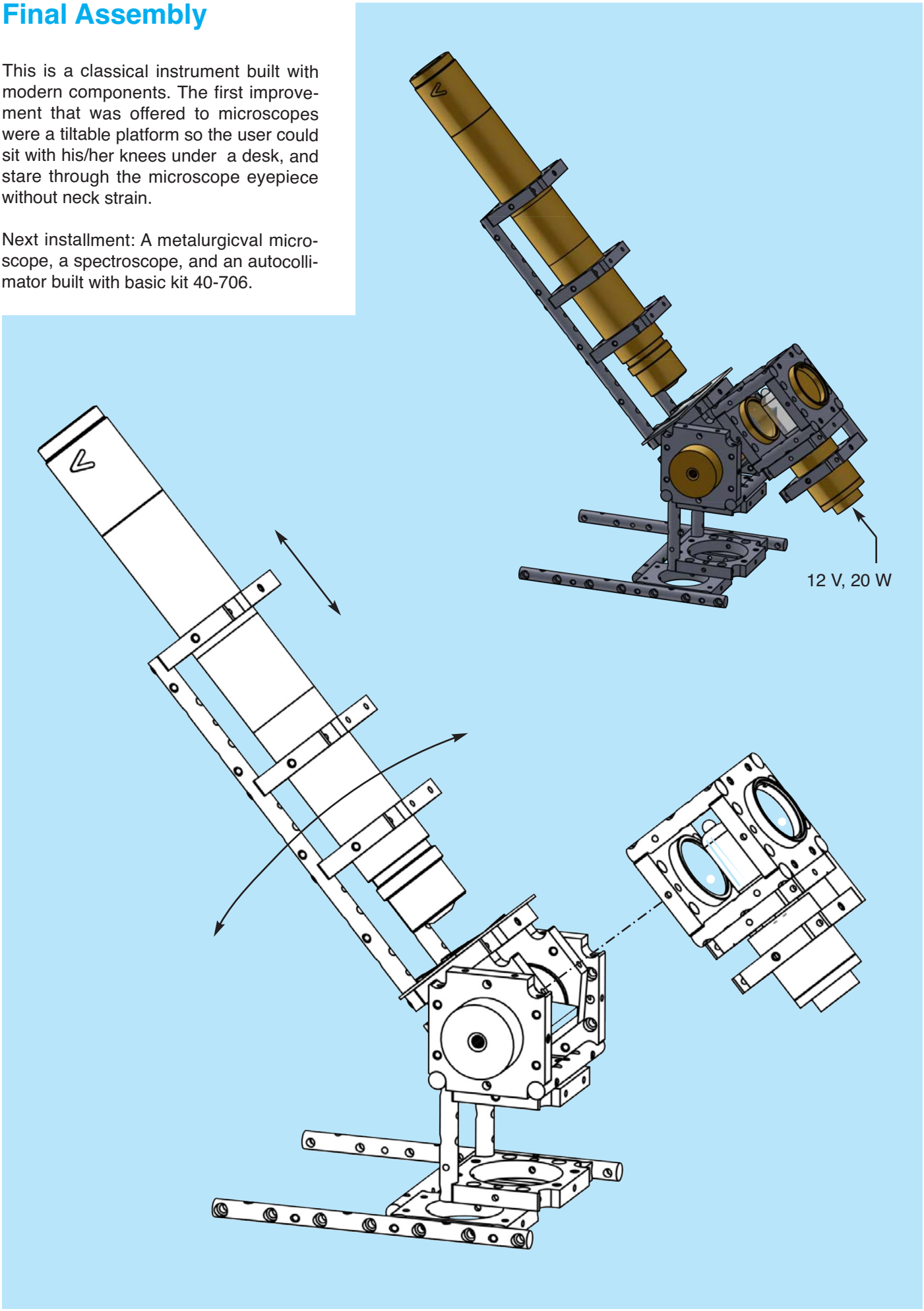


We'll discuss more sophisticated linear bearing focusing platforms, and precision X-Y stages to position the sample either manually or under computer control.

Final Assembly

This is a classical instrument built with modern components. The first improvement that was offered to microscopes were a tiltable platform so the user could sit with his/her knees under a desk, and stare through the microscope eyepiece without neck strain.

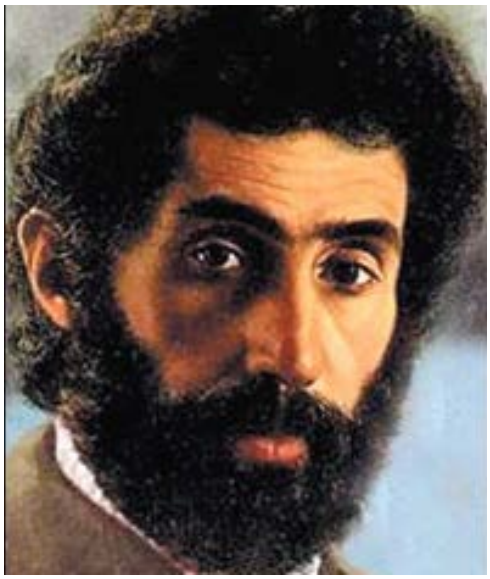
Next installment: A metalurgicval microscope, a spectroscope, and an autocollimator built with basic kit 40-706.



Finding your path in the ambiguity of Spiritual journey Part II

We always learn something new while traveling. The thing that kept surfing in my mind during this trip was how to purity the self. While I was at Munich museum I felt I had to slow down to pay attention to their display pieces, and I thought the same is true about how we live our lives. We never slow down to look at our inner self, and as we get more and more distanced from childhood, we also realize how peaceful it was during that age of innocence.

I have not seen anyone who has shed more light on the importance of pure self than Sohrab Sepehri. He was a native of my home town, Kashan whose poetry is full of humanity and concern for human values. Here's one of his famous poems: "Lets not murky the water", describing our role in maintaining the virtues that has been passed on to us by our ancestors:



Sohrab Sepehri, contemporary Iranian Poet

Let's not murky the water:
Perhaps a pigeon is drinking down the stream
or a finch washing her wing by a far thicket
or a pitcher being filled in a village.
A beggar may be dipping his stale bread into the water.
Let's not murky the water.

Perhaps this stream is running to a white aspen
to some day sooth a lonely heart.
A beautiful woman has come to the stream.
Let's not murky the water.
The beautiful face has doubled!

How delightful this water is!
How refreshing this stream!
Those people who live upstream,
how fortunate they are!
May their springs be ever fresh,
their cows always fertile!
I haven't seen their village,
But surely, God's foot is on
their threshing floor and
the moonlight there illuminates
the width of their words.
The walls are low in the village upstream.
Blue there is really blue.
When buds blossom, they know, those people.

What a village it must be!
May its streets be filled with music!
Those people by the stream
Have left it clear.
Let's not murky the water.

Where's the friend's house?
Music Video: https://vimeo.com/34527594

A wayfarer took the bright branch from his lips,
conferred it on the darkness of the sands,
pointed with his finger to a poplar tree and said,
"Just before that tree
there is a garden path greener than God's dreams.
In it there is love as wide as the blue wings of true friendship.

You go on to the end of the path that takes up again
just beyond maturity,
then turn toward the flower of loneliness.
Two steps before the flower,
stop at the eternal fountain of earthly myth.

There a transparent terror will seize you,
and in the sincerity of the streaming heavens
you will hear a rustling.
High up in a pine tree,
you will see a child
who will lift a chick out of a nest of light.
Ask him,
'Where is the friend's house?'"

Sohrab Sepehri studied wood carving in Japan, and traveled to neighboring countries like Pakistan, and Afghanistan. He traveled through out Europe like Germany, Switzerland, France, and Italy. He was the foremost modernist painter in Iran whose paintings are so sought after today, they are sold for millions at international auctions. Like Robert Frost, Sepehri was deeply inspired by nature in both his poetry, and paintings. Sepehri came to prominence with the publication of his collection “The Water’s Footfall” in 1965.

He liberates you from limitations of time, and space that it could be even explained to a child: “My mother washed the dishes in the memory of the stream“, ... “I went to the pool, but found no water. The fish said, this isn’t the fault of the trees”!

Here’s from his poem called: “The water’s footfall”

Peoples I saw.
Towns I saw.
Plains, mountains I saw.
Water I saw, soil I saw.
Light and darkness I saw.
And plants in light and plants in darkness I saw.
Creatures in light, creatures in darkness I saw.
And humans in light, and humans in darkness I saw.

I’m a native of Kashan, but
My city is not Kashan.
My city is lost.
I, with endurance. I, with fever,
Have built a house on the other side of nighttime.

In this home I am close to the humid anonymity of grass.
I hear the sound of the breathing of the garden.

And the sound of darkness, when it drops from a leaf.
And the sound of brightness, coughing from behind a tree,
The sneezing of water from every crack of rock,

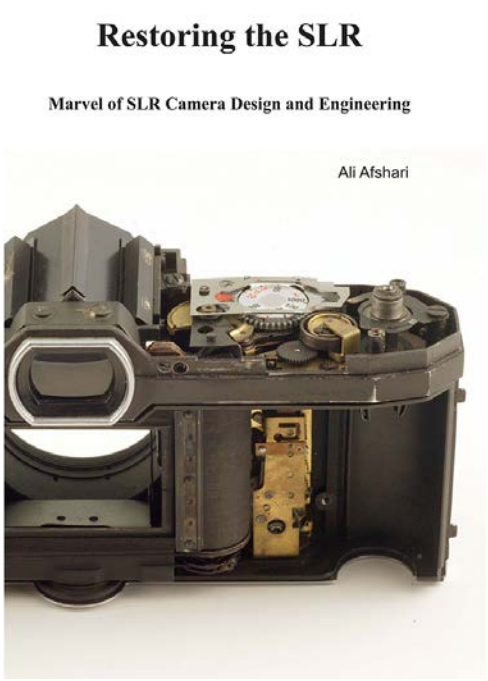
The dripping of swallows from the ceiling of spring.
And the clear sound of opening and closing of the window of loneliness.
And the pure sound of the mysterious moulting of love,
The concentration of the passion for soaring in wings

And the cracking of the soul’s self-restraint.
I hear the footsteps of longing,
And the methodical footsteps of blood in the veins,
The pulsing of the dawn of the pigeons’ well,
The beating of the heart of Friday night,

Sohrab Sepehri is the most popular contemporary poet in Iran. He is the subject of a newly released film “Sohrab’s Dream” directed by Ali Qavian traces the mysticism and philosophy of Sohrab Sepehri’s poetry. Sepehri died of leukemia in Tehran in 1980 at age 52.

A new Book on optomechanics took 25 years to compile

Ali Afshari is the author of Leica 101, a book on the Leica design philosophy, lavishly illustrated with his original drawings and photographs. This new book follows the format established in that book, of explanatory drawings and photographs that show how SLR cameras work. Co-author and editor for this book, Bob Shell, was Editor in Chief of Shutterbug magazine for many years and has authored/co-authored more than two dozen books on photographic topics.

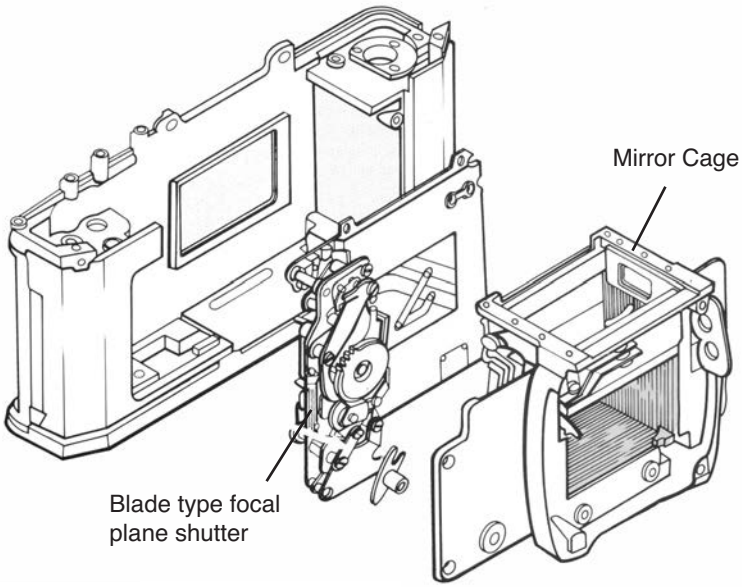


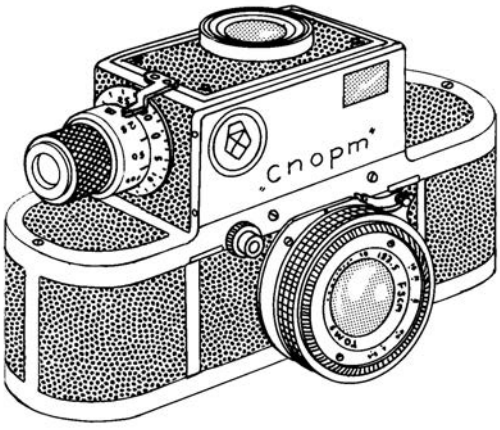
The book has 300 pages with more than 900 detailed illustrations and disassembly photographs. This is one of a new series of books to be written by Afshari and Shell about camera design and the world photo industry. Such books have never been written before, perhaps because the optical engineers thought it was up to the mechanical engineers to do so, and vice versa; and today the electronic and computer engineers are added to the mix.

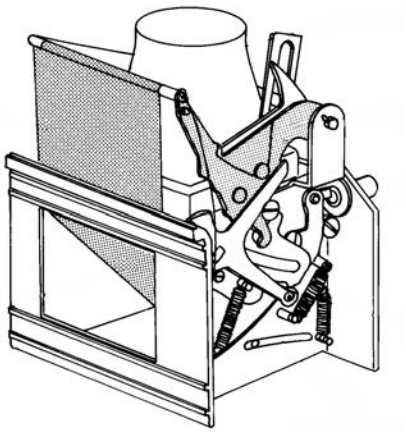
This book covers designs that influenced the photo world and talks of the people responsible -- For example Kaoritsu Chatani, who invented the blade-type focal plane shutter that is used in virtually all camera today -- You won't even find mention of him on the Internet. You will learn of Jeno Dulovits, inventor of the eye level SLR with instant return mirror and automatic lens aperture, both of which first appeared in the Gamma Duflex, and many other innovators in camera design.

This book will be an invaluable reference work that shows you how mechanical cameras actually work, information that you will find nowhere else. Ali Afshari's technical information is spiced with Bob Shell's personal recollections of his more than 40 years in the photo industry. Rescuing the SLR, and Leica Design 101 are now available in Amazon.com

Kaoritsu Chatani the inventor of blade type focal plane shutter in 1932







The Russian Sport (left) was the first SLR camera introduced in 1934. It had an intgrated focal plane shutter/mirror mechanism (left) and a ground glass focusing screen to focus the image.

Chromic

Automatic Chromozome sorting software

Software features:

Costs under $5k, compatible to most cameras

Online image capture and visualization

Convenient tools for editing metaphase images

One of the best image processing algorithms for enhancement of microscopic images

Last generation Artificial intelligence algorithms for classification of chromosomes

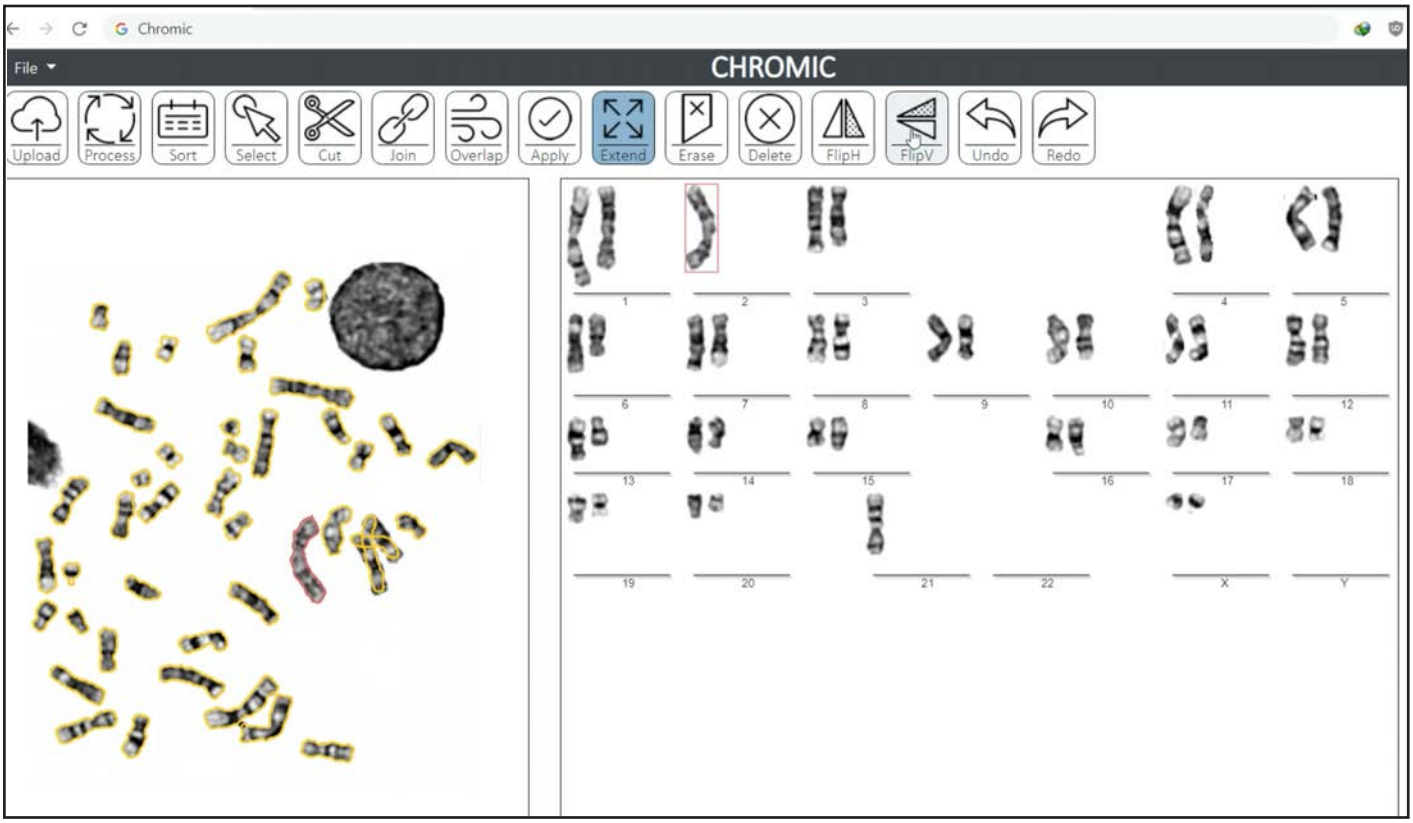
Provides powerful tools for separation of overlapping chromosomes

Exports a report based on examiner's comments on the test results

Optional motorized stage control for metaphase search, and image capture

Competitive advantages of the software:

- ☐ One-year free access to latest software upgrades
- ☐ Personalization options for labs and users
- ☐ High quality and lower cost
- ☐ Technical support



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