

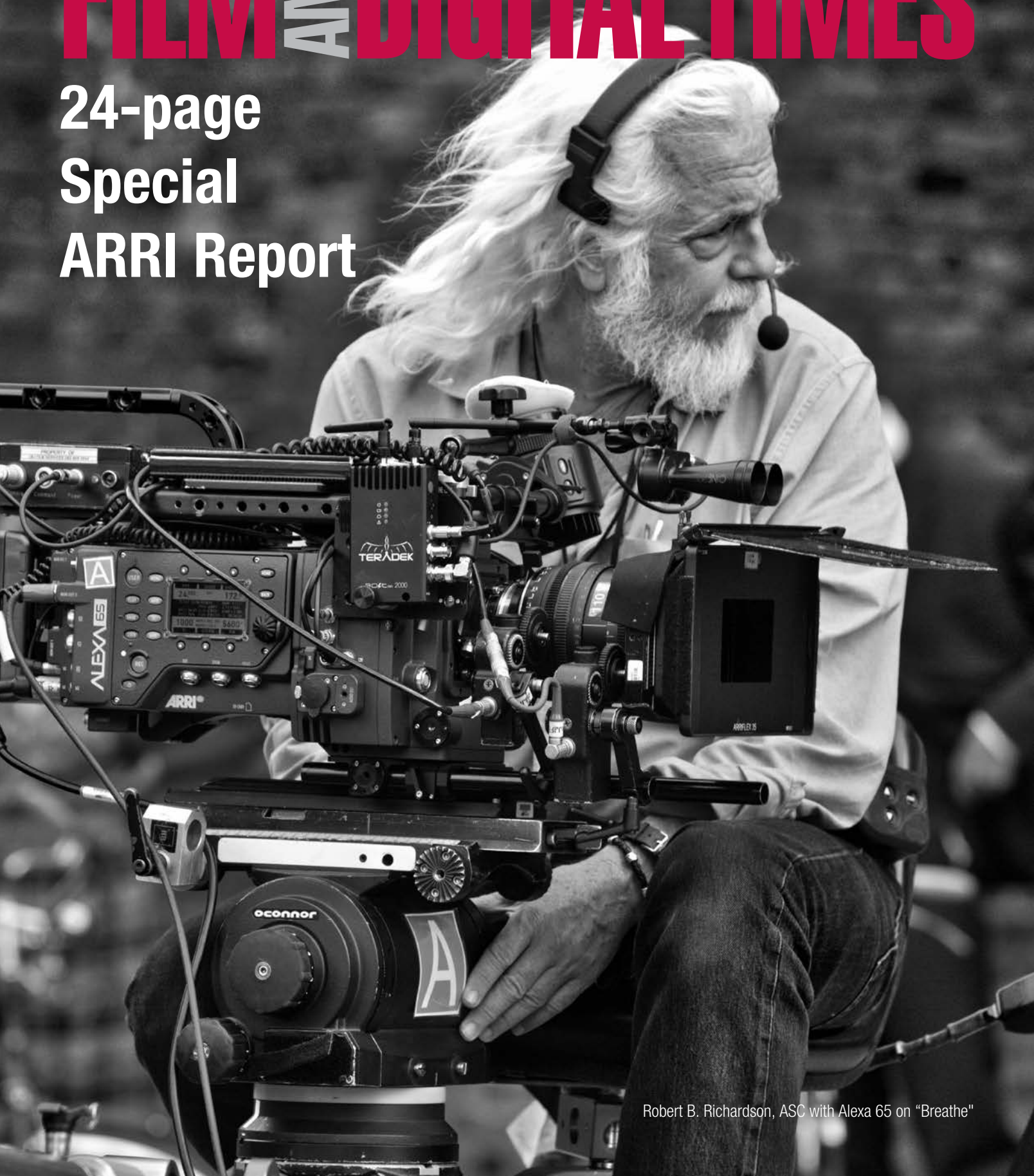
Jon Fauer, ASC

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Special
ARRI Report



Robert B. Richardson, ASC with Alexa 65 on "Breathe"

Jörg Pohlman, Managing Director of ARRI



Jörg Pohlman is Managing Director at ARRI GROUP. Like many German companies, ARRI has two Managing Directors. Franz Kraus is the other, and we've interviewed him on a number of occasions. Joerg started at ARRI in October 2014. He has a graduate degree from George Washington University Law School where he specialized in intellectual property law. Prior to ARRI, he held different management positions at BMW, where he started in the legal department, then sales and marketing, finance, member of the core team that developed the new electric vehicles (BMW i3 and i8), and then as Managing Director of two start-up companies in the USA and Germany to set up carbon fiber supply chains for the new, lighter-weight vehicles.

JON FAUER: ARRI will be celebrating its 100th anniversary in 2017. That's quite a run.

JOERG POHLMAN: If we think about the 99 years we have on record by now, look at where we are and where we want to be in the future, one of the key factors is how unique ARRI is. We are involved in almost all aspects of the motion picture industry, from developing cameras, lighting and accessories, to product manufacturing, including sensor bonding. Our ARRI Rental Group gives us proximity to film sets, and provides immediate feedback if something does not work or can be improved. When you finish shooting, you can come back to ARRI for post-production, editing, sound, VFX, mixing, screening, DI and distribution. ARRI can provide the entire value chain from developing a camera all the way to releasing feature films into theaters. I think that makes ARRI unique.

We understand the industry and the needs of the people who work in it, and I think we are known to be a company that listens. That's important to us: listening to our customers, partners and friends. All these people mingle and mix in the inner courtyard of our headquarters at Munich's Türkenstrasse and we benefit from their insights. We listen to criticism, requests, and expectations and then we try to translate those ideas into products and services very close to the needs of the people in our industry.

How do you predict these needs and the global demand for ARRI equipment when planning production, sales and distribution?

It is indeed difficult to predict the market. For example, the ALEXA Mini became popular far beyond our expectations. It's difficult for us to plan even in specific regions. We may have a bit of a difficult year in the U.S. one year, do very well in Europe and Asia, and then have a great year in the U.S. the following year.

What's the reason for that?

I don't think we can explain it, to be perfectly honest. I find that very interesting because the motion picture industry is, in a way, very intimate and yet still so difficult to predict. As you know, I come from the

automotive industry where predictions are easier to make. Certainly there can be car models where your estimates are off, but that's more the exception than the rule. In the cine market, it seems to me to be almost a rule that predictions are difficult.

Isn't the cine business somewhat like the fashion business? Products fly or they fail. Often, it has nothing to do with the product; it may be the weather, the collective mood, or the other fashions and films being made that year.

As you know, ARRI is also in the rental business. In England this year, many of the films were shot on film. Next year it will probably shift back to digital. Or look at New York: TV pilots were down by a third this year. Production shifts in a dramatic way. A lot is going to Atlanta. Some is shifting back to New York. A lot is going to Canada. Much of the influence comes from tax incentives. Production pulled out of Florida and went to Georgia and Louisiana.

Is this globalization? For a long time, the motion picture business has been migrating to many states and countries—wherever it was cheaper. Ultimately, does that help the industry or hurt?

From a macroeconomic point of view, I would always be very doubtful as to whether state subsidies are really the best way to handle production. An economist would encourage keeping subsidies out of the equation; let the market take care of it. From a cultural point of view, and as a European, I would say that I think it's good there are some subsidies because a lot of beautiful movies have been made that otherwise would not have been possible. These are films that may not appeal to the mass market.

Which is more the case in Europe than it is in the U.S.

It's probably more the case in Europe. It has to do with language, the culture and the fact that a lot of countries are smaller. German language films are a big market, with close to 100 million people if you count Austria and the German-speaking part of Switzerland. French films have a potential audience of 220 million worldwide. But take countries like Hungary or other smaller countries. It's even more difficult for them. They have their own film market and I think you need subsidies to sustain their movies.

The French government, through the CNC, is involved in motion picture production, where surely industry and art become a matter of politics. Nevertheless, France is perhaps the fifth largest film production entity in the world. Do subsidies in U.S. states like Georgia help the local economy?

I think it does help Georgia. It creates quite a few jobs. Just as in other industries, tax incentives attract business. I know it's a far stretch, but because I came from that industry, look at Spartanburg, South Carolina, the big BMW factory. What was the result? BMW is now the biggest exporter of vehicles from the United States. It all comes from Spartanburg. Tens of thousands of jobs have been created there when you include the suppliers and all the other businesses that opened as a consequence. So I am sure Georgia, too, has benefited in many ways and it is possible that all this business and the taxes paid as a result more than compensate for the subsidies that are being handed out to stimulate this development.

But isn't film production more migratory?

True. Producers set up shop and then they move on. Depending on subsidies, we've seen movement coming and going—California, Florida, Michigan, New Orleans, New York, Canada, Atlanta. And the same thing happens in Europe: Romania, Budapest, Prague. Also, there have been very substantial subsidies in London that have attracted a lot of feature films. British production is subsidized to a

large degree by local taxes and lottery funding. Another big development, of course, is China. Big players are coming in, especially the Wanda Group. If you read the official statements, around 10 movie theaters a day are being opened in China.

Let's talk about the ARRI brand. What does it mean and how does it relate to customers?

The ARRI brand is a promise. And the question is what do people expect from that promise? I think they expect very functional products, reliability, excellent quality, service, and attention to detail. Maybe we can approach the concept of perfection. I remember a quote from Antoine de Saint-Exupéry's "Terre des Hommes" ("Wind, Sand and Stars"). He's writing about airplane design, but the concept applies to us: "Perfection is finally attained not when there is no longer anything to add, but when there is no longer anything to take away." That's how I'd like to see perfection—less is more. It's not a matter of adding the latest, faddish feature to a camera but rather only to add it if it really makes sense for the cinematographer. Ultimately, it's about creating the best overall image quality. That is what ARRI really stands for. It has to be true to the promise. It has to be true to the expectation of the people who have been using ARRI equipment over the decades.

Do you think that's the reason, for example, in Japan, land of so many camera manufacturers, 90 percent of the customers are using ARRI cameras for high-end movies?

It's the brand but I think it's also the fact that cinematographers deep down feel understood when they work with an ARRI product. That's what we try to achieve and it can only be achieved by being extremely close to our customers and users. It's the personal relationship we have with people using our products that is absolutely essential to deriving insights and translating them into product features. That is true not only for cameras but also for all our other products, like accessories. It is why we make very successful accessories for other people's cameras.

Why do you make accessories for your competitors' cameras?

Even when cinematographers are using other companies' cameras, we would like them to be able to experience ARRI quality and attention to detail. It's still a positive ARRI experience. It was difficult for me to understand this at first, I have to say, when joining the company, but I've come to understand that it is still completely consistent with our brand and its message.

Let's talk about ARRI and how it is structured. There has been rapid growth and increasing presence worldwide.

At ARRI, there are five business units and three sales regions. We have Camera Systems: not only cameras but also lenses and accessories. Stephan Schenk and Walter Trauninger are the Managing Directors. Camera Systems accounts for almost half of our turnover. Our Lighting Systems business unit is headed by the two Markus: Markus Zeiler and Markus Lampier. Their LED SkyPanel has been an astonishing success worldwide.

ARRI Rental is headed by CEO Martin Cayzer. Thomas Loher is Managing Director. ARRI Media is our post-production and deliverables business, headed by Josef Reidinger. The flagship of this business unit is our new Munich facility, ARRI@Bavaria, run by Daniel Vogl. It has the only Dolby Vision HDR projection grading suite outside of Los Angeles, a Dolby Atmos theatrical mixing studio, and a Dolby Home Atmos studio. We've always been involved in post, and it is an important component that provides a footprint in the production chain all the way to television, movie theaters, and even the cinema we have in Munich.

Our newest business unit is ARRI Medical, managed by Hans Kiening and Thomas Hürland. With their team, they developed the ARRISCOPE, a 3D digital surgical microscope that draws on technology from both our camera systems and lighting units. The first ARRISCOPES are in use in hospitals in Germany and Austria, and we have high hopes for the future of this new business unit.

Then, we have three sales regions. European camera and lighting sales are managed by Stephan Schenk and Markus Zeiler—in addition to their responsibilities as heads of their respective business units. They also handle the Middle East, Africa and India. Glenn Kennel is in charge of sales for the Americas, and Paul Ivan takes care of EAP—East Asia Pacific region, where China clearly is the biggest market. Our fast-growing subsidiary in Beijing is managed by Forest Liu.

In addition to the five business units and three sales regions, we have the areas that support the ARRI corporate environment: finance, HR, marketing and communication. We have a lawyer on staff and are taking increasing steps to protect our IP worldwide. We also have a new strategic purchasing and process excellence department. We introduced it because of our increasing purchasing volume across all business units. We also want to find new suppliers and development partners and become more international. Furthermore, we want to focus on more efficient processes, not only in production but also in development and logistics. It's a task for the entire company, especially since we are spread out the way we are with five business units and three sales regions.

How many people work at ARRI?

We have 1,300 people working at ARRI. About 750 are in Germany and the rest are around the world. We have 300 people in the U.S and Canada. We have 70 in Hong Kong, Beijing and Sydney. And we have well over 100 in England including ARRI Rental. In Vienna, where we develop and manufacture our electronic camera accessories, we have about 40 employees. It's quite an international workforce. Which is a strength. But it also means that we are conscious of the fact that we are a global company. And we need to attract good talent around the world wherever we are. So we endeavor to use the clout of our brand to attract the right people to the company.

This special edition follows the tour you took me on recently in Munich: ALEXA 65 at age 2, ARRI Rental, ARRI camera manufacturing and ARRI@Bavariastudios.

What you probably sensed when you visited our Munich locations is that there is a lot of change going on. Our Camera Systems business unit is growing and we have added many new engineers—in fact doubling the R&D team in size over the last three years. Also, our new Medical business unit is expanding. We needed additional room and at the same time ARRI Rental was looking for new space and a better location from a logistical point of view. They moved to Ismaning earlier this year and that turned out to be a good fit.

We also embraced the opportunity to move into new grading studios at the Bavaria Film Studios, thus setting a new standard with Dolby Vision and Dolby Atmos. These technologies provide a new experience in movie theaters, and they help to take full advantage of the images our cameras can produce.

ARRI, at almost 100 years, continues to be very dynamic and we are just starting construction on a building in the north of Munich that in a few years will serve as the new headquarters and home for our camera systems business unit.

ARRI ALEXA 65 at Age 2



ARRI Rental launched ALEXA 65 at Cinec in September 2014 and at Camerimage in November 2014.

Within the next 25 months, ALEXA 65 has been used on more 65mm productions than were shot on film in the previous 25 years. That may not account for military films and unaccountable films in the East. "It's a sobering thought when you consider that, during the concept phase of the ALEXA 65 system back in 2014, we assumed that the camera would be used mainly for special sequences and VFX work," said Neil Fanthom, Director of Technology at ARRI Rental.

Now, isn't that archetypal ARRI? When the original ALEXA 35mm digital camera was announced at IBC in September 2009 (7 years ago), it was another golly aw-shucks modesty moment. ALEXA was positioned at the time, in the august words of FDTimes, "for HD television, commercials and a few features. (*note the 'few'*) ARRI feels that uncompromised and uncompressed 4K resolution will remain in the domain of 35mm film for some time to come." (*Ahem, eat words.*) That humble camera for "a few features" went on to become one of the most successful digital cine cameras of all time, capturing 80% of major motion picture production recently.

In the beginning, ALEXA 65 followed a similar path. Robert Elswit, ASC and Pete Romano, ASC used the ALEXA 65 for the underwater sequence on "Mission: Impossible 5," Emmanuel Lubezki, ASC, AMC used it on parts of "The Revenant," and Anthony Dod Mantle ASC, BSC, DFF used it on sequences of "Snowden."

Word got out quickly that the camera was indeed lighter, smaller, flexible, rugged, and actually very well suited for entire feature productions. It even proved to be economical and appealing to producers. The skills of a soothsayer were not required to predict the appeal. After all, a prominent rental house owner once famously said, "Give a cinematographer a larger canvas and they will want to fill it up." This isn't new. A visit to the "Machines of Cinema" exhibit at the Cinémathèque in Paris shows a 65mm camera from 1896, two years after the birth of 35mm, quickly followed by 68mm, 58mm and a Lumière 75mm camera in 1899.

The first production shot entirely with ALEXA 65 was "The Great Wall" in spring 2015. Cinematographer Stuart Dryburgh ASC, NZCS used four ALEXA 65 cameras.

What's the appeal of the 65mm format? Robert Richardson, ASC explained, "I shot two back-to-back films on the ALEXA 65. 'Live by Night' used Panavision lenses and then on 'Breathe' I used ARRI Rental lenses. Why the ALEXA 65? It has, by far, the best image I have found in digital. The speed of the camera is not as advertised. It is vastly higher. I rate it at 2000 rather than 1000. It has gorgeous color. Yes, lenses matter: they are the one element one must be careful with. Neil and ARRI Rental gave me a stunning selection of lenses. Panavision also did. But what matters here is the body. The ALEXA 65 is without doubt the most subtle camera I have worked with in the digital world."

Which brings us to lenses that matter. All the early ALEXA 65 productions were shot with ARRI Prime 65 and Vintage 765 lenses.

Prime 65 lenses began life as Hasselblad HC lenses made by Fujinon for the Hasselblad H5D (image circle 61.9 mm and larger). They have the new ALEXA 65 XPL mount (72 mm diameter, 60 mm flange focal depth). ARRI Rental and IB/E Optics completely stripped the original lenses and only used the optical elements inside. All the mechanical parts, barrel, cams, and rings were custom built. Focus is managed by a smooth cam mechanism. As Manfred Jahn, ARRI Rental's project leader on the lenses said, "They feel as smooth as Master Primes."

In addition to the Prime 65 series, 11 Vintage 765 lenses are available for the ALEXA 65. These are updated Hasselblad/ZEISS/ARRI lenses with a Maxi PL mount, originally built for the Arriflex 765. Familiar to Hasselblad users as V-series (or 500 series) lenses, they cover the analog medium format size of 56 x 56 mm (aka 6 x 6 cm or 2 1/4" x 2 1/4"). The image circle is a whopping 79 mm.

Flange focal depth of the original Arriflex 765 camera with Maxi PL mount was 73.5 mm. The Vintage 765 lenses can be used on an ALEXA 65 with a Maxi PL to XPL adapter, which mechanically extends the Alexa 65 XPL mount's 60 mm flange depth to the Arriflex 765 flange depth of 73.5 mm.

ARRI Prime 65 Lenses



Focal Length mm	Aperture	Close Focus	Length	Front diameter	Image Circle	Weight
24	T4.8-32	0.38 m / 15"	101 mm / 4"	114 mm / 4.5"	62 mm	1.5 kg / 3.8 lb
28	T4-32	0.35 m / 14"	101 mm / 4"	114 mm / 4.5"	62 mm	1.5 kg / 3.8 lb
35	T3.5-32	0.5 m / 20"	120 mm / 4.7"	114 mm / 4.5"	62 mm	1.8 kg / 4 lb
50	T3.5-32	0.6 m / 24"	120 mm / 4.7"	114 mm / 4.5"	62 mm	1.8 kg / 4 lb
80	T2.8-32	0.7m / 2' 4"	120 mm / 4.7"	114 mm / 4.5"	62 mm	1.8 kg / 4 lb
100	T2.2-32	0.3 m / 12"	120 mm / 4.7"	114 mm / 4.5"	62 mm	1.8 kg / 4 lb
150	T3.2-45	1.3 m / 4' 3"	120 mm / 4.7"	114 mm / 4.5"	62 mm	2.2 kg / 4.9 lb
300	T4.5-45	2.45 m / 8'	200 mm / 7.9"	114 mm / 4.5"	62 mm	2.6 kg / 5.7 lb
50-110 Zoom	T3.5/4.5-32	0.7 m / 2' 4"	190 mm / 7.5"	120 mm / 4.7"	62 mm	4.0 kg / 8.8 lb

ARRI Vintage 765 Lenses

Focal Length mm	Aperture T (widest)	Close Focus m / ft
30	3.6	0.32 / 13.5"
40	4.2	0.50 / 20"
50	3.0	0.50 / 20"
60	3.6	0.30 / 12"
80	2.8	0.64 / 25"
100	3.6	0.70 / 2' 4"
110	2.1	0.80 / 3' 1"
120	4.2	0.75 / 2' 5"
150	3.0	1.40 / 4' 8"
250	4.2	2.06 / 8' 6"
350	4.2	1.90 / 8' 3"



ALEXA 65 Prime 65 S Series



ALEXA 65 Prime 65 S Lenses
114 mm front diameter

But no cinematographer has ever been happy with the equipment at hand or the lenses available. Most wanted more, including Panavision System 65 and Primo 70 lenses. While the ARRI Prime 65 and Vintage 765 lenses covered the entire ALEXA 65 sensor (54.12 x 25.59mm, 59.87 mm diagonal), the appeal of having a different look, a faster maximum aperture or a consistent T-stop across the entire set made up for the smaller image circle. So Panavision mounts were co-developed for the ALEXA 65.

Neil Fanthom said, “It’s entirely fair to acknowledge Panavision’s lenses as contributing to the the success of ALEXA 65. Several feature films have used those lenses on the camera. We work closely with Panavision on feature, TV and commercial productions where cinematographers like the combination of ALEXA 65 image quality and Panavision lenses.

“Though our Prime 65 and Vintage 765 lenses have proved very popular with the ALEXA 65, we knew when we launched the camera that ARRI Rental would need additional lens ranges to broaden the appeal of the camera system. We looked into what might be possible. When we partnered with IMAX and the ALEXA IMAX 65 came about, we initially were looking to develop a technically challenging set of prime and zoom lenses that would have all been T2.5. They would have been very expensive to develop and would have taken 3 years to complete.”

But, 3 years is a very long time in the digital age of 65mm cinema.

In September 2015, ARRI Rental Group CEO Martin Cayzer, ARRI Rental Europe Managing Director Thomas Loher, Group Head of Optical Systems Manfred Jahn, and Neil Fanthom met in Munich. They discussed statistics. In the first year since the camera had been launched, 15 successful ALEXA 65 productions had been completed. There was a great demand for more cameras. Therefore, it was decided to commission 40 additional ALEXA 65 cameras to be built during 2016.

Next came the topic of more lenses for ALEXA 65. ARRI Rental commissioned the fast-track development of a new set of faster aperture lenses, to be called Prime 65 S.

Working with their lens partner IB/E Optics, these additions to the Prime 65 series offer a slightly softer image, beautiful bokeh, and an LDS interface. Maximum apertures are T2.5 and T2.8. The set includes two macros (90 and 120 mm).

Prime 65 S Lenses

Focal Length mm	35	45	55	75	90	120	150
Aperture	2.5	2.8	2.8	2.8	2.8	2.5	2.8
Close Focus (m)	0.55	0.45	0.50	0.60	0.40	0.57	1.20
Close Focus (in)	21.5	18	20	24	16	22	47



ALEXA 65 Prime DNA Series



ALEXA 65 Prime DNA Lenses
114 mm front diameter

Accidental Imperfection

In F. Scott Fitzgerald's "The Great Gatsby," the memorable Eyes of Dr. Eckleburg peered from a billboard over the valley of ashes in Queens. In Queensboro Plaza since 1936, another giant billboard peered over motorists crossing the bridge to Manhattan. Eagle Electric's giant neon sign proclaimed, "Perfection is not an Accident." That slogan fueled crews working in nearby Silvercup Studios with a ready retort to any irksome AD. If asked why the camera wasn't yet ready to roll, the First AC would invariably reply, "Because perfection is not an accident."

And then there's serendipitously accidental perfection. Many cinematographers have their own idiosyncratic collection of lenses: ancient, modern and unusual. "Wouldn't it be nice if looks created by these lenses could be achieved on an Alexa 65," they wondered.

ALEXA 65 Prime DNA Series

So, concurrent with the Prime 65 S project, Manfred Jahn and his crew at ARRI Rental set out to work on a series of serendipitous and idiosyncratic lenses. They would be called Prime DNA. Every "imperfect" lens was pulled off the shelves and examined, regardless of age, imperfections, blemishes, bruises or mount. They fabricated a C-XPL mount, "C" as in compact, with a 52 mm flange focal depth to accept 35mm format PL lenses and to see what would happen with them on a 65mm sensor. It was interesting what turned up.

The primary requirement was to find lenses that fully covered the 65mm format (60 mm diagonal). There was no "good" or "bad." A lens that had been rejected because of imperfections when used with a film camera might appeal to certain cinematographers in this new age of 65mm digital discovery. Manfred and his lens

team found image attributes that few had seen before—because the lenses had only been used on 35mm cameras.

For example, an 85 mm T1.3 ZEISS Super Speed (ca. late 1970s) just accidentally happens to fill the entire ALEXA 65 sensor area. It takes on a totally new look. It's a spherical lens that happens to have anamorphic-like oval bokeh as happy accidents that affect the peripheral image area.

"Around that time we were also talking with Greig Fraser, ASC, ACS about 'Rogue One: A Star Wars Story,'" Neil Fanthom explained. "Before settling into prep with Panavision's Ultra Panatar lenses for that show, Greig spent weeks at ARRI Rental in London evaluating the format and performance of the camera, seeing if and how the look and coverage of full frame 35mm format Nikon, Canon and Lomo glass transferred across onto the full 65mm canvas of the ALEXA 65 sensor. Some of the early tests were shot with Greig's own Nikon 50 mm f1.4 lens, a Lomo Petzval 85 mm f/2.2 lens, and our ARRI Rental 80 mm lens from the Vintage 765 range. Greig's feedback has been instrumental to the direction and scope of our DNA lens program."

The DNA lens series is a work in progress. Unique lenses will be introduced with a variety of different looks and characteristics according to special requests by cinematographers.

The first DNA lenses were prototyped in London by the ARRI Rental lens technical team of Andy Taylor, Bob Campbell and John Duclos. At the same time, Manfred Jahn and his team were working at ARRI Rental Headquarters in Ismaning, outside Munich. Ten lenses were produced in ten weeks, all hand-built, all one-offs.



ZEISS 85 mm T1.3 Super Speed on ALEXA 65 Open Gate 6560 x 3100



58 mm Prime DNA lens

ALEXA 65 Prime DNA Series



Manfred said, “Matching lenses within a series involves examining bokeh and color. We tweak each lens, especially relative to sharpness, sometimes modifying floating elements and also the iris assembly. We have advanced lens testing equipment at our new ARRI Rental headquarters in Ismaning and are investing in more equipment around the world. We really are building a global lens business now.”

C-XPL mount Prime DNA lenses for ALEXA 65 went with Robert Richardson, ASC on Andy Serkis’ “Breathe” and with Greig Fraser, ASC, ACS on Garth Davis’ “Mary Magdalene”. Both productions were period pieces, both were low on VFX and low on budget. Hand-made backup lenses were built for the focal lengths that would be used the most. For Richardson, it was an 80mm T1.9 lens, and for Fraser, it was a 65mm T2.8 lens.

Neil continued, “The great thing about the DNA optics is that they are an ever-evolving range of custom lenses. Every one is special in its own way. You can mix and match to create a bespoke set of DNA lenses for a specific look, or to suit a specific genre or narrative.

“We have already decided to step up manufacturing on the Prime DNA Medium-Soft set because they are so beautiful across the range and we’ve just commissioned 10 sets. They won’t have LDS, but they will have lots of character. Manfred and his team will build them in the new Ismaning facility.

“The only rule we have about the images produced by the DNA lenses is that every spherical lens has to fully cover the ALEXA 65 sensor. We will not prescribe the look of a lens, since we all perceive perfection in our own unique ways. For example, the 58 mm Prime DNA lens is wild and complex. Probably no lens manufacturer would make a lens like this for sale into the motion picture market. But in the right hands, the images are unbelievably beautiful.

“2017 will see additional ARRI Rental lens initiatives. We are looking at making a small range of super speed 65mm format spherical lenses—some as fast as T1.3. Focus pullers will be raising an eyebrow or two when they read this. We’re also looking at other lens technologies and formats for the ALEXA 65—anamorphic, for example. The sensor allows us huge scope for experimentation, so we might break a few more rules next year.”

By the way, focus-pullers working at 65mm format T-impossible stops can find comfort in the form of the latest generation of Preston Light Ranger 2, Easyfocus 2, or Qinematiq focus assist tools.

In conclusion, Martin Cayzer said, “Our original prediction at the start of the project was that we were developing a digital version of a 65mm film camera that would be primarily used for VFX, large vista shots, landscapes and scenes where resolution was critical. We wanted to have a superb 65mm sensor that would be a digital successor to the larger film formats. Our aim was bigger real estate, providing as much resolution as possible—still utilizing the same pixels as the standard ALEXA, but with a lot more of them.

“Of 30 feature films and TV dramas that have used ALEXA 65 so far, the majority used it for the entire production. I think it’s because of the aesthetic of the larger 65mm format, because ALEXA 65 has the same image characteristics as the 35mm ALEXA, logistics are easier and costs are lower compared to large format film capture. After 24 months of experience we can see why this trend continues to grow—hence our commissioning an additional 40 cameras and the significant development of new lens systems to support the dramatically increasing demand.”



Prototype DNA Series for Alexa 65

2017 Prime DNA Special Optics

Very fast aperture, soft image, more pronounced shading at edges, exaggerated field curvature.

Focal Length mm	58	85
Aperture	1.9	2.1
Close Focus (m)	0.45	0.94
Close Focus (ft/in)	18"	3'

2017 Prime DNA Soft

Fast aperture, soft image, slight field curvature, creamy fall-off.

Focal Length mm	50	65	80
Aperture	2.0	2.8	1.8
Close Focus (m)	0.45	0.60	0.94
Close Focus (ft/in)	18"	20"	3'

2017 Prime DNA Medium-Soft

Medium-soft image, graceful, silky focus fall-off.

Focal Length mm	35	45	55	70	80	85	110	150	200
Aperture	3.5	2.8	2.8	2.8	1.9	1.3	2.8	2.8	2.8
Close Focus (m)	0.45	0.45	0.45	0.60	0.70	0.94	1.20	1.50	2.50
Close Focus (ft/in)	18"	18"	18"	20"	2' 4"	3'	3'11"	4'11"	8'2"



Features Shot Entirely with ALEXA 65

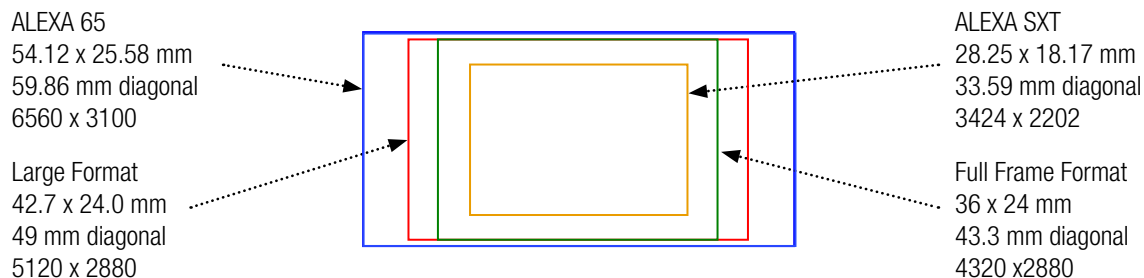
"The Great Wall" Stuart Dryburgh ASC, NZCS
"Live by Night" Robert Richardson ASC
"Breathe" Robert Richardson ASC
"Sully" Tom Stern ASC, AFC
"Passengers" Rodrigo Prieto ASC, AMC
"Okja" Darius Khondji ASC, AFC
"Marshall" Newton Thomas Sigel ASC
"Rogue One: A Star Wars Story" Greig Fraser ASC, ACS
"Mary Magdalene" Greig Fraser ASC, ACS
"Assassin's Creed" Adam Arkapaw ACS
"Planetarium" Georges Lechaptois
"War for the Planet of the Apes" Michael Seresin BSC
"Thor: Ragnarok" Javier Aguirresarobe ASC, AEC
"Doctor Strange" Ben Davis BSC
"Ghost in the Shell" Jess Hall BSC
"The Solutrean" Martin Gschlacht
"The Dark Tower" Rasmus Videbæk
"Transformers 5" Jonathan Sela
"Life" Seamus McGarvey ASC, BSC
"Asura" Patrick Murguia AMC
"Gerald's Game" Michael Fimognari



ARRI ALEXA 65 Views



ALEXA 65 Formats and Image Area Comparisons



ALEXA 65 Specifications

Overview	
Sensor type	ARRI A3X CMOS sensor
Sensor active image area	54.12 x 25.58 mm (diagonal 59.86 mm)
Sensor Resolution	6560 x 3100 (maximum recordable)
Measurements	
Weight	10.5 kg / 23.2 lb
Size (body without mount, EVF, handle, antenna)	L: 338.7 mm / 13.3" W: 208.3 / 8.2" H: 163 mm / 6.4"
Overall length (body with XPL mount)	L: 387.8 mm / 15.3" Mount adds 49.05 mm / 1.9" to length
Power	24 VDC
Lens Mount	ARRI XPL Mount (with LDS contacts)
Optical Center	105 mm / 4.13" from base
Shutter	Electronic, 5° - 358° adjustable in 1/10° increments
Frame Rate	20 - 60 fps (full aperture)
ISO Settings	200 - 3200 ISO. Base is 800 ISO.
Dynamic Range	>14 stops
Recording File Format	Uncompressed ARRIRAW
Sensor Crop Modes	1.78:1 cropped 5120 x 2880 24x36mm Full Frame 4320 x 2880
Storage	Codex SXR capture drive 2 TB (max 60 fps) 43 minutes record time at 24 fps Codex XR Capture Drive 480 GB (max 27 fps) 11 minutes record time at 24 fps
Connectors	
Viewfinder	ALEXA EVF-1
BNC connectors	4 x 3G SDI - MON (1) Out: 2 x 3G SDI - MON (2) Out: 2 x 3G SDI

SD card	For software updates and menu settings (like ALEXA)
Additional connectors	Focus / Iris / Zoom motor connections
	5 x RS 24V for accessories
	1 x 12V for accessories
	TC I/O (5-pin Lemo)
	1 x LDD, 2 x LCS, ACC
	BAT (pin 1: GND, pin 2: +24 VDC)
	ETHERNET, EXT (multi-pin accessory)
Other	
Camera IP Address	169.254.XXX.123
Synchronization	Like ALEXA, RET IN and EXT: Sensor sync, processing and HD-SDI outputs for 3D and multi-camera
Monitoring	3 independent color outputs: 1. EVF LogC/709/ARRILook 2. MON (1) OUT LogC/709/ARRILook 3. MON (2) OUT LogC/709/ARRILook All with optional overlays. All options are available during playback. MON OUT tools: Zoom, Overscan, Overlay info, Frame Lines, False Color, Peaking
CDL	CDL server support like ALEXA XT
In-camera playback	Playback via EVF, HD-SDI MON OUT including Audio
Audio	Two channel recording and playback, Analog line inputs, Headphone monitor output
Remote UI	Existing RCU-4, Web-Remote via ethernet, WCU

Martin Cayzer & Thomas Loher at ARRI Rental

JON FAUER: Please give us an overview of ARRI Rental.

THOMAS LOHER: We have seven offices in five countries in Europe: Germany, Luxemburg, Austria, Czech Republic, and Hungary. They share an equipment pool that is deployed from our headquarters here in Ismaning, which you noticed is quite close to Munich airport. That helps get the equipment where the jobs are. We take great pride in the quality of our service. That means having responsible team members taking care of the gear and knowledgeable staff for sales. I manage the overall operations. For the gear, we have three experts. Manfred Jahn is Head of the Camera Department. Miki von Hohenzollern is in charge of Lighting and his brother Kiki is in charge of the Grip Department. All three gentlemen are located here but they are responsible for overall operations in Europe.

JON: How many people do you have working in ARRI Rental?

MARTIN CAYZER: We have a staff of 100 here in Europe. In Great Britain, there are 60, and another 80 in the US for camera and lighting. Worldwide, the team totals about 330.

JON: How about Asia?

MARTIN: We haven't got a permanent rental base in Asia just yet. Although this year, I think partly because of the ALEXA 65, we've been going into different parts of the world. We've been in New Zealand twice this year—first with the ALEXA 65 on the DreamWorks feature “Ghost in the Shell” with cinematographer Jess Hall BSC which Thomas's team supported, and now we're supplying a Warner Bros film with Tom Stern, ASC, AFC in New Zealand. We were in Korea, Australia and also in China. So it's been quite an international year.

THOMAS: The whole organization is very familiar with location shows in far-off places. This has always been the ARRI Rental benchmark—to be very flexible, to have the right inventory, keep quality high, and to be efficient. It was the only way to go, I have to say, because when you're sitting in Munich, it's not the center of the world for film production. This is Bavaria, so we have to find a way to support our customer bases worldwide.

JON: The landscape is quite competitive, so how do you compete?

MARTIN: Quality and service. We have our gear and it's standardized. We have excellent technicians. We are flexible. We can jump into a plane and get the right people on location quickly.

JON: You're near the airport and FedEx.

THOMAS: It's always a big headache when you have too many different cameras, old versions, new versions. We are able to offer the latest gear, maintained to the highest standards.

MARTIN: It's all about the people working here. The equipment travels pretty well to different places around the world. But it's really about having the right teams that can travel with the equipment to different parts of the world, having the right technicians, the right backup.

JON: You send people with the equipment, usually?

MARTIN: Yes. Right now, we have people in New Zealand, Australia and China. For example, on “Meg,” the crews tested and prepped in New Zealand and we sent the equipment there for checkout with our technicians. The Marvel Studios film “Thor -

Ragnarok” in Australia decided to send their crew to the UK and test lenses and cameras in the UK. It varies on every project.

JON: Did you set up a rental facility in New Zealand for those shows?

MARTIN: No. Our remote team goes out there when they test equipment. If the crew needs additional equipment, on a daily basis, we work with a local partner company.

THOMAS: Another aspect you may appreciate is that almost all of our technicians were trained at ARRI in Munich. Many worked at the ARRI factory in camera assembly; almost everyone started their career in this camera heartland. That means we know what we're doing when a camera, lens, accessory or remote control system is heading out. It's checked, inspected and is going to work the way it should.

JON: How do you balance the work with local rental companies?

MARTIN: The ALEXA 65 has been a catalyst for us this year because New Zealand, China, Vancouver, and Australia all have great rental companies that supply the local industry. We have to find out how we can fit into the existing ecosystems in those countries and it's been the ALEXA 65 that's been the technology taking us in there, where there's a need for that technology and for us to support it. We have two ways of dealing with it. One is having the group of small teams in the US, UK, here in Germany, very experienced staff technicians who fly around the world to support the projects. Many of them are part of the ARRI manufacturing and R&D teams. They have been with the ALEXA 65 and the lens development since the very beginning.

Alternatively, we have to look and see where the more permanent hubs need to be. If we get more work in particular regions, then we have to consider whether to set up a more permanent base to support the boutique equipment that we've got. The first one was Atlanta because it's such a production hub and growing. There was a great demand for the ALEXA 65, including the Columbia Pictures film “Passengers” with Rodrigo Prieto, ASC, AMC, for example. This fall, we're going to open up a small boutique rental hub in Los Angeles and then another one in Vancouver.

JON: Why LA?

MARTIN: Because we've done more tests with productions, cinematographers and directors in LA than anywhere else. Dana Ross has been working very hard there but we need our own facility. We have a temporary base just a few blocks from Burbank Airport while we search for a permanent facility. It's a perfect step for us to have a small, boutique rental facility in LA supporting primarily the ALEXA 65 for tests and shoots.

JON: Does the equipment come back here for major service?

THOMAS: Yes. Often the technicians can do most of the service on location with their special tools. But for specialized service and specific lens work, you probably haven't seen a rental facility like the one we are about to show you. Let's take you on a tour of our Ismaning ARRI Rental headquarters.

But first, would you like a coffee, Jon? Perhaps an espresso?

JON: I was hoping you would ask. Rumor has it that your espresso is among the best of any rental house anywhere.

ARRI Rental's new Camera Department in Ismaning



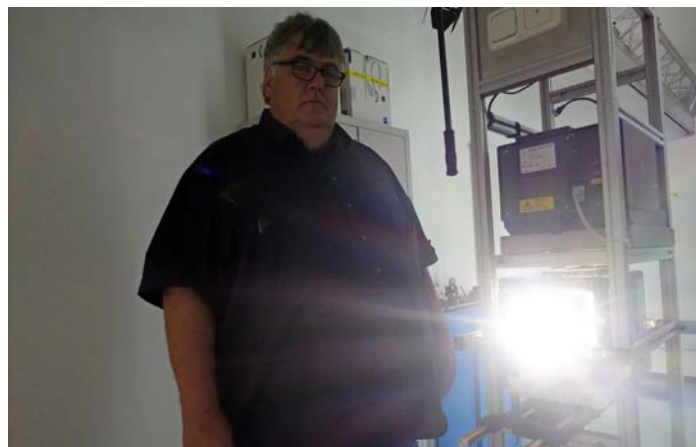
ARRI Rental's Camera Department recently moved into a new 4,500 sq meter facility in Ismaning, a short drive from ARRI's offices on Türkenstrasse



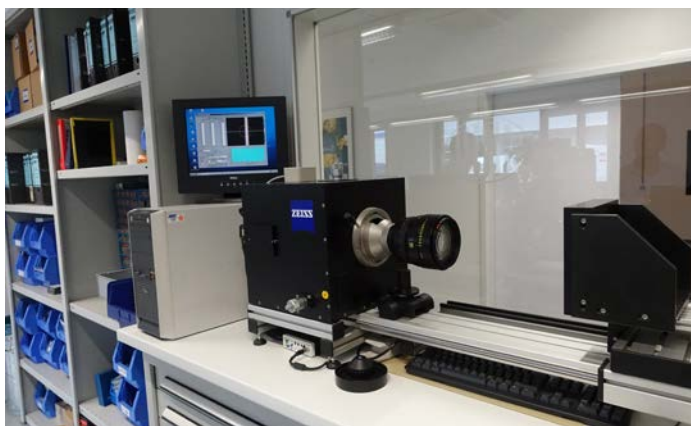
Neil Fanthom (ARRI Rental Director of Technology) and Thomas Loher (Managing Director) with 2 ALEXA 65 cameras. The rest are on location.



Neil Fanthom, Judith Evans (Group Director of Marketing & Communications at ARRI Rental), Martin Cayzer (CEO), Thomas Loher



Manfred Jahn, one of the world's best camera department managers



Lens testing area

ARRI Rental, Camera Dept.



Window on the camera prep and service area



Judith Evans on the camera prep floor



Camera prep area—clean, bright, organized



Camera equipment storage area



Vintage Eclair Cameflex with SOM Berthiot zoom



Camera checkout area—wood theme throughout



Camera checkout



Lounge, lunch room, terrace and excellent espresso

ARRI Rental Lighting & Grip Department



ARRI Rental's large Lighting and Grip Department is in a massive, modern building across from the Camera Department in Ismaning



CNC machines for custom accessories and replacement parts



Assembling new dolly track with a unibody triangular frame



ARRI Rental Dolly, Crane & Grip Department



Hexatron and Jürgen Heinlein, Martin Cayzer, Miki (Hubertus) von Hohenzollern, Felix Jahn, Hans Lehner



ARRI Rental's Hexatron: camera crane and remote head on an all-wheel drive vehicle that climbs like a mountain goat. With the Alps in ARRI's backyard, the Hexatron will make remote head setups on steep slopes much easier and faster.



ARRI Camera Manufacturing Update



It's been a year since the last visit to ARRI's camera manufacturing and assembly facility on Türkenstrasse in Munich. A few things have changed.

On the last visit, Managing Director of ARRI Cine Technik Walter Trauninger—famous for fast cars and need of speed—was the proud owner of a powerful new bike. This time, Walter was on a bicycle, riding fast, saying something about the motorcycle having been totalled or in the shop.

Now, ARRI's manufacturing area is running full tilt in several shifts. ALEXA cameras are flying off the shelves. Forty new ALEXA 65 cameras are in the works. ALEXA SXT cameras are being put together at a prodigious pace and shipping. ALEXA Minis are on benches everywhere, along with AMIRAs.

The space occupied for so many years by ARRI's film lab is now being renovated to become a new center for the ever-expanding R&D team.



May 2015: David Bermbach, ALEXA Mini Project Manager; Christian Hartl, Head of Camera Assembly; Walter Trauninger, Managing Director of ARRI Camera Systems, with his new motorbike; Martin Höcht, Head of Procurement; Michael Jonas, ALEXA Mini Product Manager.



ARRI Camera Manufacturing



ALEXA Minis in the assembly area (above). ALEXA SXT cameras ready for QC testing (below).



ARRI Camera Manufacturing



Joerg Pohlman viewing 3D image with an ARRISCOPE medical camera



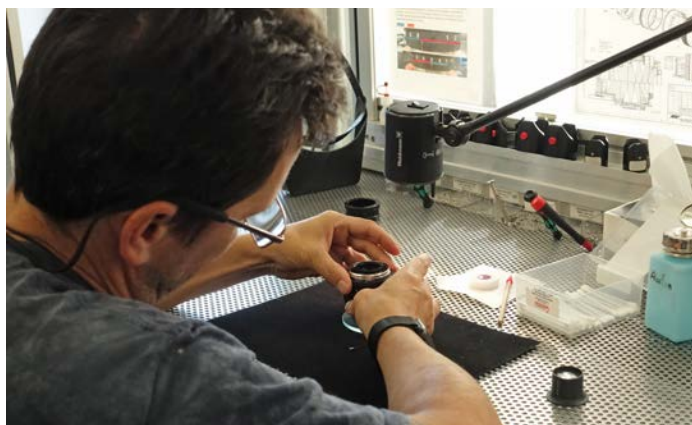
Christian Hartl, Head of Camera Assembly and Andreas Weeber



ARRISCOPE Cameras



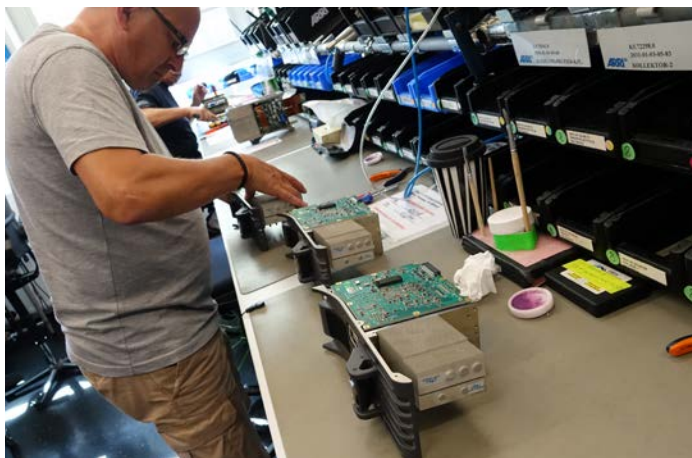
ALEXA Minis



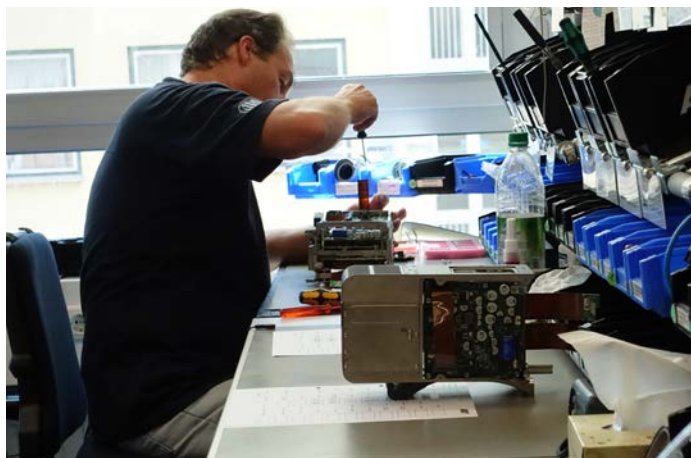
Eyepiece assembly



ALEXA SXT



Cooling fins inside ALEXA SXT

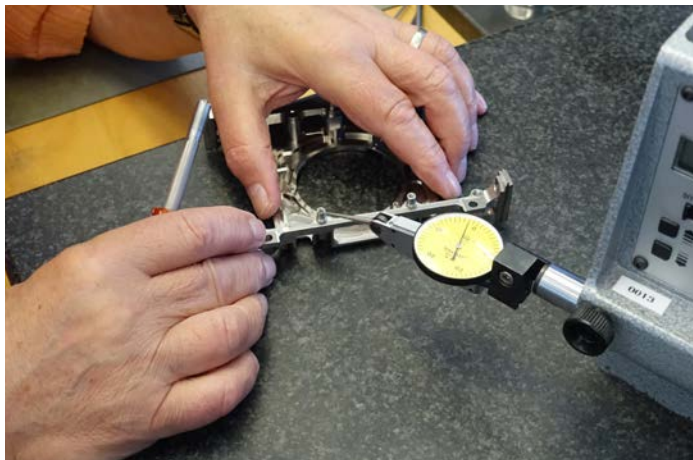


ALEXA SXT

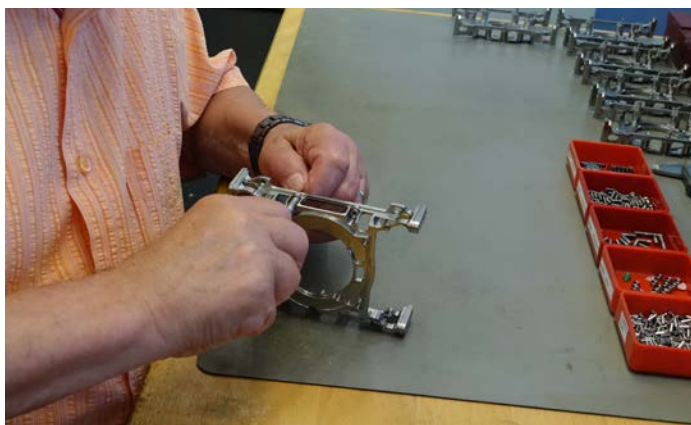
ARRI Camera Manufacturing



Preparing SXT camera left side media drive doors



Measuring lens mount carrier



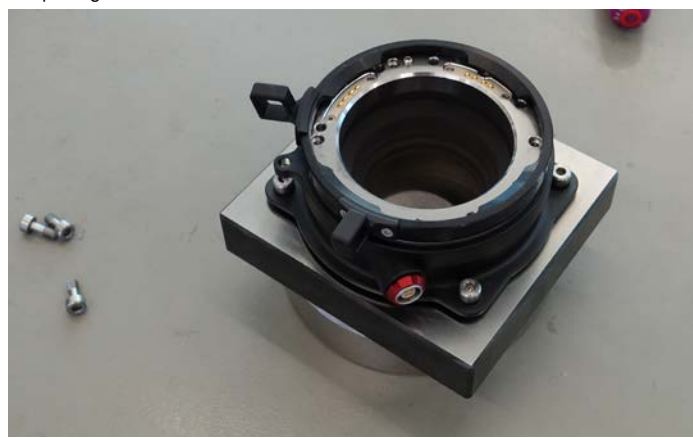
Lens mount carrier



Preparing lens mounts



Fitting mounts to AMIRA cameras



PL mount for AMIRA and MINI cameras with LDS and /i data contacts

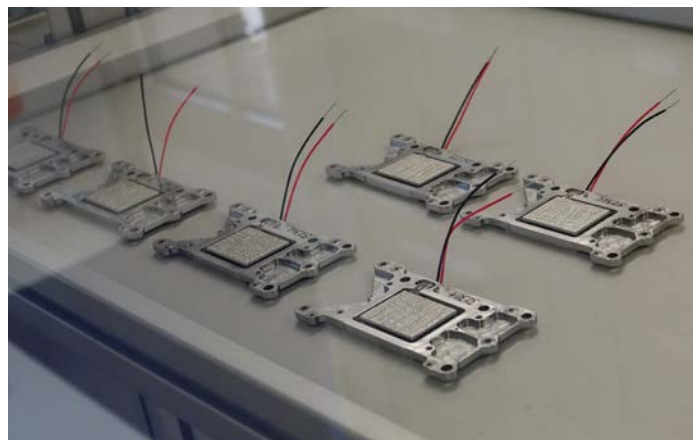


Rear connection panel



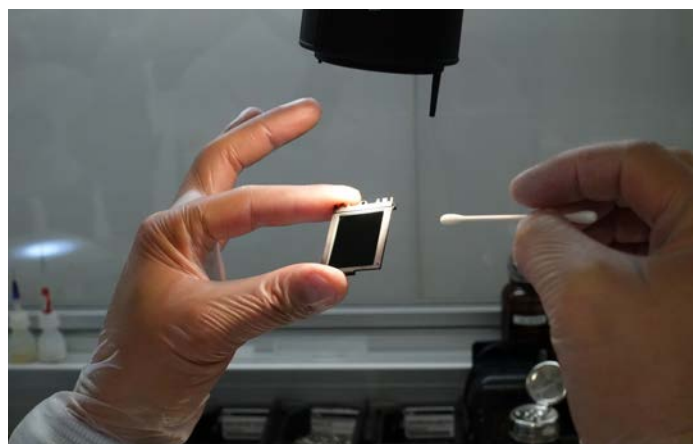
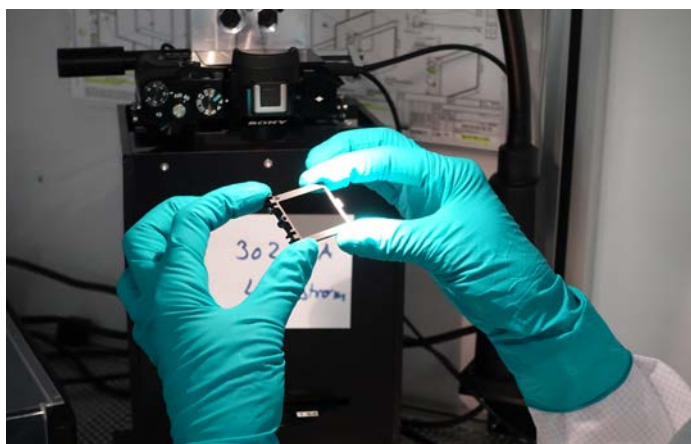
Loading software

Clean Room



ARRI ALEV 3 sensors are prepared

Sensors mounted on carriers



Cleaning individual behind-the-lens ND filters for AMIRA and MINI

Completed ALEXA Mini and AMIRA motorized ND assembly



ARRI@Bavariafilm's Studio C Dolby Vision grading suite

Bavaria Studios is a 13 km drive or train ride south of ARRI headquarters on Tuerkenstrasse. It is a 350,000 square meter complex of studios, backlots and production facilities, perhaps best known as the dry land home of "Das Boot." It is also the new home of ARRI Media's ARRI@Bavariafilm Editing, Mixing and Grading Facility. Thanks to Joerg Pohlman, Daniel Vogl and the entire staff for the recent tour and especially to Siegfried Oblinger for the technical details that follow.

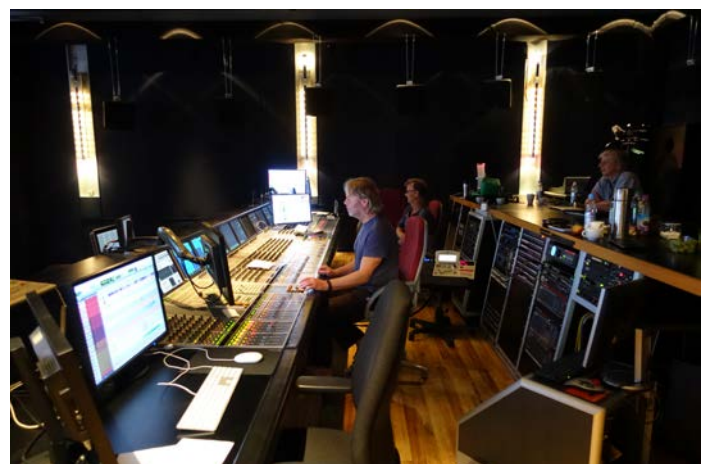
Studio C / Dolby Vision HDR grading suite is the only grading room outside of Los Angeles with Dolby Vision laser projection. The projector can display up to 108 nits (standard cinema is around 48 nits). Even more impressive than brightness is that blacks can be displayed down to 0.0001 nits, which lets the screen virtually disappear in a dark room when black is projected.

This allows for a contrast ratio of 1,000,000:1. A standard DCI Xenon projector in most theaters today has a typical contrast ratio of around 1,000:1.

The higher dynamic range enabled in Studio C lets the viewer more accurately see what the camera actually captured. RAW ALEXA files can capture more than 14 stops of dynamic range. A standard cinema projector typically displays around 10 stops. A Dolby Vision projector is capable of up to 20 stops. The extended dynamic range allows the colorist to work with more highlights, shadows and subtleties to provide new creative options.

The grading suite is also equipped with a standard 4K Xenon Barco DP4KP projector for grading standard dynamic range projects. There are two Blackmagic DaVinci Resolve Studio grading systems installed in the room. One is for grading on-screen and the second one is for support work such as digital beauty or masking.

Studio A is the Dolby Atmos mixing stage. It is an immersive, 360 degree environment that differs from a standard cinema setup by having additional side-surround and top speakers. Dolby Atmos allows a room to have up to 64 speakers installed—Studio A has 46. There are 3 speakers behind the screen.





Studio A Dolby Atmos Mixing Theater

With Dolby Atmos, the mix is now “object based.” That means tracks can be assigned up to 118 locations that can be positioned or moved around the room dynamically, placing them wherever you want to create an effect. Metadata saves information about the position, size and movement of the sound. All this is processed and mastered into a DCP.

When played back in an Dolby Atmos theater, the mix is optimized to the room in which it is played. This allows the same mix to be played back in a smaller cinema with fewer speakers or in large theaters with many speakers.

Now there’s a whole new landscape of possibilities in creating an emotional soundscape. A mixer can now give the viewer the impression of sitting in a real 360° environment during a movie. This can range from creating realistic natural sounds with birds and wind coming from defined points throughout the room up to letting an airplane or spaceship circle throughout the theater.

Studio D is a reference home environment to show customers how a Dolby Vision/HDR graded film can look and a Dolby Atmos mix can sound in a home environment. Studio D is also used for grading and mixing projects for consumer delivery.

Projects are played back directly from a Blackmagic DaVinci Resolve Studio grading and Pro Tools based audio system. The monitor is an LG 65” OLED 4K Dolby Vision/HDR capable TV with a 7.1.4 Teufel LT5 Dolby Atmos speaker system.

For example, this setup lets a production team working in Studio C for theatrical release also quickly look at the same project in a home environment. It also helps the creative team review a grade or sound mix created one environment on another.

All these well-equipped studios offer seamless preview of finished productions before the encoding process and enable quality checking after encoding and authoring.

Studio D: Home Atmos screening room





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