



Peter J. Knight, Vice-Chairman of the CTC and long-time operator of the www.madcornishprojectionist.co.uk website writes about a two-day technical course at BFI Southbank

Digital Exhibition for Festivals was the title of a two day course which took place in various locations within the BFI Southbank, run by High Definition & Digital Cinema Ltd, supported by the BFI and skillset with sponsorship from Doremi, Qube, Fraunhofer Institute & DVS.

I was very pleased to attend this course to report for *Cinema Technology* magazine. The format, and a certain amount of the content, was very similar to the previous course about DCP Mastering, which appeared in *Cinema Technology* in March 2011, except that this course was specifically aimed at those involved with Film Festivals. The course time was split up into an interesting mixture of Seminars, Workshops and Practical Sessions. There was certainly a lot of information to take in during the course and I was thankful to find out that the presentations were going to be available to download later on. It turned out that one of the main reasons that the course came about was as a direct result of the experience of the London Film Festival, where as a result of the virtually overnight increase in content being submitted in the DCP (Digital Cinema Package) format there was a substantial increase in the number of DCP problems. There were around 40 people who attended over the two days, and while a large number of the attendees worked in different areas of the BFI, there were a wide range of people who had travelled from as far as Belfast, Glasgow and the Lake District

Day 1 - Seminar

The course started with introductions and the usual house-keeping information from Richard Boyd, Head of Technical Services at BFI, who also explained how the course came about, before Rebecca Davies from Skillset explained a little about the Skillset funding and why it was felt that this course was important. After this Peter Wilson provided a quick potted history to his and

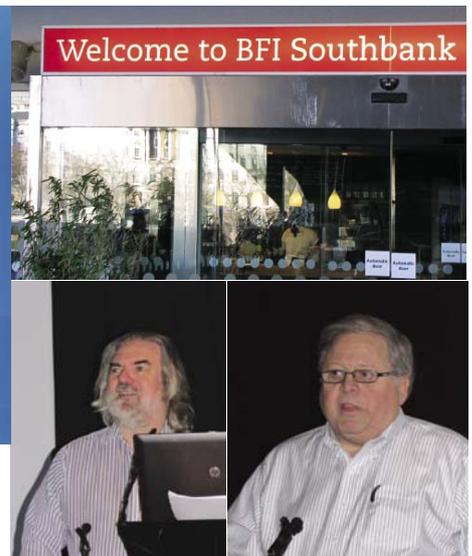
co-presenter Jim Whittlesey's experience and knowledge and it was clear to see that we were going to be in safe hands over the next two days. We certainly benefited from the wide and detailed wealth of experience of Peter and Jim and in fact throughout the course, there were many insightful asides as to why something had ended up as it had, or a story about a decision which provided a real grounding in what was being said. Just as on the previous course the idea was that there would be a number of theoretical sessions which were there to build up knowledge before giving us the opportunity to have a go ourselves, with most of the second day given over to practical sessions.

The objectives for the course were described as:

- **Management to gain an overview of the Digital Cinema system and its features/benefits.**
- **Management to gain an overview of the most common VPF funding method for mainstream distribution.**
- **Management to gain an understanding of the complex and technical logistics needed to keep a Festival running smoothly**
- **Technicians to gain an overview of how the Digital Cinema system works from a commercial point of view and an understanding of the logistic challenges of a festival.**

With the vast amount of very detailed and every changing information which we were presented with over the two days, I can only provide an outline and a flavour of what was said here, otherwise I would be writing a whole manual!

One of the early messages which came out from the introduction was that turning away anything other than a DCP from a film festival should be avoided, but where possible you should work with a local company to get the material transferred. We were also reminded on several occasions, that DCinema is not yet a "Plug n Play"



Peter Wilson and James Whittlesey made a good lecturing team

technology and that it is essentially still very much in its early days, pushing the boundaries of what is possible with IT systems. Although Engineering has been marginalised in European cinemas, it is vital for these Engineers and Technicians to be involved at a high level with festivals in order for them to be successful.

Background theory

And so we moved on to the background theory - starting right at the beginning with the question of 'what is Digital?' (the Latin for finger), through to Binary and bits and bytes. We then moved through to how sampling works and how it is different in Film from Television, and the difference between Interlace and Progressive scanning; and why it was that Interlace material should never go anywhere near a Digital projector without time and money being spend on converting it.

The next section was about the 'K' and what it actually means, i.e. it is the description for the number of horizontally pixels there is in a picture, and nothing else and is considered a poor description of a Digital Cinema System. The number of horizontal and vertical pixels in turn define the number of megapixels in an image. I also learnt that the chips used in Digital Cinema were based on pre-existing ones which originally had a different purpose, and it is for this reason that DCinema image always has a black border somewhere on it. One of the most interesting slides, although one that made my head hurt slightly was the one around sampling an image, which in turn provides the individual RGB values for that pixel, which in turn is what is stored in order to be reproduced on the screen.



The course was very 'hands-on' with lots of opportunities to put the theory into practice

We then went through how the two types of Digital Projector work and the reasons for integrated media blocks on 4K projectors. There was a lot of the history around the Digital Cinema Initiatives specification and its history. One thing which was interesting to hear, and which makes sense in such a young technology was that different design teams have interpreted the DCI spec in different ways. This in turn can cause issues which will only be resolved actually in the field, when it is discovered that one manufacturer's interpretation of a requirement is slightly different from another's. This is something I have had personal experience of when working with other companies on metadata specifications which I have been responsible for and their interpretation of my requirements have not been the same - of course a discussion about the issue can usually resolve any differences. But as Jim said, "Everything is still work in progress".

There were then discussions on the benefits of digital and how military grade encryption is used on the DCP and how despite the standards being worked on for at least 13 years it is still the interim format which is being used - something which was important to note for later on in the course. The whole next section of the morning was around the key points of the DCI specification and how it is necessary for additional frame rates to be added to the specification, not just for High Frame Rate material but also for archive material.

Digital Distribution

The Digital Distribution section was all about how a Digital Cinema Package (DCP) is actually made from its original files, and how the Digital Cinema Distribution Master (DCDM) is formed of a collection of discrete picture and sound files, which are

compressed using the JPEG2000 format and then wrapped together into an MXF (Media Exchange Format) file, and encrypted. Alongside the MXF file are a number of required files that tell the server what files it needs and the order in which to play them. It was interesting to learn that each 'reel' which appears in a DCP actually still has its own header and footer attached! What this session demonstrated was that Digital Cinema is a very technical subject which no one can easily talk about without it becoming technical!! But throughout the course both Peter and Jim always made sure that any acronym or difficult concept was explained fully, but without over complicating things.

Festival requirements

The second part of the morning was about Festival Requirements.

I wrote down four bullet points which can easily summarise this section of the course:

- **TIME**
 - **COMMUNICATION**
 - **INFORMATION**
 - **KDMS**
- **Although not necessarily in that order!**

The first point was very much about the importance of good communication and information flow between everyone involved in a film festival. When thinking about the impact of Digital Cinema on film festivals it is important not to break the bits that work, for example the London Film Festival has operated for 56 years without a break, but there has been a 90% reduction in film submissions in a very short time which has seen a complementary increase in digital delivery. It is therefore important to have a technical person on the management board to help with communication. It is also a good idea to also include the IT person at this level so that they know what is needed in any management of the networks. This is

a big change for many festivals but it is seen as a reflection in the change in terms of just how technical the screenings have become. But it is important to have a complete contact list which includes out of hours details for specific nominated person; along with clear responsibilities for each person on the organisation chart which are simply and clearly defined. Along with the contact list and clear responsibilities it is important to have a complete list of authorised contractors and their responsible areas and a list of the festival venues.

It is then very important to request and receive very clear ingest requirements for DCPs which should be outlined in a Delivery Requirements Document providing clear and practical information, as it is quite possible that the film makers/people providing this information may not understand the technology themselves. It is then an imperative to capture a very full and detailed list of the equipment which the venue exhibitors have, along with software versions and certificate information in order that you can be confident what is and is not likely to work in a venue and in order to provide the necessary KDMS.

Of course it is possible that non DCP content may arrive, but it is important to remember that tape decks are expensive to rent and so ideally tapes should where possible be converted into DCPs by festival technical staff or specific contractors/facilities houses. DVDs especially may contain a multitude of compression and wrapper formats but should ideally be converted to DCPs as well. But of course a small number of screens should be equipped to run non-DCP content directly in case there is no time for conversions. With so much different content coming into a film festival from lots of different sources it is important to quality control ingests

and sufficient time is required to do this checking of the packages and their contents and, where appropriate, the KDMs which will be needed. This therefore requires sufficient technical time and sufficient workstations in order to do the job properly. The ingest quality control is however a check of the correctness of the ingest and playback of the content and whether the sound is in sync, not to see if the grading looks nice or the soundtrack is correctly mixed. If external facility companies are going to be used for any of the different processes then it is important to make sure that proper business contracts are put into place in order to not allow costs to spiral out of control.

A good technical relationship needs to also exist with each of the venues in order to make sure the correct information about the different systems can be obtained and maintained, especially when issuing KDMs.

Subtitling

The subject of subtitles generated a large amount of discussion as there have been a number of issues around them, as we also discovered later on in the course.

Afternoon - Workshop

The afternoon session was entitled "Workshop" and really took the vast amount of information which we had been provided with in the morning and expanded it in much greater detail, especially around things like the Digital Cinema Distribution Master (DCDM), XYZ Colour space & conversions, compression and packaging in MXF. There were quite a few slides of extracts of XML text on screen with large amounts of discussion. There was further discussion on subtitles, although this time it was also about the different types which can be used (unicode text or PNG graphics files).

Day 2 - Practical work

The second day took place in the BFI Blue room and was primarily a practical one. There was a short introduction from Peter and Jim discussing processing non-DCP submissions sent into Film Festivals and alternative formats with an emphasis on everyone needing to keep up with equipment and industry "standards". At the practical sessions four different manufacturers had brought along some of their top experts in order to work with the students. There were representatives from Qube (Francisco Lopes), Doremi (Brent Watson and Kamal Mohamed), EasyDCP (Heiko Sparenberg) and DVS. For the practical sessions we were divided into smaller groups of five, which allowed plenty



The photograph that was used by my team to demo a DCP creation

of one-to-one and group discussions to take place, and there was plenty of time in order to carry out the practical exercises, and see a demonstration of the individual vendors' products in use. Our specific tasks were: to make a DCP movie (really a trailer), fix a bad subtitle file and remake DCP, re-making the original DCP we made in Lab 1 but this time with encryption, make a key (KDM) with a supplied certificate and working with file systems (FAT32, NTFS, EXTII & III) and Zipped files.

Lab session

There was a lab session where there were deliberate errors with the various files required with a DCP and in our groups we had to work out how to resolve the issues. Some of them were fairly straightforward, such as "ASSETMAP" should always be in capitals and so should the "UTF" element in the subtitle XML. We learnt when it was possible to change elements in order to repair a DCP and when it is not possible because of the encryption. In the group I was in our last session of the day was with Heiko Sparenberg from easyDCP. One of the members of our group owns his own cinema in Keswick and was interested in finding out just how easy it was for him to use this software. So as an extra 'lab' and to demonstration both how easy and how quickly a logo slide could be created from an image file, we did one ourselves, using a photograph I took of the group. In less than five minutes the photograph had been transferred onto the computer, cropped to the right size, imported into the software and a DCP created - real proof of the value of this course.

Conclusions and final thoughts

There were some key points to come out of the sessions.

Time is important - time to ingest the content, time to check the content and time to plan seemed to be a key message. We were also reminded several times that

this is not a mature technology yet; in fact what is being achieved currently with Digital Cinema equipment is pushing the boundaries of computer and IT systems to their limits, especially in terms of the amount of data flow.

Digital Cinema conversion is only the beginning, and things will continue to change and develop.

The other important message to come out of the first day was the requirement that **a technical person should be on a Film Festival management board,** thus improving communications and in turn helping to make life easier.

Despite having been involved with Digital Cinema for a number of years and having written the BKSTS CTC Digital Projection Handbook, I still learnt a lot of new information, along with having reinforced just how complicated Digital Cinema actually is. This was a well-run and well organised course which was relaxed but highly informative and provided a wealth of knowledge. There were several experts available throughout the course, and always an opportunity to ask questions, or to discuss a point, either directly within one of the sessions, or privately over lunch or a break. All the hand-outs from the sessions and some additional information to help us on our way was provided for candidates to download from the website. I have learnt a lot from the course personally, and also met a number of new and interesting people, which is always good. I can highly recommend this course, and I am sure that any future course would be well worth attending.

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