

Guidelines for the safety of digitally recorded productions

The VTFF and DFG recommend following the points below in the planning, preparation and realisation of digitally recorded film productions:

1. Target medium

- The target medium has a considerable effect on the production procedure and risks associated with this and must, therefore, be established, if possible also with planned further exploitation chains, upon the completion of the insurance contract.
- The target medium including planned further exploitation chains must be clearly described in the production contract (with broadcaster, distribution/sales and co-producer).
- All persons who are responsible for quality and safety must be informed about the target medium and further exploitation chains.

2. Camera system

- The choice of camera system has a considerable effect on the course of the production and should, therefore, be recorded in detail:
 - Camera type (incl. software and firmware version)
 - Resolution (spatial resolution, e.g. 1920x1080)
 - Colour depth (bit depth per pixel)
 - Sub sampling (e.g.: 4:4:4 or 4:2:2)
 - Frame rates (temporal resolution e.g. 25p or 25i)
 - Colour space/gamma (e.g. LogC Matrix Off or Cinegamma or Slog)
- You should adhere to the workflow recommended by the manufacturer or the VTFF.

3. Recording medium

- If the recording of image and/or sound data occurs solely on memory cards (e. g. SxS, CompactFlash etc.), solid state discs (SSD) or hard drive (HDD), use suitable storage media for the recording format.
- The storage media should reliably reach the required data rates. Compare data rates.
- The firmware version should not be changed during the production.
- You should adhere to the workflow recommended by the manufacturer or the VTFF.

4. Test shoot with documentation

- All camera equipment including all extras (filter, lens etc) must be fully checked. The same applies to all additional cameras with corresponding extras.
- A test shoot is always recommended.
- A test shoot is always required before shooting abroad.
- A standardised testing procedure does not currently exist for electronic recording media. An end control of the medium e.g. by a film laboratory in the production of film material, is not possible.

- Errors such as compression and image processing artefacts can only be recognised by a visual inspection of a test sequence.
- The data rate of the recording medium should be tested randomly e.g. by recording a sequence with the highest possible frame rate.
- Check in advance to see whether the software version of the camera is compatible with the planned post production.
- No changes should be made during the course of the production without testing first.
- Allow sufficient time for checking all equipment and a test shoot. Saving time here often involves extra error sources and more time during filming and in the post.

5. Sound

- The sound recording should occur on both an electronic image recording medium as well as on solely sound recording equipment.

6. Backing-up data

- Make at least a double back-up daily of all the original camera data of the recorded material as well as all associated metadata.
- Check data integrity during all copy and back-up procedures by establishing check sums.
- Copy data onto a back-up data medium on set (recommend minimum RAID Level 1 or LTO from Generation 3).
- This back-up stays in production, separate with regard to the room and fire protection from post production. Alternatively to this, the back-up for production may also be made after the first data control in post production.
- The data is also copied onto a transfer data carrier with which the recorded material is transferred from the place of filming to the post production process via dispatch, courier or similar.
- Transport occurs in suitable containers incl. a delivery note and data volume details.
- The supplied data is recorded in a system which can be easily reviewed/checked (with file name and metadata such as clapper board lettering, takes, time codes if possible).
- As soon as the recorded material has been transferred to the post production process, make back-ups from this data (RAID from Level 1). If this has not already occurred on set, create LTOs for independent and long term back-up.
- The original data on set may only be deleted once the transferred data has been checked.
- Data must always be available for access control.

- The back-up concept (e.g. LTO: when and where) is adapted to suit the relevant production conditions.

7. Quality control

- The recorded material should be checked daily with view to usability and recording errors.
- Timely advance inspections of the recorded material are only possible on set with view to major errors.
- A skilled image inspection is only possible by qualified personnel with professional experience in image analysis, digital colour correction and a knowledge of national and international technical guidelines.

7.1. Technology for quality controls in HD or 2K analysis

- Skilled image inspection requires a native HD/2K display without scaling effects and after image, 10 bit colour depth, minimum size 23".
- Measuring devices Waveform, Histogramm and Vektorskop should have separate monitors.
- Viewing must be possible in realtime (realtime ability) and the inspection should occur in realtime.

8. Quality report with written documentation

The quality control should be documented in a written report which includes all important project data as well as detailed information about technical and other errors.

Examples of image errors:

1. Digital image errors
 - a. Clipping
 - b. Fixed pattern noise
 - c. Pixel errors
 - d. Reading errors
 - e. Rolling shutter artefacts
2. Format, coding & compression errors
 - a. Compression and image processing artefacts
 - b. Splash
 - c. Image loss
3. Recording-specific errors
 - a. Lighting
 - b. Sharpness
 - c. Technical equipment in the image
 - d. Reflection
 - e. Team/crew in the image
 - f. Filter and light exposure



9. Adaptation of safety standards to suit production format

- The safety requirements must be adapted to suit production formats.
- Less time intensive quality controls and data back-ups are usually sufficient for long running daily productions.
- For weeklies, the required quality controls are determined depending on the duration and experience of the series production.
- A complete inspection must be made with series of fewer than 50 episodes per year.
- A complete inspection is also required for individual productions e.g. TV movies. For high quality productions, back-up on LTO is particularly recommended.

10. Data transfer

When more than one service provider is involved in processing, it must be made sure that all qualified data and metadata has been transferred.

11. In the event of damage

In the event of damage, a full chronological documentation of points 4 and 6 to 8 (camera tests, quality reports of daily samples etc.) should be available.

The underlined points represent the most important requirements.