Document C1(N) - Notes to accompany Camera assessment form C1 (Parts A + B)

This documented is intended to provide guidance and background information, to help in completing the camera performance assessment on Form C1 - Parts A & B (this being a simple and hopefully straightforward way for inexperienced operators to evaluate how well their CCTV camera is performing, in relation to fulfilling the requirements for TRUSTED© status).   Please read these notes carefully before you start the assessment.

GENERAL INFORMATION:- For the purposes of this exercise, the type of camera being used is not really significant, although with expert interpretation, it is possible to say given the results of this evaluation, whether it is actually appropriate for the task, or whether an alternative set up might have been the preferred option.
Whilst the questions have been structured for the analysis of a conventional CCTV camera, the same principles will apply to all surveillance cameras (Form C1MP should be used for IP Video 'Mega-Pixel' type cameras).

If you are testing a fixed camera, it would hopefully have been set up by the installation engineer to provide the best possible quality, and the following assessment should confirm whether this is indeed the case.
Where a remote control camera is being used (Dome or PTZ), it should either be set up on the view most commonly required, or alternatively with an optimized zoom / focus set up to fulfill a singular recognition task, whichever is appropriate. This evaluation can only indicate the performance of the remote control camera, but does not offer any insight as to whether it is in fact the correct tool for the job.

The overall quality of the image displayed is ultimately dependent on the quality of the monitor (and of course the transmission system); with that in mind, it would normally be preferable to test the picture using a short signal lead connected directly from the camera to the monitor, although recognizing that it would be impractical for most operators to do this, the questionnaire has been designed to test both the camera set up and the transmission system being used (in general terms, and not to the same extent as would be performed by an experts detailed analysis). It should be noted that some of the visual problems covered in Section 1 - Picture Quality, can equally be as a result of issues with the monitor display; if you suspect any technical problems with your monitor, this can be checked against another test unit or alternatively a TV display. If you're not sure whether it's the camera or monitor, simply try another video signal (either from a 2nd camera or a TV output) and see if the problem disappears - if it doesn't, then it's probably the monitor that's at fault.

Wherever possible, any processing equipment in the system, for example a Picture in Picture unit, Quads, Multiplexers etc., should be bypassed, or at the very least a live unprocessed camera feed should be selected for display, as this will most likely not suffer from any further equipment related degradation in the image. If you are not sure how to select this, you will need to refer to the manufacturers Operating Manual, or if you are completely stuck, you can always contact *Doktor Jon* for further guidance.
It is important to mention that if the cameras resolution is technically outperforming the monitor being used, then it is safe to assume that what is actually being observed is a minimum achievable image, and that in practice the camera signal (particularly in terms of overall resolution and colour quality) may actually be better than that (as would be visible if it had been displayed on a much higher quality screen).

At the top of the form, you will see an assessment number (1 or 2), which is to indicate whether the form being completed relates to a one off evaluation (e.g. daylight, or normal room lighting situation etc.), or a second survey being carried out under alternative lighting conditions (e.g. nighttime, or indoor with Infra Red etc.).
If the camera is to be tested under differing conditions, you may only need to repeat the Part A assessment, as much of the content of Part B is unlikely to be affected simply by changes in lighting (where actual operating conditions vary enormously, both Parts A + B can be repeated to provide a more detailed comparison).
Before you start, just circle the number to indicate which survey you're doing, write the date and lighting condition on the top as a future reference, and record the number or ident of the camera which relates to the unit being assessed.

IMPORTANT:- If there is more than one camera to be tested, make copies of the form C1 (Parts A + B), and then simply write a unique identifier number on the top of each form, for the individual camera being checked.
The scope of this particular TRUSTED© assessment is designed for general CCTV systems, to indicate relative performance and possible areas for refinement. Even if a high score is achieved, it does not necessarily mean that there isn't room for improvement, or that an alternative set up may not have been more appropriate to the task.
It should be clearly understood that this document is simply designed to measure equipment performance for Incident Monitoring and Evidential Recording. It does not relate to a CCTV systems possible role for Deterrence or Site Management, and as such, does not in any way indicate whether it has been correctly profiled for its original intended purpose.

Where a remote control camera has been evaluated, its eventual score will demonstrate the units imaging capabilities, but likewise will not offer any insight as to whether it is actually the correct tool for the job.
Doktor Jon has provided these evaluation documents in good faith, and does not accept responsibility for the accuracy or suitability for any users individual situation. Likewise no responsibility will be accepted for any consequential loss or disadvantage resulting from their use.

Doktor Jons – 'TRUSTED' © CCTV Camera Assessment - C1(N) Notes

Please read these notes carefully step by step, as you complete the assessment.

Section 1 - PICTURE QUALITY

With regard to the displayed picture, you need to think about the size of your targets (whether they be persons, faces, vehicles or number plates for example). Remember that the key "recognition zone" which you have to define, could be a small area in the picture, or anything up to the entire image itself. When answering each question, take a little while to look carefully at the picture, before reaching a firm conclusion (.... also make sure the monitor screen is clean!).

1.1 - Consider whether the displayed image is sharp overall. If parts are in focus and other areas are not, it may be that the lens has been focussed on the wrong point. If there is a noticeable / constant lack of focus throughout the image, that could be indicative of a number of factors, which are outlined in more detail on the results document C1(R).

1.2 - It's really the "recognition zone" which is most important for a camera to be ©TRUSTED, so consider how agreeable the sharpness is in this vital part of the image.

1.3 - If the monitor is Black and White, then obviously you can ignore this question (it won't affect the overall scores at the end). When considering the accuracy of colour reproduction, both the camera and the monitor can for various reasons significantly shift what we perceive to be the real colour, but suffice to say, if red looks red, and green looks greenish, then that's probably good enough for now. You should also consider whether large white areas have any colour cast.

1.4 - The general appearance of the image is extremely important, so looking at how pleasing the brightness and contrast settings are (once they have been correctly adjusted) can also provide a clear indication as to whether the cameras exposure control system is actually working correctly.

1.5 - Having adjusted the monitor to best effect, indicate how the overall image exposure looks, particularly where there is demanding lighting such as 'back lit' targets, bright light sources in the image, large dark areas etc.

1.6 - Is the image locked and stable or is there for example, any jitter or roll in the picture?

Still on the subject of overall image quality, we need to establish whether there are any significant technical issues that may be affecting the image:-

1.7 - Can you see any noticeable horizontal tearing or break up in the picture, either constant or occasional?

1.8 - 'Noise' which usually appears as an 'all over' sparkling effect, is generally much more obvious in dark images produced under low light conditions. Under normal room lighting, it shouldn't be noticeable, but if it is, this suggests possible problems either with the ambient lighting, the automatic exposure control, or other camera settings.

1.9 - You may notice thin white vertical lines, particularly where there are bright light sources in the picture (for example, the sun or a bright light reflecting off an object). If so indicate the scale of the problem.

1.10 - You may see horizontal dark bars of varying height moving vertically through the image. These are called hum bars and may be indicative of a number of potential problems, usually with the transmission system.

1.11 - An overall faint dark mesh or 'moire' to give it it's proper technical name, can again present as a symptom of a number of different problems. This can either be stable, or possibly even moving very slowly.

1.12 - Exposure related problems come in many forms, for example 'ramping' where the image gets lighter or darker in a regular cyclical way, or gentle 'drifting' when a particularly bright or dark object or area moves through the image.

1.13 - Colour images can become unstable for a number of different reasons, although areas that are lit with a mixture of artificial lighting and daylight, can be most prone, for example indoor areas close to windows. This is usually due to the cameras white balance circuits being unable to cope with sudden or overlapping changes in 'colour temperature'.

1.14 - Where a point of light can enlarge or flare, this can possibly indicate a lens related problem if the flare is static, or perhaps an exposure control issue if the point gradually changes in size.

1.15 - Where there are secondary images or ghosting, this again can be due to a number of factors, although in most cases this is simply due to a simple signal 'termination' problem, or an issue with the transmission system.

Section 2 - TARGET SIZE

This section is all about how big a target appears on the screen. In order to make sense of it, you will need to roughly measure the height and width of your monitor, using a plastic ruler (if it is an LCD flatpanel display, take extra care not to scratch or mark the screen). Where %'s are requested, simply measure the target as requested, then using a calculator, divide it by the height or width of the screen as appropriate, then multiply by 100 - this should give you an approximate percentage in relation to the screens size:-

2.1 - This question relates to a targets maximum size, at the closest point in the recognition zone.

2.2 - This question actually relates to a targets minimum size at the furthest point in the recognition zone.

2.3 - Here we're looking for 'dead areas' of the picture, such as walls or pillars which will prevent the movement of targets, and which in most situations, could potentially be excluded from the image.

2.4 - Again, it is important to consider large horizontal areas which may take up a significant portion of the image, but have no relevance to the imaging of targets. For example, a large area of ceiling along the top of the picture, could be excluded by tilting the camera down slightly to take in more floor area, or it could be used as a convenient 'parking' space for any time or date captions being displayed.

2.5 - In this question, we are looking for any obviously intrusive fixtures (e.g. shop displays, filing cabinets etc.) which may inadvertently reduce or obscure any opportunities for clearly identifying targets.

Section 3 - TARGET PRESENTATION

The previous sections related to picture quality and the size of a target on screen, but the next set of questions relates to how a target is positioned in view of the camera. For a target to be clearly identifiable on screen, it ideally needs to present to the camera within a certain angle, and the camera itself has to be ideally located, and not simply fixed in the easiest or most convenient position.

3.1 - A CCTV expert can usually visualize what size of area a camera is covering, with just three pieces of information; the lens focal length, the size of the camera's imager, and the height of the camera. Without this information, the next best thing for the purposes of this evaluation, is if you can estimate by looking at the screen, whether you think the picture is covering an ultra wide area, a very narrow cone, or something in between ("Standard" lens coverage is normally taken to be about the same as the human eye).

3.2 - If you can imagine a point on the ground / floor just below the camera, and then measure the rough distance (pref. in metres) to the nearest point of the recognition zone, this will help to assess the technical demand on the camera.

3.3 - Now, if you imagine a person walking straight towards a camera, that would represent a "Direction of Travel" angle of 0 degrees. If they were walking left to right across the front of the camera, that would be 90 degrees. Try and estimate as accurately as possible, at what angle targets move in relation to the camera (see diagram A below).

3.4 - For this question, you need to try and estimate at what angle the camera points downwards (see diagram B below).

3.5 - Here we need to establish whether targets normally move in a straight line (for example cars on the road), or whether they generally move around randomly within a larger space (e.g. commuters on a railway station concourse).

3.6 - Indicate roughly at what angle a target moves (direction) in relation to the cameras fixed position. If multiple targets move completely at random within the recognition zone, then select 45 degrees as your answer.
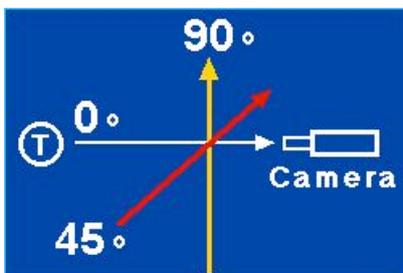

Diagram A. (left)
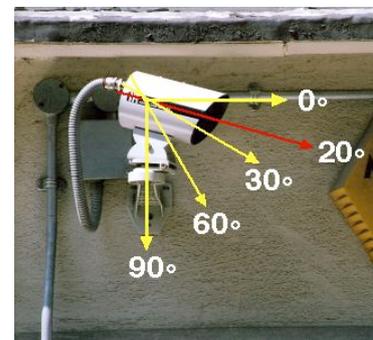**Target (T)**
'Direction of Travel'

Diagram B. (right)
Camera
'Angle of Tilt'

Section 4 - TARGET DURATION

In the final section of this evaluation, we have to consider that even if the picture quality is outstanding, and targets are presented perfectly, it's absolutely vital that there are enough images available for recording, so here we have to estimate how long a target will remain in the recognition zone.

4.1 - The first point to consider is the relative speed of the targets within the recognition zone. Are they moving through at high speed (for example vehicle number plates on a motorway), or are they relatively static in the image (e.g. guests checking in at a hotel reception desk).

4.2 - Although speed of movement is the main factor which dictates whether a target becomes blurred in the image, there are other less obvious reasons. Try and estimate to what degree the targets are specifically blurred by movement, rather than just simply out of focus.

4.3 - You need to try and estimate on average how long a target may be present in the recognition zone, so it could be anything from 1 second for a fast moving car, up to perhaps 3 or 4 minutes for our guest check-in example.

4.4 - Although a target may be present 'in the zone' for many seconds or even minutes, it doesn't necessarily follow that they are correctly presented to the camera. So for example, if someone is standing (for one minute) at a door entrance with their back to the camera, then they quickly turn to walk through the door in less than three seconds, you would need to indicate three seconds as the answer to this point.

COMMENTS

-
-
-
-
-
-
-
-
-
-
-
-

When you've completed the form C1, the results can be interpreted using the accompanying document C1(R) to produce an assessment score. If the camera is used under wildly varying lighting conditions, the survey should be carried out at least twice at differing light levels (e.g. brightest and darkest ambient lighting), using supplementary Form C1 Part A. There is a separate page at the end of the score sheet, which can be used to record the main "Areas of Concern", any "Action Required" and all additional "Comments".
If there are a number of CCTV cameras in the system, the overall scores for each unit can eventually be transfered on to document SR1 (available on request) for a more detailed analysis.

If you need any further information or wish to comment , or offer any feedback and suggestions to help future development of the 'TRUSTED'© project, please contact *Doktor Jon* **- email to:- info@doktorjon.co.uk**
Alternatively, you can discuss TRUSTED© on Doktor Jons Forum - http://www.doktorjonsforum.co.uk

PLEASE NOTE: This particular TRUSTED© assessment is designed for general CCTV systems, and is not really intended for large systems or technically complex installations like Town Centre camera schemes. The camera assessment should be carried out under all operating conditions that are appropriate (e.g. day only - use one C1 form per camera; for day and night coverage - use two separate C1 forms).It should be realized that this is designed to provide a reasonable indication of CCTV Camera performance for Incident Monitoring and Evidential Recording only; although it does not specifically take account of Site Management or Deterrence roles.