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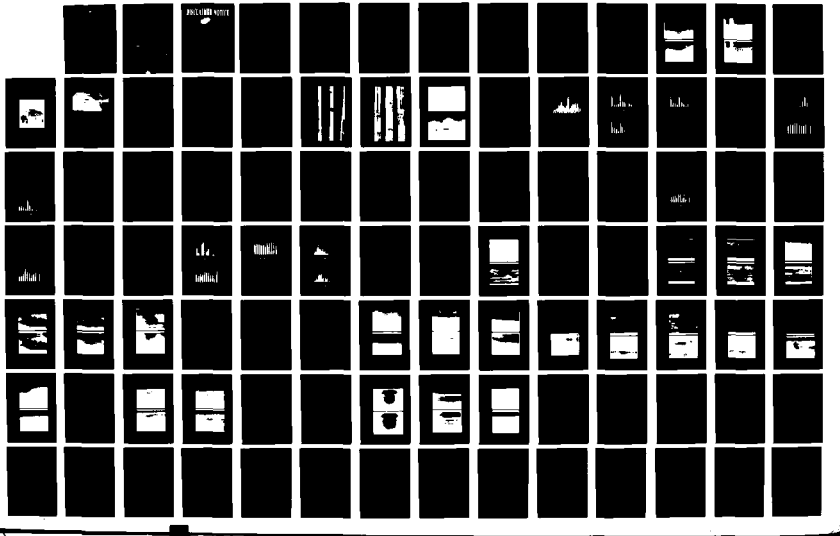

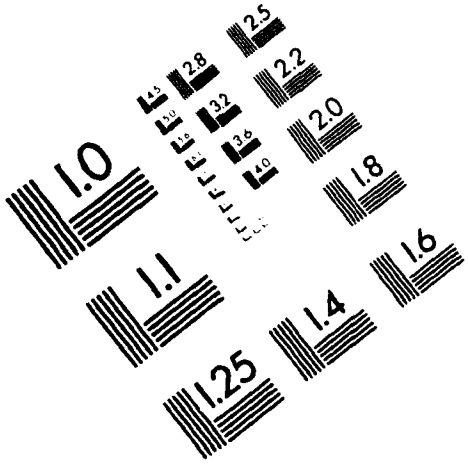

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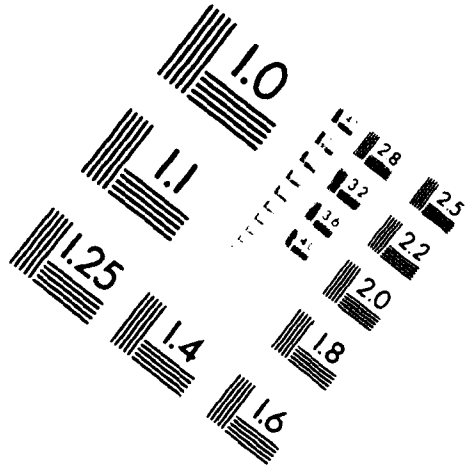

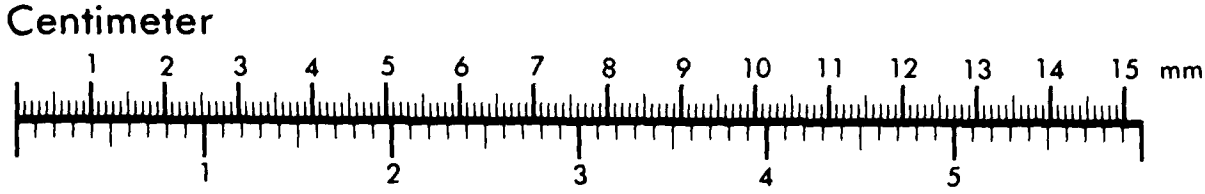

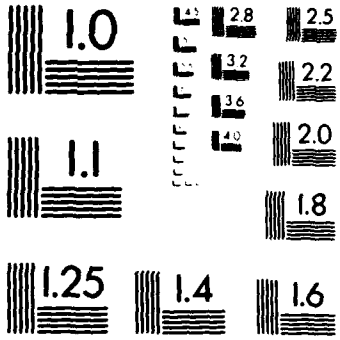

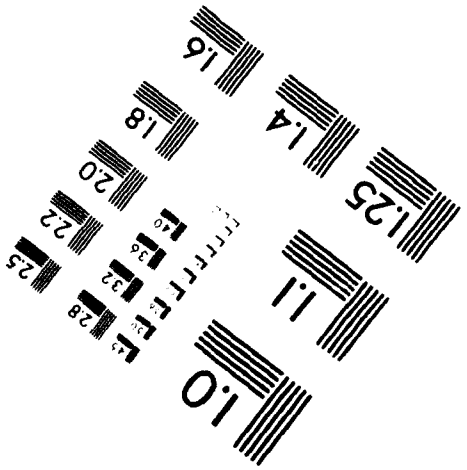

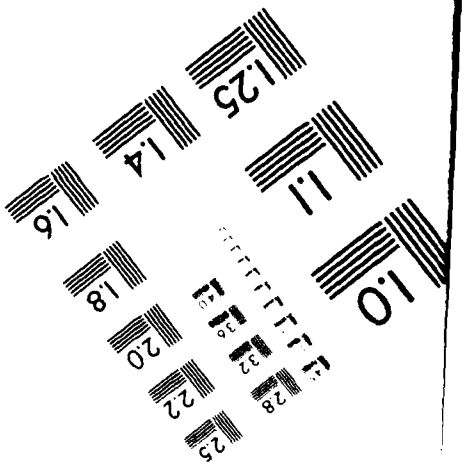

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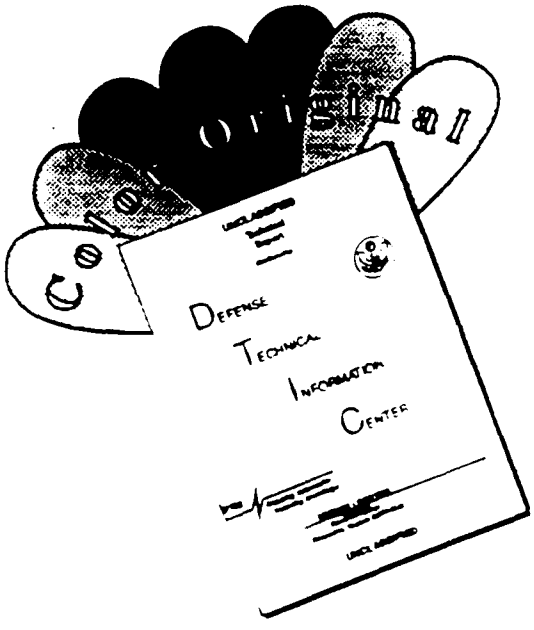

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author(s)	:	J.A. Boden, M. Deutekom, M.J. Wilmink
institute	:	TNO Physics and Electronics Laboratory
date	:	April 1993
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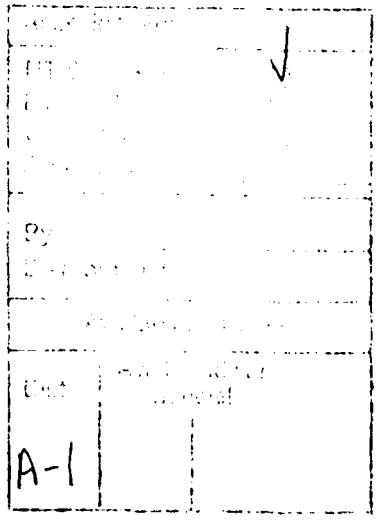
Research supervised by	:	J.A. Boden
Research carried out by	:	J.A. Boden, M. Deutekom, M.J. Wilmink

ABSTRACT (ONGERUBRICEERD)

A survey is presented of the 'still video' pictures that have been recorded with 3 CCD-cameras during the BEST-TWO trial in Mourmelon, France.
The composition of, and selection for two databases is described and the results of processing with the FEL-image processing algorithm are given. A statistical analysis of these processing results is carried out and described. For each scenarios, one or more examples of processed images are given.



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SAMENVATTING (*ONGERUBRICEERD*)

Een overzicht wordt gegeven van de 'still video' beelden, welke gedurende de BEST-TWO trial in Mourmelon, Frankrijk, opgenomen zijn met 3 CCD-camera's. De samenstelling van, en de selecties voor twee databases worden beschreven. Resultaten van de bewerking met het FEL-beeldbewerkings algorithme worden gegeven. Een statistische analyse van deze resultaten is uitgevoerd en beschreven. Een of meer voorbeelden van bewerking worden voor elk van de scenarios gegeven.

CONTENTS

1 INTRODUCTION

On a TV-monitor not more than about 30 different grey levels can be made perceivable within one picture. Simple state of the art cameras can record more information. In large dynamic range scenery high performance cameras can be necessary to resolve small contrasts due to the recording of quite different brightness regions. Small contrasts may be caused also by atmospheric haze and fog or by dust and smoke e.g. under battle field conditions.

Image processing is always necessary to bring the recorded information within the perception domain of the monitor.

Well-known histogram modification techniques can render improved image quality perception but its effectiveness also often depends on the composition of the scene. Sometimes it can even render worse quality in local parts of the image.

At TNO-FEL, The Netherlands an image processing algorithm has been developed that, independent of its local brightness, enhances the contrasts in any part of the image [1].

With a high performance camera (12-bit), developed at the TNO-FEL, a data-base of 'still' pictures taken under various atmospheric conditions has been used for evaluation of the mentioned image processing algorithm.

It was shown that all the recorded information could be made perceivable.

Under conditions of haze and fog it resulted in a significantly extended visual range and at clear weather at least in a more clear and comfortable vision.

In chapter 2 a short description will be given of the potentials of the algorithm with 2 examples.

TNO-FEL has participated in the Best-Two trial at Mourmelon with a PC-controlled camera setup with 3 CCD-cameras, to evaluate the contrast improvement as function of various battle field conditions. Improved camera performance and dedicated image processing generally results in an extended visual range.

This measuring setup will be shortly described and discussed in chapter 3 and the pictures taken with this setup in Mourmelon will be discussed in chapter 4.

Processing results will be discussed in chapter 5, for each scenario some examples will be given in chapter 6.

It is now clear that often the contrast loss due to dust and smoke is so complete that processing often does not yield new information within the perception domain. Then the contained information is yet more clearly presented after processing.

Within 10 to 20 seconds the transmission of the dust or smoke clouds is often considerably improved and new information can be made perceivably after processing.

2 POTENTIALS OF THE DEDICATED IMAGE PROCESSING

The dedicated image processing (FEL-) algorithm is based on dynamic range transformation with local, adaptive contrast enhancement [1].

The range transformation depends on the recorded luminance range in the scenery, which must be mapped on the optimum range of the monitor. This mapping usually implies a compression of range, which is accompanied by loss of contrast. A local adaptive contrast enhancement is simultaneously carried out by using local statistics. The calculations are carried out in the logarithmic domain. They result in a contrast enhancement independent of the local brightness; dark and light regions are treated in the same way. The contrast enhancement is realized by multiplying the local contrast difference by an adaptive constant, which on its turn is calculated from the local variance. The local contrast difference is calculated by a moving average filter; the size of the filter can be chosen by the operator; in far most of the cases a 3x3 size will suffice.

All the recorded information can be made perceivable without rendering artefacts and with preserving a natural appearance of the recorded scene. An example is given in fig.2.1 concerning a city view taken from the laboratory tower during a dense fog. At the top is the original 12-bit picture (before processing), at the bottom the same picture after processing. The visibility varied from 1 to about 4 km with a layer of more dense fog just beyond the horizon.

Obvious the processing results in an extended visual range and in a more comfortable image. In this example the processing result benefited to a considerable extent from the dynamic range transformation due to the limited grey level range in the original picture. This limited range is due to the luminance bias, which is caused by scattering of light at the fog particles.

Another example is given in fig.2.2, concerning now a picture taken during clear weather from the inner court of the laboratory. On top, again, the original 12-bit picture (before processing) is shown, at the bottom the same picture after processing. The full grey level range from black to white is already present in the original picture, the range transformation will not be helpfull now. Nevertheless, also in this case more information becomes perceivable after processing, especially from within the rooms. This result is mainly due to the local contrast enhancement.

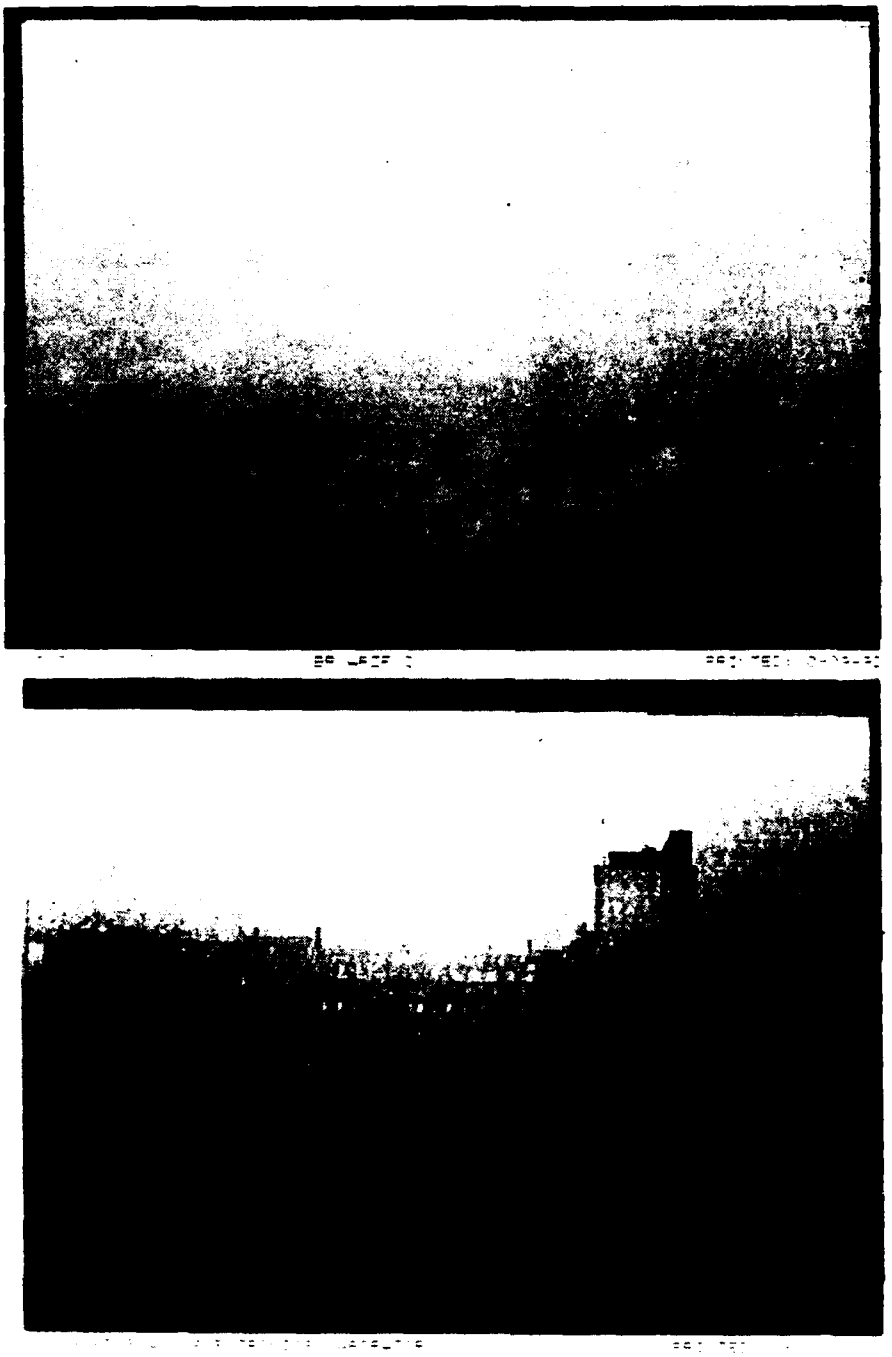

Figure 2.1: City view, visibility 1 to 4 Km.
Top: before processing, bottom: after processing.

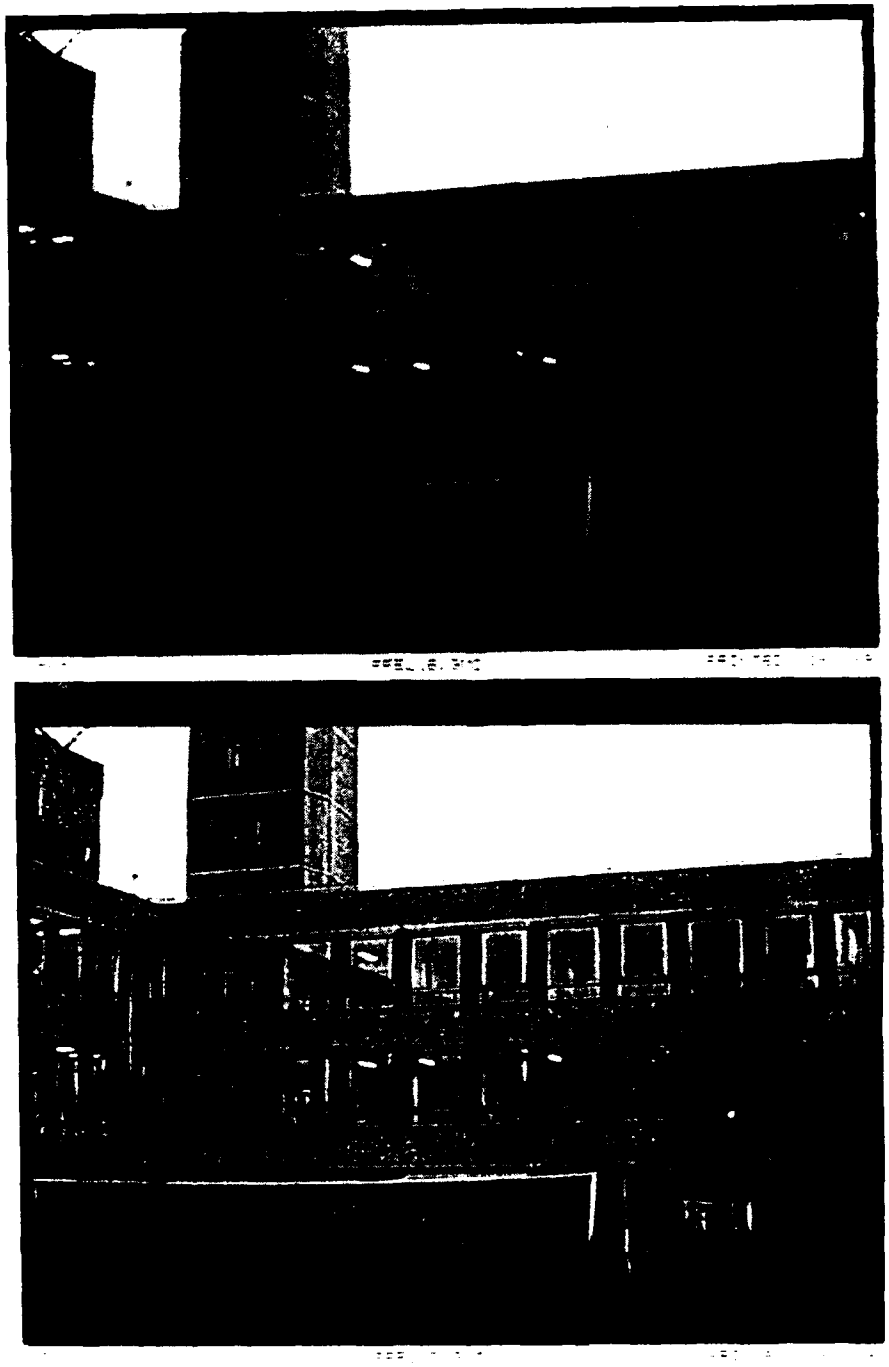

Figure 2.2: Inner court of the laboratory at clear weather.
Top: before processing, bottom: after processing.

3 MEASURING SETUP

3.1 Instrumentation

For field measurements a PC-controlled setup has been developed that can control up to four 8-bit cameras and one 12-bit camera. An advanced framegrabber board of Imaging Technology Inc. (VS-100 AT) has been used as the data acquisition board.

Analog video data of the 8-bit cameras are fed directly into the framegrabber board and converted to 8-bit 512x512 digital images.

Digital data of the 12-bit camera are directly fed into the 12-bit digital input port of the framegrabber. The video-output of each CCD-pixel of the TNO-FEL camera is separately filtered according a Correlated Double Sample technique and 12-bit AD converted. The image size therefore corresponds with the number of sensor pixels (384 per line), rather than with the sensor dimensions. The prints of the camera pictures given in this report are made by a video copy processor and give the correct image size. The necessary geometrical correction to generate a correct image size has been carried out by pixel replication, such that along every image line the number of image pixels is extended from 384 to 512. Image storage was on a WORM optical storage medium.

The platform in Mourmelon contained 3 CCD-cameras:

1 a 12-bit daylight system

2 a 8-bit daylight system

3 a 8-bit gated Image Intensified CCD system for day and night

Specifications of these cameras are given in table 3.1.

A photograph of the camera setup is given in fig.3.1.

On top are the 3 CCD-cameras, the white box just below contains the analog electronic circuits for controlling the 12-bit camera.

The most important circuits are:

- the drivers and receivers for the readout electronics
- drift compensation circuits
- correlated double sampling circuits
- 12-bit AD conversion

Digital data are transmitted via a junction box to the framegrabber board in the PC-Vectra computer. Analog video of the 8-bit CCD-cameras is transmitted directly to one of the analog inputs of the framegrabber board.
A photograph of the complete setup under canvas during the battlefield trial is given in fig.3.2.

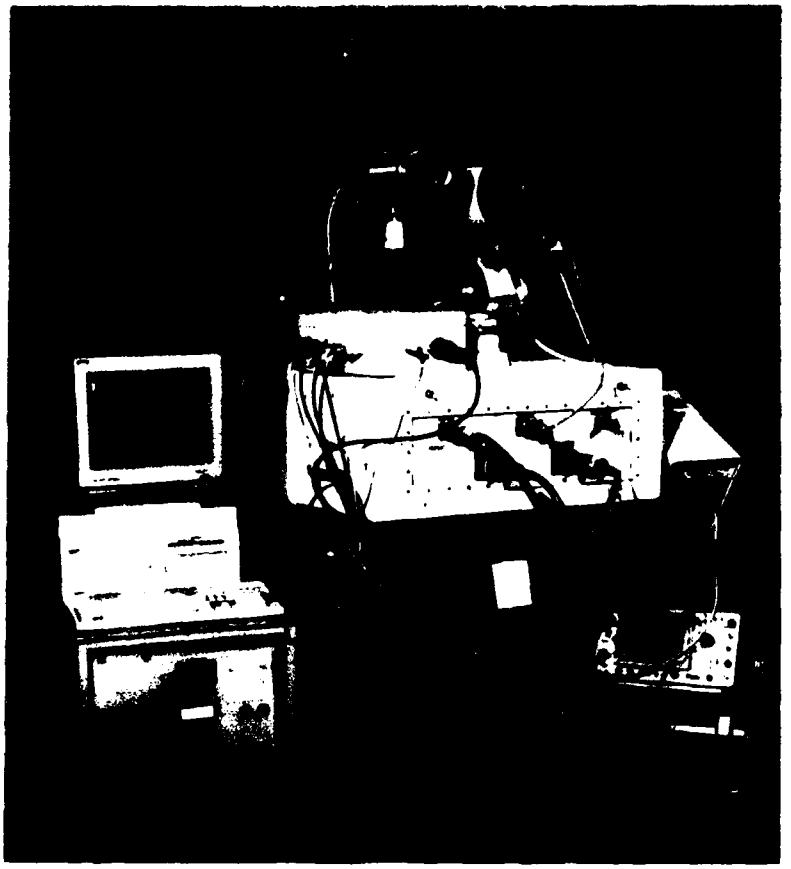

Figure 3.1: PC-controlled camera setup with on top from left to right: 8-bit image intensified camera for day and night, a 12-bit and a 8-bit daylight camera.

Figure 3.2: Experimental setup under canvas at the Mourmelon site.

3.1.1 12-bit daylight camera

The provisions for achieving a 12-bit performance have been:

a slow read-out of the sensor.

b cooling the sensor down to -30 °Celsius by means of a two-stage Peltier cooler

c correlated double sample of pixel video

d sophisticated drift compensation

The camera head is a modular double-walled (air-filled) chamber to prevent condensation on the chip, which with the Peltier elements is mounted in the inner compartment.

The black box with ribbons on top of the setup in fig.3.1 is the heat-sink for the Peltier cooler. The large dimensions have been chosen to prevent forced cooling.

Despite the high ambient temperatures of 40 °C or more during the Mourmelon trial, the sensor temperature of -30 °C could easily be maintained. However, due to a several extra power consuming PC-boards, a reliable operation of the controlling PC-computer could be guarantied only up to ambient temperatures of about 25 °C. During the trial therefore the computer was put

in a modified refrigerator and kept on a temperature of about 15-20 °C. Also the optical storage medium was put in the refrigerator, but more because of precautions against dust pollution. Throughout the trial this resulted in a faultless operation of the instrumentation.

Table 3.1: Specifications of the used CCD-cameras.

camera	12-bit daylight	8-bit daylight	8-bit low light level
CCD-sensor			
type	interline	frame transf.	frame transf.
HxV pixels	380x488	604x588	604x588
HxV dimensions	11x8.4 mm	6x4.5 mm	6x4.5 mm
Image Intensifier			
type			2-stage hybrid
1st stage			2nd gen.18mm
2nd stage			1st gen.18/7
gain			105 Cd/m2/lux
E.B.I			0.18 microlux
gating			200nsec-inf.
on/off ratio			106
Dynamic Range (intrascene)	4000	200	<200
gain control	fixed	optional	ccd optional II fixed
camera head	Peltier cooled -30 °C		

3.2 Measuring location

Description of the instrumentation areas during the Mourmelon trial can be found in several 'best-two' reports and in the best-two test plan as well [2]. A schematic layout of the test site is given in fig.3.3.

The CCD-camera setup was at the field instrumentation area (FIA) and is indicated in fig.3.3 by point 'B', which was about 100 m to the north of the setup of the TNO-FEL infrared group, which is indicated by point 'A' (see also de Jong [3]).

This location for the CCD-cameras has been chosen because of:

a the shorter distances to the passing vehicles (1-1.5 Km instead of 4 to 1 Km)

b transmission measurements in various wavelength regions from the same location

c the presence of several contrast targets within the FOV of the cameras.

For a more detailed illustration of the FIA with its relevant facilities see, for instance de Jong [3].
A photographic survey of the site, as seen from the Field Instrumentation Area, is shown by the photographs in figs 3.4A and 3.4B. In the panorama view of figs.3.4A and 3.4B the site is pictured from the North to the South from top right to bottom left (that is according block 11, 12,...21, 22 etc. in fig.3.4A down to block 64 in fig.3.4B). The Main Instrumentation Area was located in the South, but could not be perceived from the FIA.
A photograph of a part of the site with some contrast boards (according to block 42 in fig.3.4B) is given in fig.3.5. Most of the pictures given in this report cover a large part or whole of the scene given in this photograph. The fields of view of the 8- and 12-bit cameras are mostly not the same, because the different sensor dimensions have not been fully compensated by the applied focal length of the lens.
A detail of the most often occurring scenes with the contrast boards appears in fig.3.6 with at the right a concrete bunker and at the left the contrast boards with calibrated grey levels and boards with different elevation angles, each with two different surface structures [3].
The distance between these boards and the camera setup was about 1000 m.

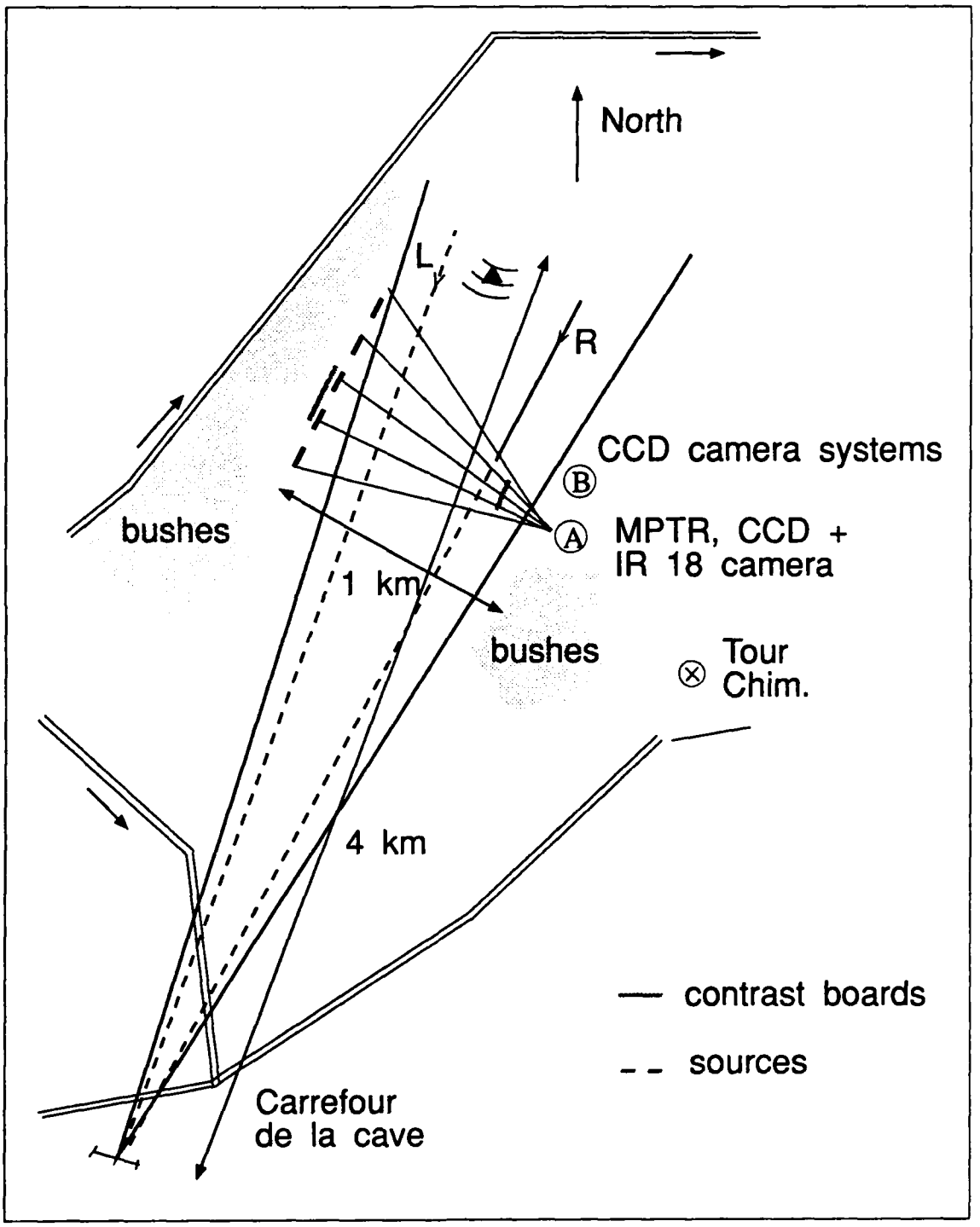

Figure 3.3: Schematic layout of the Mourmelon site with the F(ield) I(nstrumentation) A(rea) around the points A and B. The CCD-camera setup was located at point B.

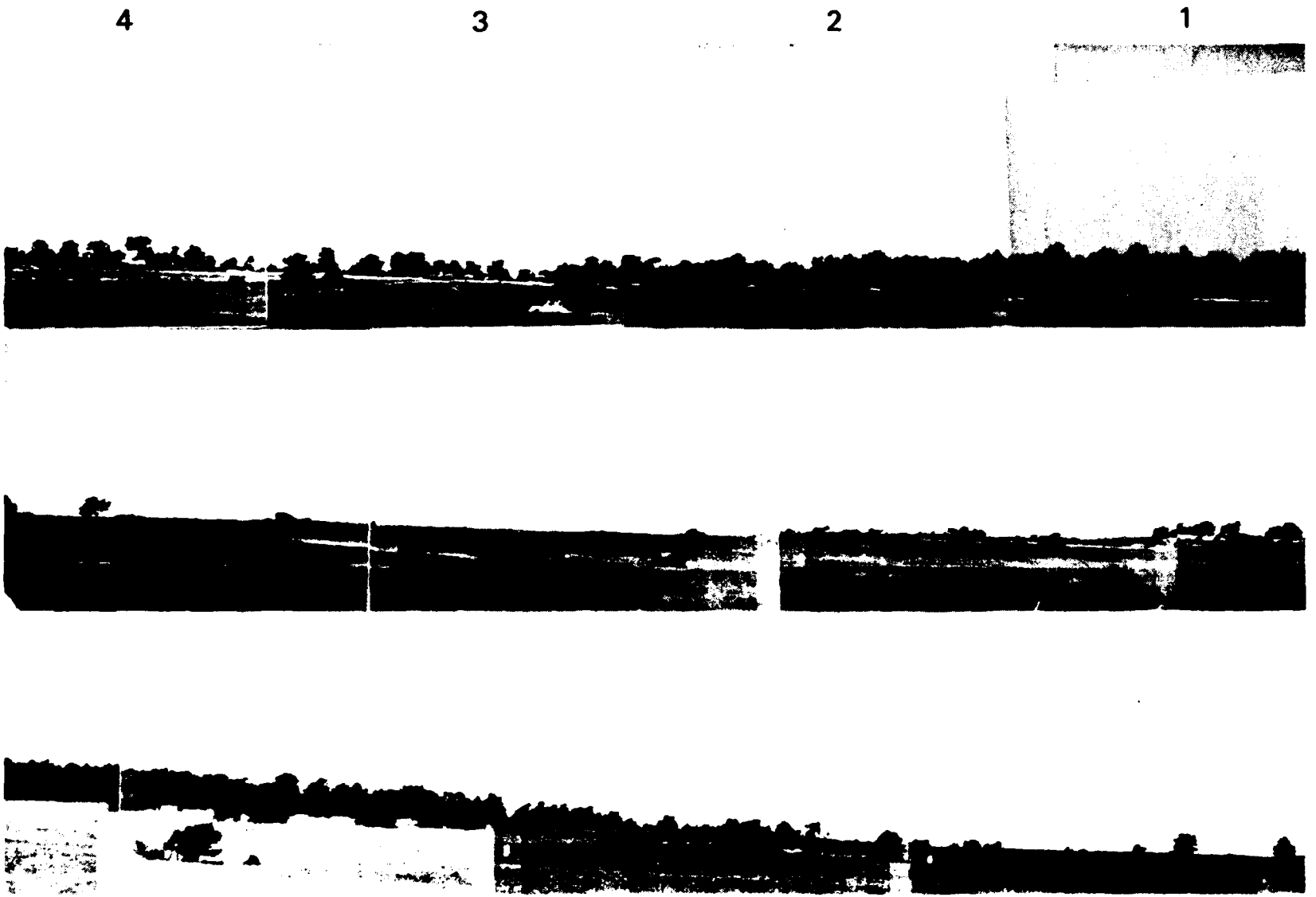

Figure 3.4A: Northern part of a panorama view of the Mourmelon site, viewed at the Field Instrumentation Area from the North (top right) to the South (bottom left).

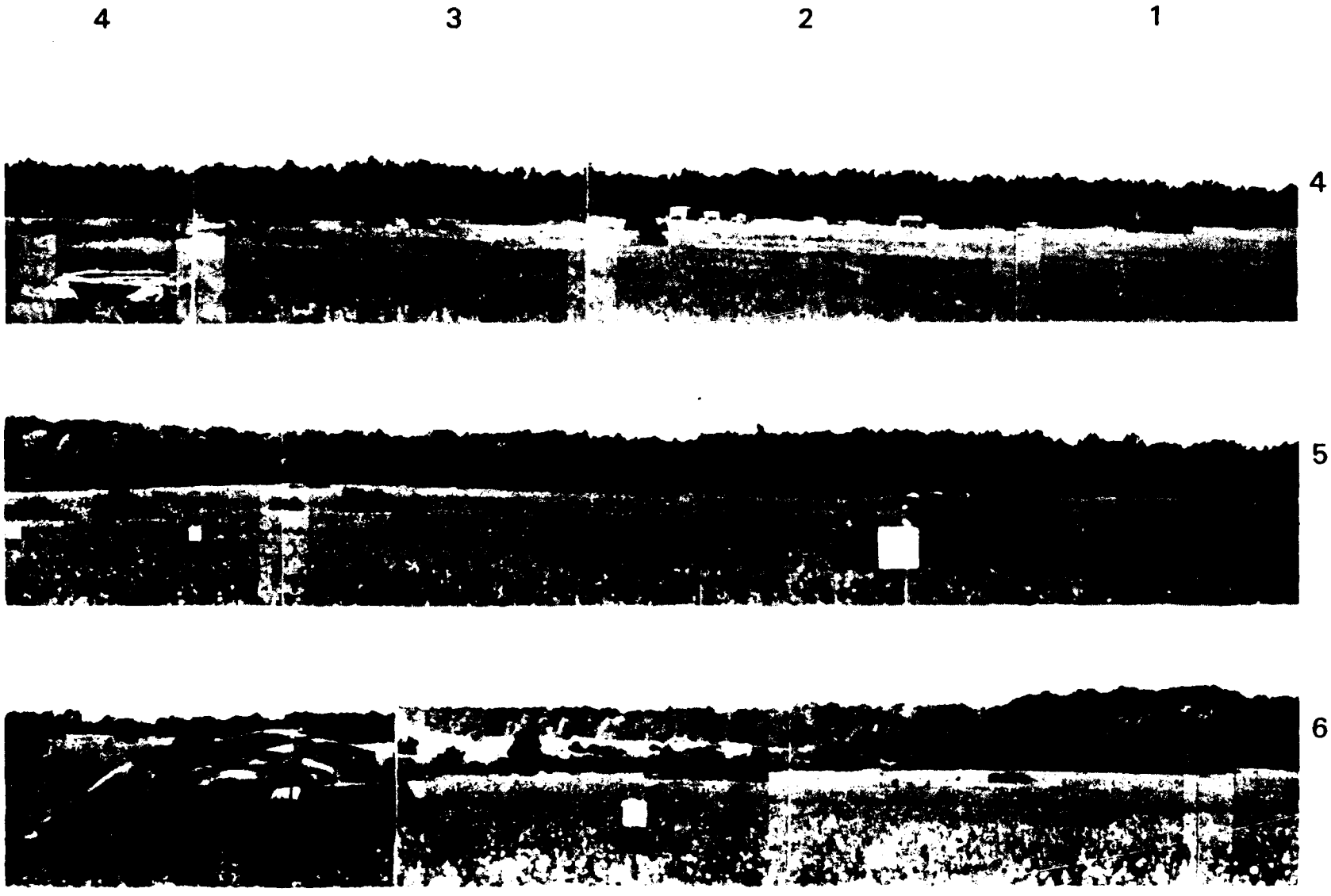

Figure 3.4B: Southern part of a panorama view of the Mourmelon site, viewed at the Field Instrumentation Area from the North (top right) to the South (bottom left).

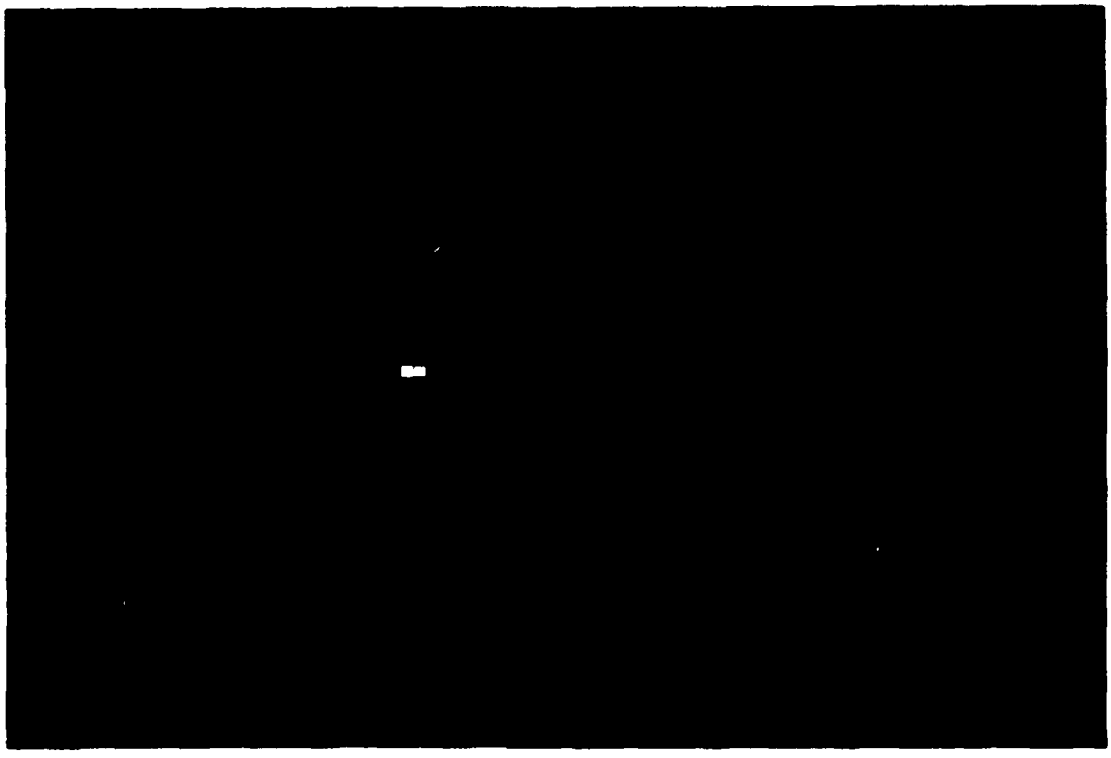

Figure 3.5: Photograph of part of the site, that is pictured in most of the recorded images.

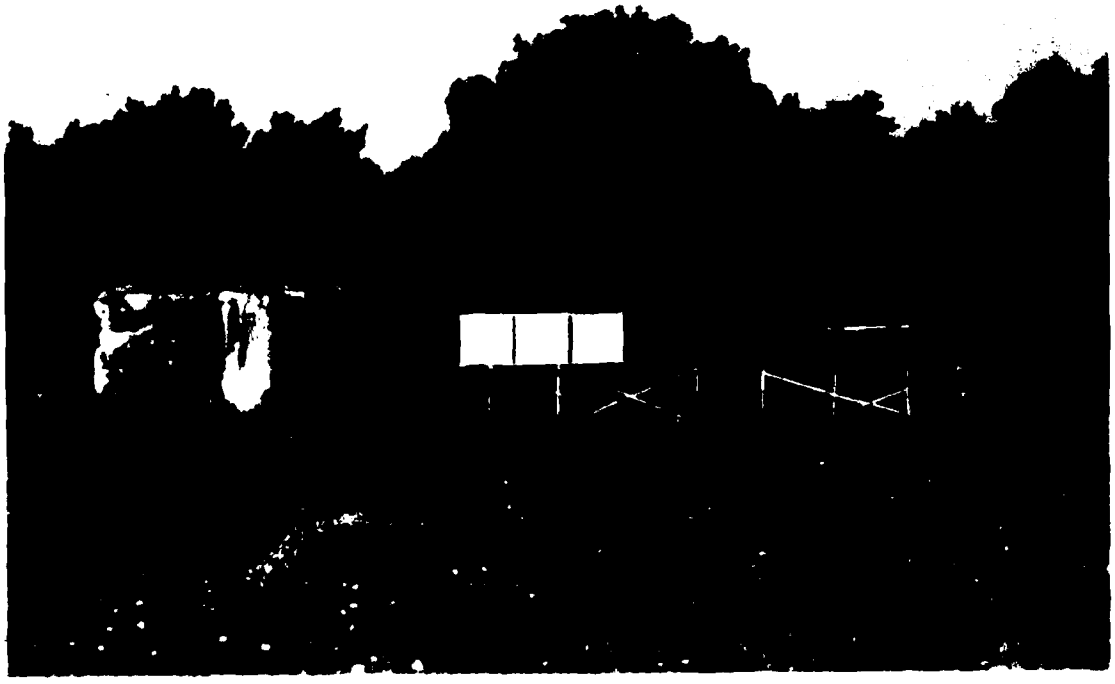

Figure 3.6: Contrast boards from left to right: white(1.0), light grey(0.8), dark grey(0.52), black(0.0), army green(0.3) and 2 boards each with glossy and rough surface, respectively at elevation angles of 90, 60, and 30 degrees; to the left a concrete bunker.

4 IMAGE DATABASE

4.1 Image distributions

Nearly 900 still video pictures have been recorded during the BEST-TWO trial with the three cameras together. A complete survey of all the recordings is given, in chronological order per day, in the bar diagram of fig.4.1., by separate bars for each of the three cameras. Special pictures, taken during periods not belonging to the regular sessions, are included. Each day two or three sessions took place, each with one scenario according the Best-Two test plan [2]. The same scenario might occur in different sessions. A short description of each session is given in Appendix A. In this description the number and the type of vehicles are given with their speed, formation and run time. Also the number of the recorded 8-bit daylight and 12-bit daylight camera images is given with the period within the sessions, during which the images have been recorded. Finally the number of processed images and the selected number of images for the US database and the number for the final TNO database is given for each session. See for a description of the sessions also [2,3,4].

A survey is given of all the recorded images for each of the separate scenario's in the bar diagrams of fig.4.2 for the 8-bit daylight camera images and in fig.4.3 for the 12-bit daylight camera images (the test week is included when applicable). In both diagrams the dark bars give the total number of recorded images and the light bars give the number of images selected for the US database for each of the given scenario's.

The selections are based on the estimated interest of the images, which is defined by a P(icture) IN(terest) code. This PIN code and the various used selection criteria will shortly be described in the next paragraph 4.2 and more extensively in the Appendix B. From fig.4.3 it is apparent that for scenarios 3B and 4A only few 12-bit pictures have been selected for the US database. This is due to the many low quality pictures, as will be explained in paragraph 4.4.3.

A complete list of the final selection for the TNO-FEL database is given in Appendix C. In this final TNO database only the complete failures have been omitted; all the images selected for the US database and all the processed images are included in the final database.

Many recording conditions, parameters and properties of the images are given in this list of recordings. A full description will be given in Appendix C and a short description in paragraph 4.3.

A survey of the 8-bit daylight and the 12-bit daylight images in this final database is given for each scenario by a bar diagram in fig.4.4.; the dark bars give the 8-bit and the light bars give the 12-bit pictures.

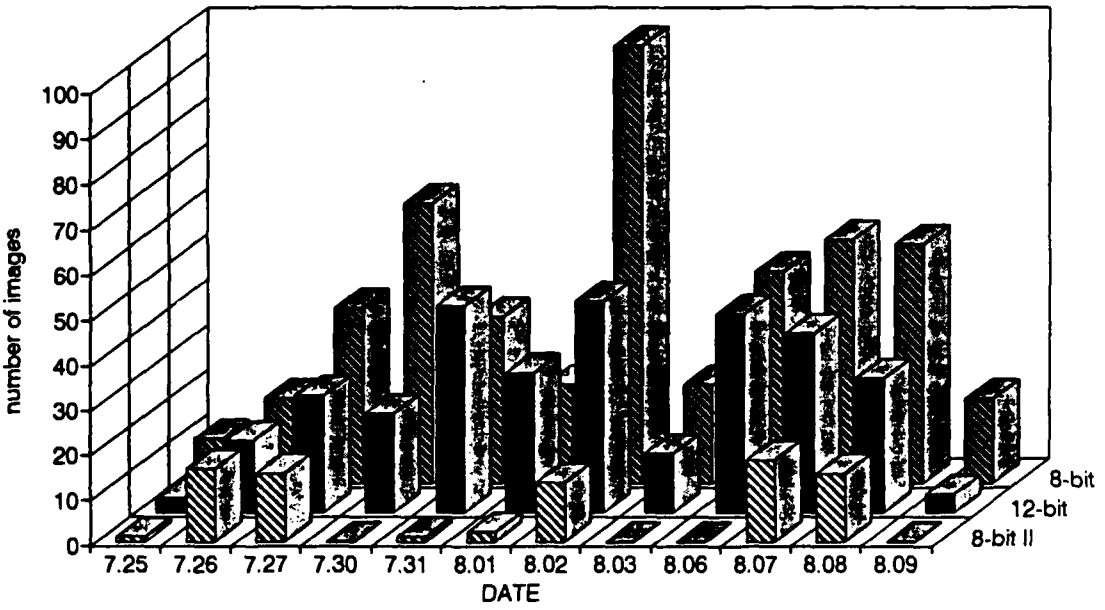

Figure 4.1: Survey of all pictures in chronological order per day.

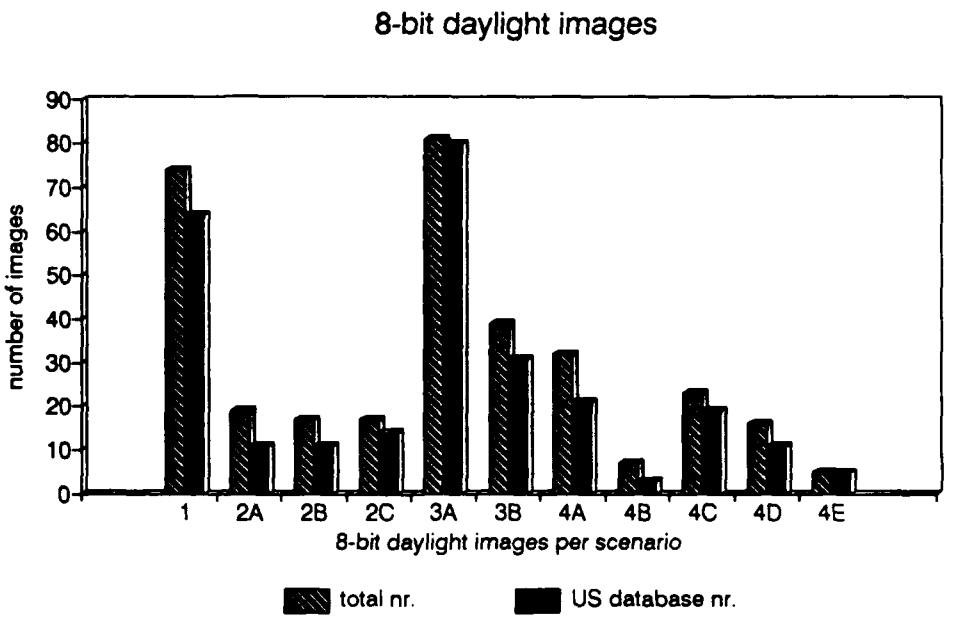

Figure 4.2: Survey of 8-bit daylight pictures per scenario; the light bars give the total number of pictures and the dark bars give the selection in the U.S. database.

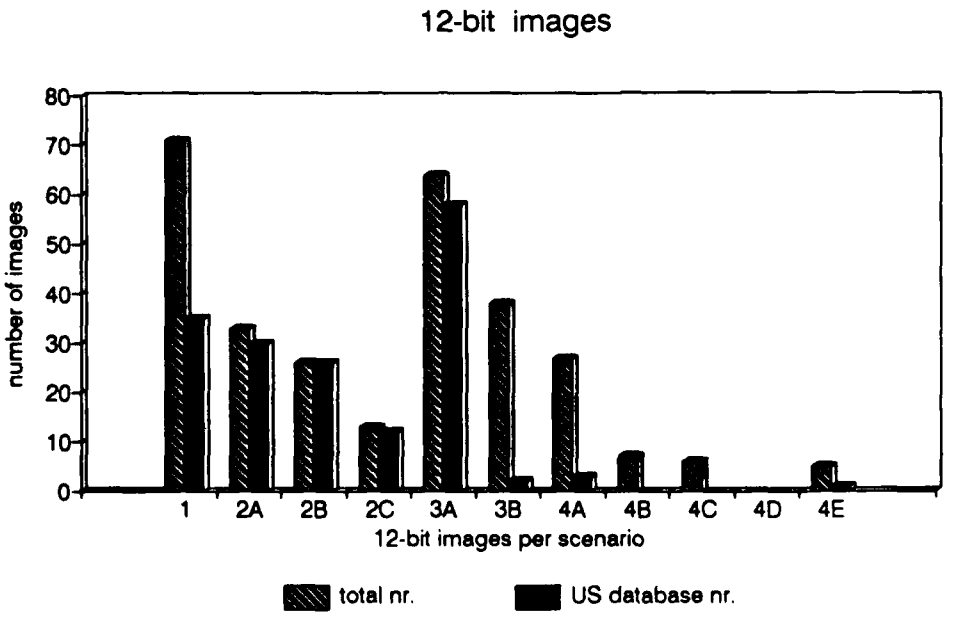

Figure 4.3: Survey of 12-bit daylight pictures per scenario; the light bars give the total number of pictures and the dark bars give the selection in the U.S. database.

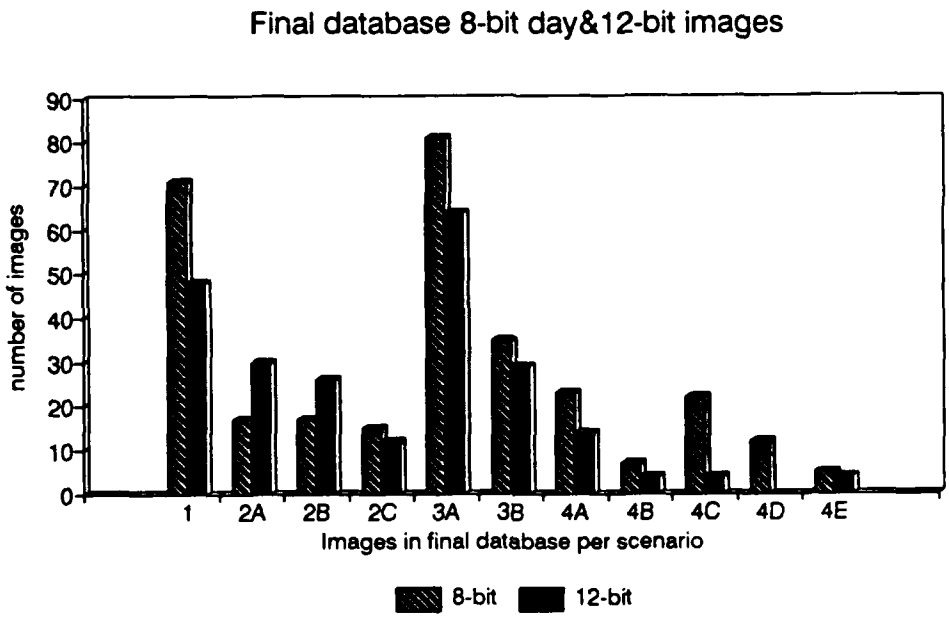

Figure 4.4: Survey of 8-bit and 12-bit daylight pictures per scenario in the final TNO database; the light bars give the 8-bit daylight pictures and the dark bars the 12-bit pictures.

4.2 Picture Interest

A picture interest code has been assigned to all the image files. This PIN code has been determined by an arrangement of two or three observers. The code is expressed with respect to the significance of the original (unprocessed) images. The most important criteria have been the effect of processing to be expected and the presence of interesting battle field effects or a unique occurrence of the picture. This significance of the picture is given by the second digit of the PIN-code or by a single digit if no second digit is given. The first digit in a 2-digit PIN code number refers to a special class of images, such as dark pictures, condensed or iced pictures or pictures with no relation with any of the regular scenario's. A picture not belonging to any special class gets assigned a single digit PIN-code number.

A full description of the picture significance-criteria and the special classes will be given in Appendix B (paragraph B.1).

A picture with an excellent photographic quality can be of no interest with respect to the mentioned criteria and will get then a value five as the relevant digit in the PIN-code number. Lower valued PIN-code numbers refer to uninteresting pictures, which have also some bad quality aspects. PIN-code numbers higher valued than five refer to pictures with some interest,

which can have, however, also bad (photographic) quality aspects. In fact, the most interesting pictures with respect to the expected image processing effect will show, in most cases, far from good photographic quality (before processing).

A survey of the assigned PIN-code number distribution for the 8-bit and 12-bit daylight pictures is given in fig.4.5. The dark bars represent the number of 8-bit and the light bars the number of 12-bit pictures for each of the PIN code numbers. The distributions are retrieved from the complete database.

The significance-value of the 8-bit images is peaking around the value 6; the 12-bit pictures are expected to be slightly more interesting as their interest is peaking around the value 7.

The mean significance-value of the pictures per scenario is given in fig.4.6. The dark bars for the 8-bit and the light bars for the 12-bit pictures. Also, here the complete database has been considered. The scenario's 2C, 3A and 3B are expected to be most interesting, which will be confirmed by the image processing results in the corresponding paragraphs.

This PIN-code has been used to select, for transmission to the US data base, a limited set of relevant data. They have been used for defining priorities with respect to the images to be processed and for composing a definite list of qualified recordings.

A full description of the selection criteria used for the various purposes is given in Appendix B, paragraph B.2.

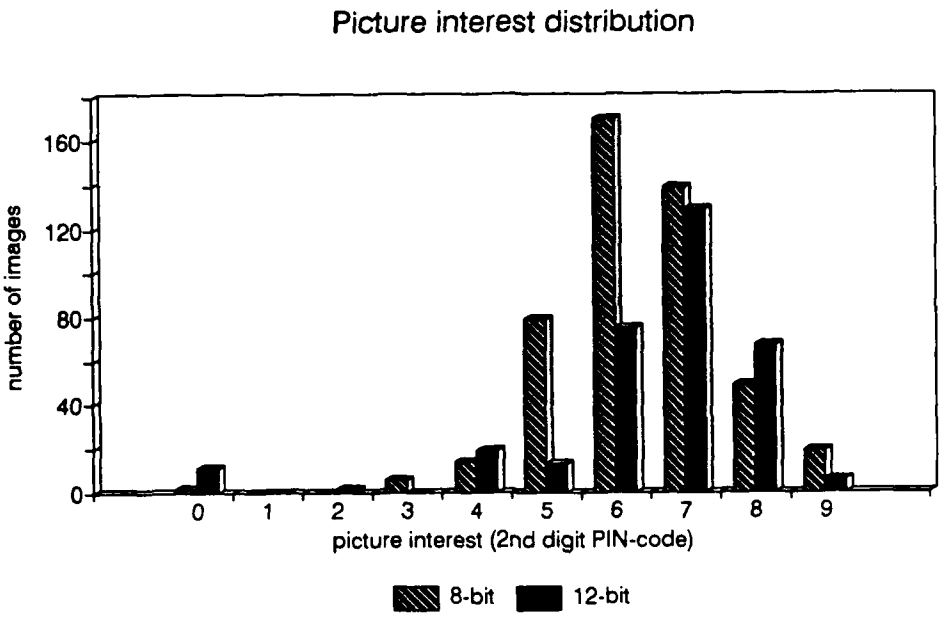

Figure 4.5: PIN-code number distribution for the 8-bit daylight (light bars) and the 12-bit pictures (dark bars).

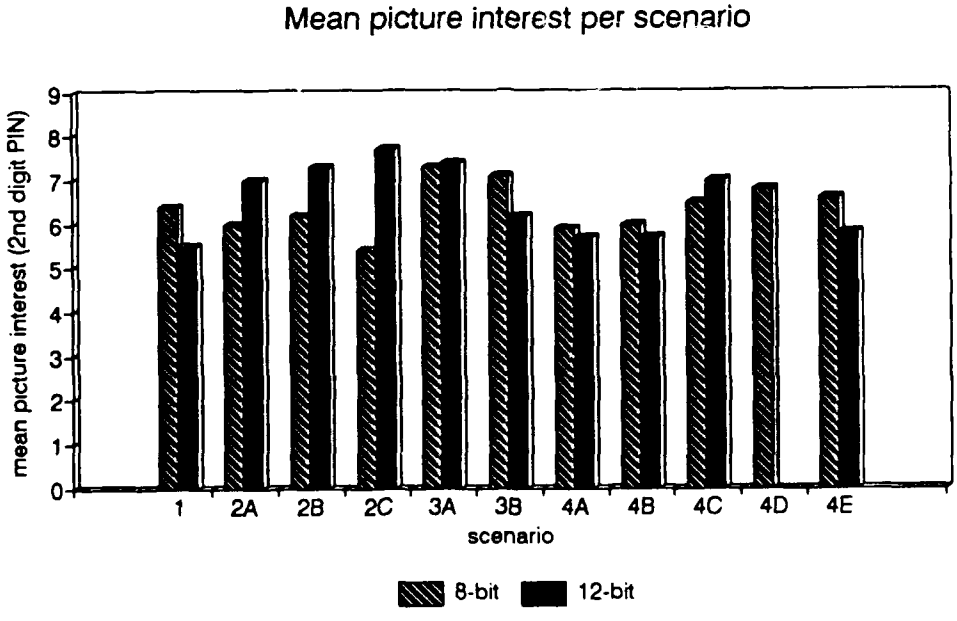

Figure 4.6: Survey of the mean value of the PIN-code number per scenario for the 8-bit daylight (light bars) and the 12-bit pictures (dark bars).

The selection criteria are different for the various classes. All images with a single digit PIN-code (most of the regular images and not belonging to any special class) with a value 6 and higher have been selected for the US-database and with a value 5 and higher for the final database. For the special classes the criteria for selection have been chosen somewhat higher (see Appendix B, paragraph B.2). All the images recorded during the regular scenarios and having a PIN-code number value of 7, 8 and 9 have been processed.

Sometimes pictures with lower valued PIN-code numbers have been processed in order to complete a succeeding sequence of interesting pictures.

This might be important for studying the effect of processing as function of the time lapse after generation of peculiar obscurants. A complete survey of the processed images per scenario is given in fig.4.7; the light bars give the number of 8-bit daylight pictures per scenario and the dark bars give the number of 12-bit processed images. The processed images with PIN-code number lower than 7 have been included in fig.4.7. Nevertheless, figure 4.7 also gives a rather good representation of the distribution of the PIN-code numbers 7 to 9 for each scenario. All the processed images are included in the final listing of recordings in Appendix C and also in the final database, of which the distribution per scenario is given in fig.4.4.

A chronological listing of the recordings in the final database is given in Appendix C with relevant comments and is shortly described in the next paragraph 4.3.

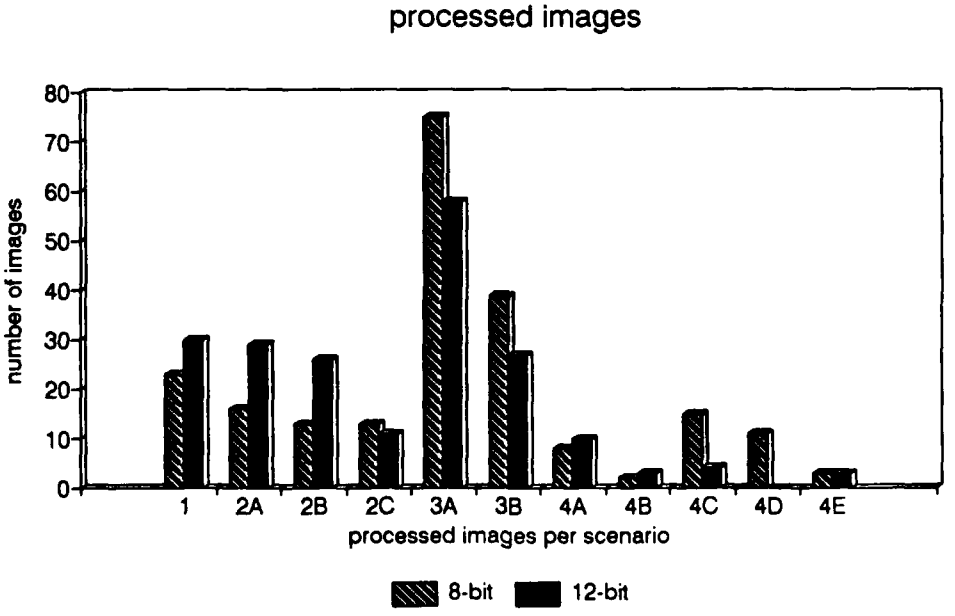

Figure 4.7: Survey of processed pictures per scenario for the 8-bit and 12-bit daylight cameras; the light bars give the 8-bit daylight pictures and the dark bars the 12-bit pictures.

4.3 Listing of recorded pictures

During most sessions, pictures have been taken with the 8- and 12-bit daylight cameras and a limited number with the Image Intensified CCD- camera. With the daylight cameras pictures have been taken in 3 wavelength regions, defined by the used filter :

a from 400 to 1100 nanometer (without filter); in column 8 of the list of recordings (Appendix C), the corresponding image files are coded with '0'.

b from 400 to 650 nanometer (photopic region); in column 8 of the list of recordings, the corresponding image files are coded with 'v'.

c from 675 to 1100 nanometer (near infrared region); in column 8 of the list of recordings the corresponding image files are coded with 'n'.

With the LLL camera in most cases recordings have been made in the wavelength region of 300 to 875 nanometer (= without filter).

Only one picture (with one of the cameras) in about 10 to 20 seconds could be recorded, which turned out to be a serious drawback for comparison 8 and 12-bit performance or wavelength dependence in situations of fast changing transmission characteristics of smoke and dust. Within 10 to 20 seconds after sand bag explosions, the transmission was often already considerably changed. The transmission of dust clouds due to moving vehicles depends among others on the speed of the vehicles, the atmospheric and terrain conditions, the mutual distance of the vehicles, the wind velocity and wind direction with respect to the cameras. Also, in these situations the transmission changed considerably within 10 to 20 seconds.

A selection has been made by 3 observers with respect to the interest of the original (unprocessed) images; most of the very low quality pictures and evident irrelevant pictures have been deleted from the list ; some pictures with bad quality regions however are maintained because of their unique occurrence or interesting properties.

A chronological listing of the recordings, selected for the final database, is given in the Appendix C.

For each of the recorded pictures several relevant conditions and parameters of the cameras, the trial, the weather, also some image properties and various codes, are given.

For the cameras:

applied focal length of the lens,

applied diaphragm in lens stop units,

exposure time or gating time (II-CCD camera),

applied wavelength and/or neutral density filter.

For the trial:

Date and local time,

type of scenario,

remarks on special battle field effects and/or the presence of special objects in the scene (eventually after processing).

For the weather conditions:

visibility from SITE.2US,

transmission from LOWTRAN.US,

luminance level at FIA location,

air temperature at FIA location,

effective temperature from MIA1.GE,

relative humidity at FIA location,

effective humidity from MIA1.GE,

wind direction and velocity from MIA1.GE.

For the images:

The filename, in which the date, the number of the session, the type of camera is incorporated.

The PIN-code with the expected interest, sometimes a special class indication.

The Image Quality code with in its first digit an indication of the photographic quality before processing, in the second digit a code for the effect of applied image processing (see paragraph 4.4.4).

For the selections:

the selected images for the US-database are indicated by a letter 'd', the selection of the final database, according the stringent selection criteria given in Appendix A, by a letter 'r' and the processed images by a letter 'p'. In the final database all the image files coded either with a 'r' and/or a 'p' are included . All the image files with a 'd' also are coded with an 'r' and therefore are included in the final database.

A survey of all the recorded image files has been given already in the bar diagram of fig.4.1; the numbers refer to the chronological sessions, two or three each day (in the best two schedules for the session numbers the corresponding type of scenario can be read then). For a description of the scenarios is referred to Appendix A and to the Best Two test plan [2]. For a detailed description of the position of moving vehicles in scenarios one and two see Valeton cs. [4].

4.4 Image Quality

It must be realized that only 'still' pictures have been recorded and the photographs therefore also represent only one frame of video information.

4.4.1 Dust and Smoke

Most of the pictures have been taken in the direction of the contrast targets during passing of the vehicles; therefore, the most frequently occurring obscurant in the pictures will be dust.

Immediately after sand bag explosions scenes behind dust clouds are not visible, nor can be made perceivable by image processing. Within 10 to 20 seconds after the explosion the transmission was often already considerably better; scenes behind clouds then become visible and more information can be made perceivable by processing.

The transmission of smoke, caused by fires, generally is better than that of sand clouds. These pictures often benefited more from image processing.
The transmission of dust clouds due to moving vehicles depends on many parameters, e.g. the number of vehicles, its speed and its mutual distance , the wind speed and its direction, atmospheric and terrain conditions as well. Also, under these various conditions the transmission changed often considerably within 10 to 20 seconds. Pictures with dust raised by a column of moving vehicles benefited most from the image processing.

4.4.2 Comparison of cameras

Within a period of 10 to 20 seconds only one camera-image could be recorded; at daylight the 8-bit and 12-bit cameras have been used alternately most of the time. Therefore, a reliable comparison of 8- and 12-bit performance is not possible due to the fast changing transmission characteristics of smoke and dust within the occurring time delay.
Other drawbacks for a reliable comparison of 8-bit and 12-bit daylight camera performance are their slightly different FOV's and the better spatial resolution of the 8-bit camera.

The perception of a monitor displayed original picture, taken with this camera, is often better than the picture taken (at about the same time) with the 12-bit camera. The spatial resolution of the 8-bit camera is better than that of the 12-bit camera. The monitor display shows, of any image, only the 8 most significant bits .
Both aspects benefit the perception of the 8-bit pictures before processing. Nevertheless after processing the 12-bit pictures look sharper, which is due to the low contrasts that can be recorded by the 12-bit camera.

Apart from the large intrascene dynamic range of the 12-bit camera, also long exposure times can be applied, which allows to take pictures at low light levels.

4.4.3 Low quality pictures

a 12-bit daylight CCD-camera.
Sometimes, at the beginning of some morning sessions, water condense was on the sensor; it has been shown afterwards that this condensation was due to the applied high cooling rate; with a moderate rate condensation can be prevented. Most of these pictures have been erased from the list of qualified pictures.

b 8-bit image intensified CCD-camera.
All pictures taken at night are severely blurred and often fully bloomed by the presence of light sources in the field. Especially, the 1 Hz flashlight in use as aircraft beacon during the night trials, caused a catastrophic blooming effect, also when the source was not within the field of view of the camera.
Pictures taken by day with the LLL camera show a poor quality with respect to the pictures taken with the daylight cameras. All these pictures have been taken with an automatic gain control of the image intensifier and of the CCD-sensor. It has been shown afterwards that an appreciably better quality can be achieved by using a minimum Image Intensifier gain, if a sufficient large entrance aperture and/or gating time can be applied. Most of these bloomed pictures have been omitted from the list of qualified images.

4.4.4 The Image Quality code

To all the processed pictures a two digit image quality (IQ) code has been assigned. The first digit gives an indication of the 'photographic' quality before processing and the second digit gives the class of image improvement due to the applied dedicated image processing. The digit for the

'photographic' image quality before processing runs from '0' for a completely unsuccessful image up to a '9' for a high quality picture, free from any blurring.
The digit for the effect of image processing runs from '0' for no effect at all, up to '3' for making a perceivable and remarkable improvement, presenting more information due to the processing.
The IQ-code number has been determined by an arrangement of two or three (untrained) observers.
An extensive description of both digits in this IQ-code number is given in Appendix B, paragraph B.3.
An indication of the 'photographic' quality after processing can be found by summing the two digits in the IQ-code. It is just an indication, because some aspects are difficult to compare and therefore the same 'photographic' quality before and after processing will never be observed. The sharpness, eg in the processed pictures due to processing, never occurs in the unprocessed pictures, as will be shown in the examples to be given in chapter 6.
Statistical results of the effect of image processing will be given in the next chapter, but will not be valid as a result for a random selection of images. Mainly the images with a picture interest code number of 7, 8 and 9 have been processed. Therefore, the corresponding 'photographic' quality before processing of this selection is not valid for a sample taken at random. The connection between the picture interest (2nd digit in the PIN-code) and the image quality before processing (1st digit in IQ-code) of the processed images is given by the 3-D graphs in the figs 4.8 and 4.9 for respectively the 8-bit and the 12-bit images. In these graphs the image quality is given along the horizontal axis, the picture interest on the slant axis and the corresponding number of pictures in the vertical direction.
For the 8-bit pictures the maximum number occurs for an image quality coded with 6 for the considered PIN-code numbers 7 to 9. For a PIN-code = 7 no pictures with an image quality code 9 occur, for a PIN-code = 8 no pictures with an image quality code 8 and 9 occur and for a PIN-code = 9 no pictures with an image quality code 7, 8 or 9 occur.
For the 12-bit pictures the maximum number occurs for an image quality coded with 6 for the considered PIN-code numbers 7 and 8 and image quality 5 for the PIN-code = 9. For a PIN-code equal to 7 and 8 no pictures with an image quality code 9 occur and for a PIN-code equal to 9 no pictures with an image quality code 7,8 or 9 occur. In general, the more interesting a picture is, the lower the image quality.

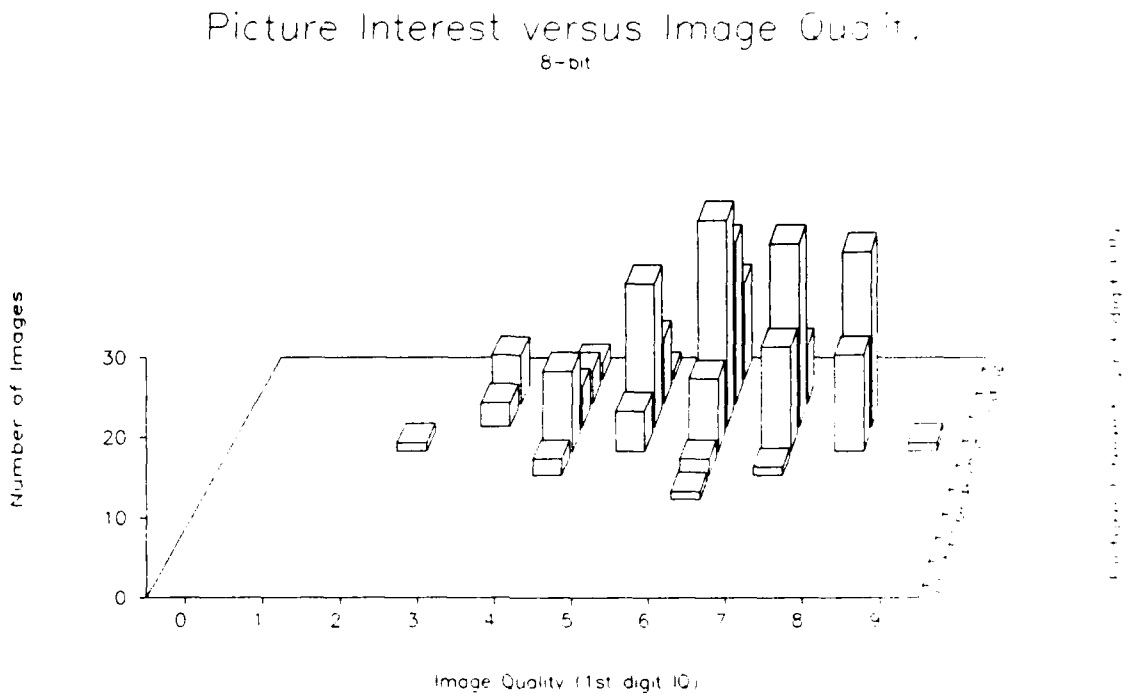

Figure 4.8: **Number of processed 8-bit daylight pictures for each of the assigned Image Quality codes with the connected Picture Interest codes.**

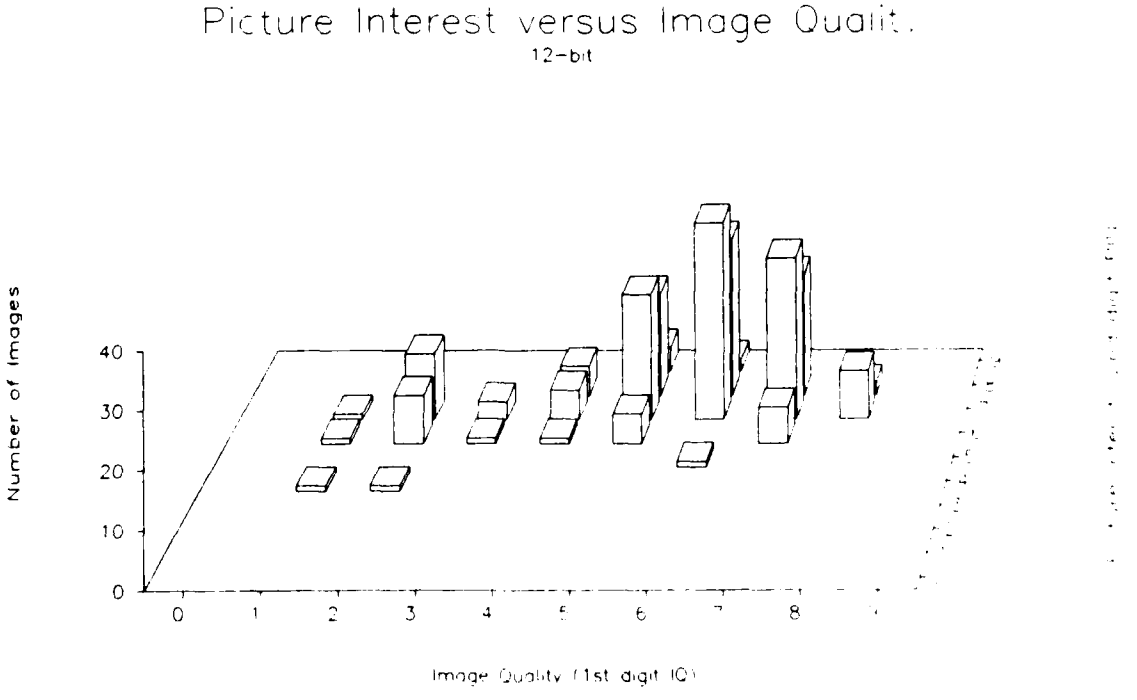

Figure 4.9: **Number of processed 12-bit pictures for each of the assigned Image Quality codes with the connected Picture Interest codes.**

5 PROCESSING RESULTS

5.1 Processing parameters

The processing is based on dynamic range transformation and an adaptive local contrast enhancement [1]. The range transformation is a global processing technique, using global statistics (histogram distribution of recorded grey level values) and the adaptive contrast enhancement is a local processing technique, using only local statistics. The contrast enhancement then is independent of the luminance range and can be carried out in the same way in any part of the image.

DYNAMIC RANGE TRANSFORMATION.

The main parameters for the global processing are the used input range and the output range:

Xi = Xmax-Xmin = the input range,

Xmax = maximum greylevel value in the original picture, used for the range transformation.
Xmin = minimum grey level value of the original picture, used for the range transformation.
The absolute maximum value that can occur is 4095 for a 12-bit picture and 255 for a 8-bit picture.
Often a lower value than the maximum occurring value, and a higher value than the minimum occurring value in the original picture is used for the input range. For an autonomous image processing a percentage of the total number of pixels can be chosen at either side in the histogram distribution. These values are kept then outside the input range for the processing. For all the pictures considered in this report, the input range is chosen by the operator for each picture separately. For this purpose, by means of the histogram distribution, a selectable range of high and of low pixel values can get assigned a typical colour in the black and white presentation of the picture on the monitor. High and low pixel values occurring only in irrelevant parts of the scene (eg white spots in the sky or black spots in the foreground) can be excluded then from the input range. Examples will be given in paragraph 5.5.5.

Yo = Ymax-Ymin = the output range,

Ymax = maximum grey level value, that is used in the range transformation for the output range.
Ymin = minimum grey level value, that is used in the range transformation for the output range.
The maximum output range runs from 0 to 255, to generate a normalized monitor input.
In most cases the output range, chosen for the range transformation, runs from 10 to 240. The small range beyond the black level and below the white level also allows a local contrast enhancement in these extreme luminance regions.
The dynamic range matching is carried out in the logarithmic domain according the following function:

$$y = k\, x^{\gamma}$$

x = the input grey level and y = the output grey level value.
In the logarithmic domain then is:

$$dy/y = \gamma\, dx/x \quad or \quad C_y = \gamma\, C_x$$

with C_x is the input and C_y is the output contrast.

So the output contrast is multiplied by γ, and the variation of the contrast due to this range transformation is independent of the local brightness; thus contrasts in bright and dark regions are treated in the same way. Depending on the value of γ used, we have dynamic range expansion ($\gamma>1$, always for 8-bit- pictures) or compression ($\gamma<1$, often in case of 12-bit images). A loss of contrast by dynamic range compression will be compensated by the measure of local contrast enhancement. In the used algorithm both the range transformation and the contrast enhancement are performed as a combined operation in the logarithmic domain. For the mathematics, see de Vries [1].
The parameters k and γ are not optional to the operator, but automatically derived from the given input and output range.

LOCAL CONTRAST ENHANCEMENT
The main parameters for the local contrast enhancement are the contrast multiplier and the control parameters for suppression possible artefacts:

Gc = contrast multiplier

The local difference in the logarithmic domain z is equal to the contrast in the input domain x (for small values of the contrast). So, by deriving from the z-signal the local difference signal, we can operate on the contrast of the input image x, simply by multiplying this local difference signal by Gc. The contrast enhancement then is independent of the local brightness.
The local difference is determined by using a moving average filter for a window size of 3x3 pixels.

$$L_d(z) = z - L_m(z)$$

with L_d = local difference and L_m = local mean

The size of the window can be chosen by the operator, but for most cases the 3x3 size is the best choice. The 3x3 filter size is used for all the processed pictures, dealt with in this report.

Vn(%) = percentage determining the threshold for the adaptivity

Vn = processor constant determining the adaptivity parameter.

Vn is the threshold value in the histogram distribution of the local variance. The contrast multiplier for pixels with a local variance beyond this value will gradually decrease to unity. The adaptivity parameter is a function of the relevant local variance and the threshold Vn.
Vn(%) is the percentage of the total number of pixels with its values for the local variance beyond the threshold. This percentage is optional to the operator and then determines the threshold, but the threshold itself also is an option.
For the mathematics, see de Vries [1].

LISTING OF PROCESSING PARAMETERS.

For all the processed pictures, the used parameters Xmax, Xmin, Ymax, Ymin, Vn, Vn(%) and Gc are given in the 'Listing of processed images and processing parameters' of Appendix D.
The filenames of the images before processing, given in this listing, are the same as given in Appendix C. The filenames for the corresponding processed images have the same filename, except for the extension, which is formed by a P and a following number. The type of processed image always is a 8-bit image; the original type can no longer be inferred from the extension.

The listing finally contains some comments and whether a copy on paper, made with a videoprinter, is available. The availability is indicated by the date of the print.

5.2 Processing statistics

5.2.1 Selection

All the images with a picture interest code value of 7, 8 or 9 have been processed. Some images with a PIN-code lower than 7 have been processed in order to complete a succeeding sequence of interesting images, as is already described in paragraph 4.2 on the Picture INterest code. A survey of all the processed pictures already has been given in fig.4.7. The processed pictures are coded with a 'p' in the listing of recordings in Appendix C.

5.2.2 Parameter statistics

Most of the images have been well exposed and, therefore, their maximum grey level value Xmax in most cases will be 255 for the 8-bit and 4095 for the 12-bit images. The maximum grey level range in the input image then will be determined by the minimum grey level value Xmin. The mean value of the used Xmin in processing the pictures is given for each of the scenarios separately in fig. 5.1. The light bars represent the 8-bit pictures and the dark bars the 12-bit pictures. There is an obvious increase in background luminance from scenario 1 to scenario 3. The background luminance arises from light scattering at dust and / or smoke particles. The increase is a result of an increasing number of dust particles in the atmosphere due to an increasing number of vehicles and / or increasing speed of these vehicles.

The increase of minimum grey level in the 12-bit pictures for the various scenarios 4 is not really significant because of the small number of processed pictures (see fig.4.7). The decrease of the mean value of Xmin in scenario 3B for the 12-bit images is due to a large number of 12-bit pictures in the corresponding session, taken with condense on the sensor. This resulted in considerably darker pictures.

A survey of the used grey level ranges Xi with corresponding Xmin in the input images is given in the scatter diagrams of fig. 5.2 and fig.5.3 for respectively the processed 8-bit daylight images and the processed 12-bit images.

The higher the value of the minimum grey level Xmin, the smaller relevant range for the range mapping will result. For the pictures exposed up to and with the saturation level of the sensor, the maximum input range for the 8-bit images is:

$$Xi = 255 - Xmin,$$

and for the 12-bit images is:

Xi = 4095-Xmin,

which represents the straight lines along the diagonals in the figs. 5.2 and 5.3.

The Xi ranges below these lines can arise because of underexposed pictures (e.g. 12-bit pictures at low light levels during early night sessions). It may also be a result of excluding regions with high luminance levels.

The most important parameter for the local contrast enhancement is the contrast multiplier Gc. The range mapping results itself also in a contrast expansion (8-bit) or compression (in most cases for 12-bit), which is expected to be inverse proportional to the quotient of the used input range Xi and output range Yo. The total contrast enhancement will be subjected to a maximum due to a limited signal to noise ratio. The maximum contrast multiplier Gc in the local contrast enhancement then will be dependent on the used input range. This dependence is also expected to be inverse proportional to the mentioned quotient.

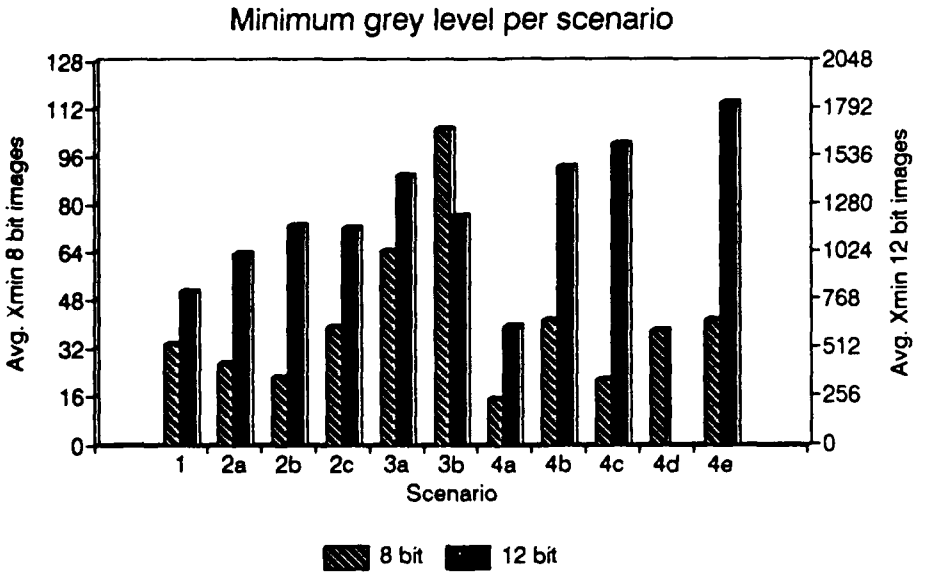

Figure 5.1: Mean value of used lowest grey level Xmin in the processing of 8-bit daylight (light bars) and 12-bit pictures (dark bars) for each scenario.

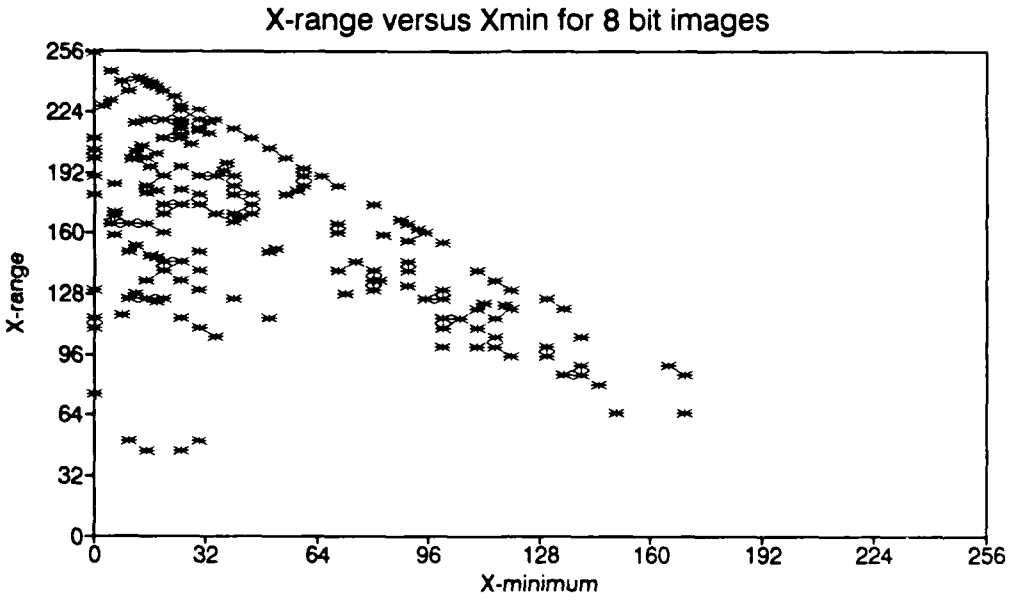

Figure 5.2: The used input grey level ranges with corresponding minimum grey level for processing the 8-bit daylight images.

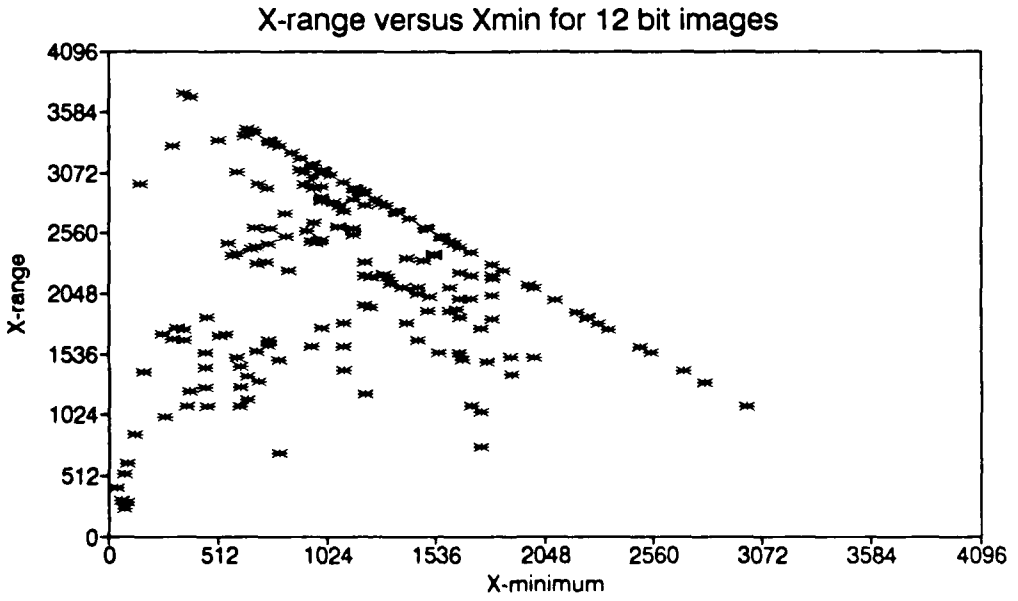

Figure 5.3: The used input grey level ranges with corresponding minimum grey level for processing the 12-bit images.

A survey of the used values for the contrast multiplier Gc is given in the scatter diagrams of fig.5.4 and fig.5.5 for respectively the processed 8-bit daylight and the processed 12-bit pictures. The values of Gc are given with the corresponding values of the used input ranges Xi. For the 12-bit images a slight correlation between Gc and Xi is perceivable, but is not really significant. For the 8-bit images any correlation is absent. The slight increase of the contrast multiplier Gc with increasing input range for the 12-bit pictures might be due to the increasing range compression.
A survey of the mean value of the used contrast multiplier Gc is given for each scenario separately in the bar diagram of fig. 5.6 for both the processed 8-bit daylight (light bars) and the processed 12-bit pictures (dark bars). There is an obvious dependence on the type of scenario. The mean values of the contrast multiplier are higher for the 12-bit pictures than for the 8-bit pictures, which is valid for all the scenarios (the number of processed images of scenario 4, is too small for relevant conclusions; see fig.4.7).

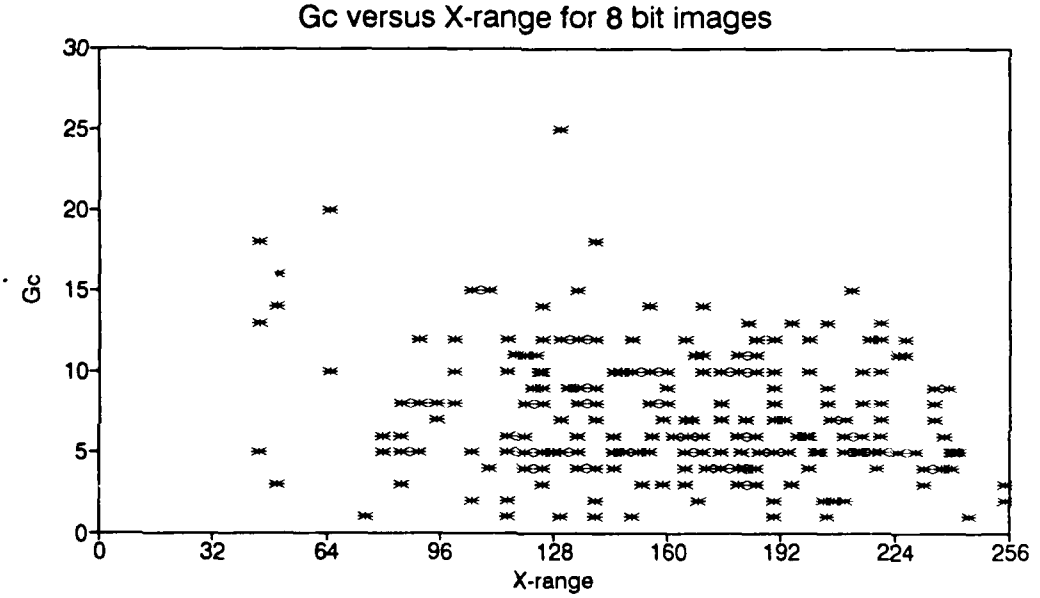

Figure 5.4: The used values for the contrast multiplier Gc with corresponding input grey level ranges in processing the 8-bit daylight images.

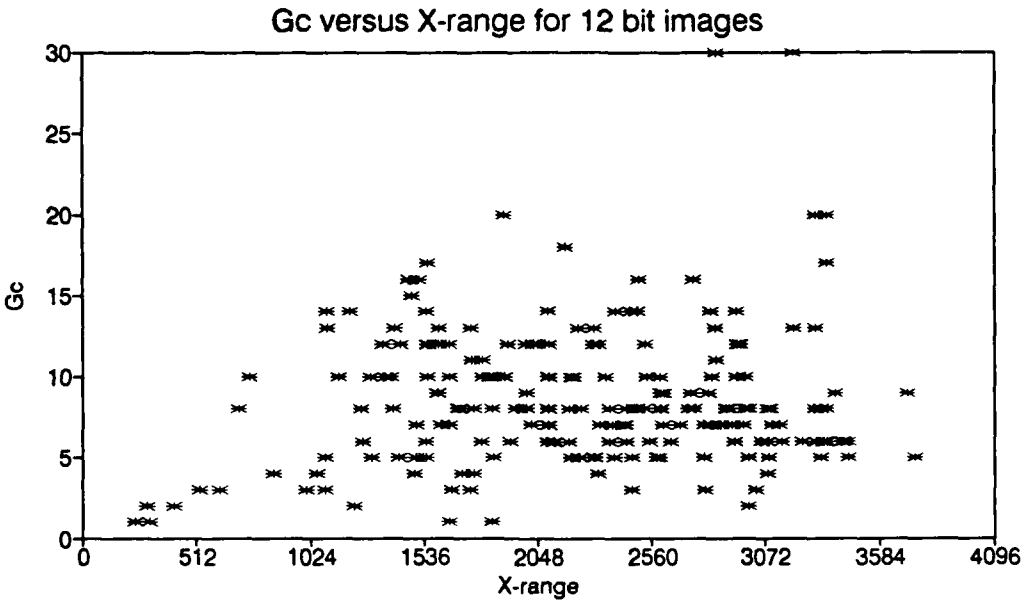

Figure 5.5: The used values for the contrast multiplier Gc with corresponding input grey level ranges in processing the 12 bit images.

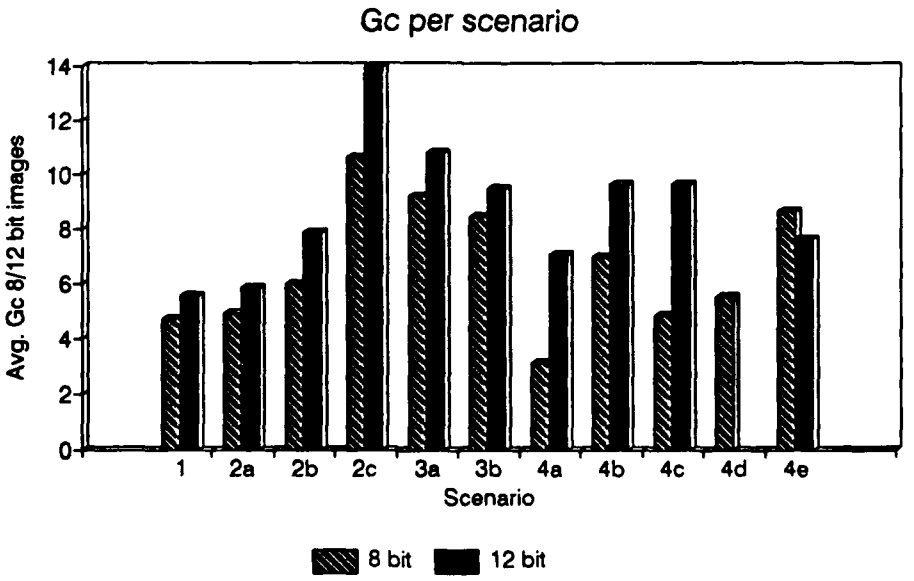

Figure 5.6: The mean value of the used contrast multiplier Gc for each scenario; the light bars represent the processed 8-bit daylight pictures and the dark bars the processed 12-bit pictures.

5.2.3 Effect of processing

The effect of processing has been classified according the following 4 categories:

0 = no relevant effect of processing.

1 = processing results in a more clear and sharp picture, but no more obvious and relevant information becomes perceivable.

2 = some new information becomes perceivable together with a clear and sharp presentation.

3 = remarkable new information has become perceivable by processing.

These categories are given by the second digit in the IQ-code number, which is more extensively described in Appendix B.

The distribution of the 'effect of processing' result, according this classification, is given in figure 5.7 as a percentage of the total number of processed pictures (per camera). The light bars give the effect for the 8-bit daylight images and the dark bars for the 12-bit images. For both the image types the maximum occurs for class 1 of the 'effect of processing', but for the 12-bit images the 'distribution curve' is clearly shifted to a higher value compared to the distribution for the 8-bit images.

The mean value of the 'effect of processing' class number is given in figure 5.8 for each of the scenarios separately; the light bars give the mean effect for the 8-bit daylight images and the dark bars for the 12-bit images. For all the scenarios the mean effect of processing for the 12-bit images is higher than for the 8-bit images. For the 12-bit images the mean effect is highest in scenario 3A and for the 8-bit images in scenario 3B.

In both scenarios the main obscurant is dust, raised by a column of driving vehicles; in scenario 3B smoke is added by fires near the path of the vehicles. In general, it may be expected that the effect of image processing is most spectacular for the scenario 3B conditions, also (and may be especially) for the 12-bit pictures. The lower effect compared to scenario 3A for the 12-bit pictures in our case is due to a large number of low quality pictures, and this not because of the obscurant, but due to a condensed sensor (see also paragraph 4.4.3). Image processing then enhances the condensed spots.

More than 60% of the total database has been processed; nevertheless the processing results might not be fully significant for the complete database. The most interesting pictures have been processed, which often correspond with a less good image quality before processing (see also the figures 4.8. and 4.9). The mean value of the image quality before processing (1st digit in IQ-code number) is given in figure 5.9 for each of the scenarios separately; the light bars represent the 8-bit daylight and the dark bars the 12-bit pictures. Now the 12-bit pictures have a lower quality

compared to the 8-bit pictures for nearly all the scenarios. On the monitor (and in the pictures) only the 8 most significant bits of 12-bit pictures can be displayed. The better spatial resolution of the 8-bit camera then becomes a significant property for the image quality (before processing); see also paragraph 4.4.2.

The results for scenario 4 are not very significant because of the small number of processed images (see figure 4.7).

The smaller the contrasts (after the range transformation), the larger the applied (optimum) contrast multiplier Gc and the larger the effect of processing possibly might be.

A correlation then might exist between the effect of processing and the applied contrast multiplier. A distribution of the applied (optimum) contrast multipliers is given in the figures 5.10 and 5.11 for respectively the 8-bit daylight and the 12-bit pictures. The contribution of each of the 4 classes of 'effect of processing' is given separately as a percentage of the total number of processed images. The separate percentages of the 4 classes are stacked at each value of the contrast multiplier Gc. The most applied value for the contrast multiplier Gc is 5 for the 8-bit and 8 for the 12-bit images.

A distribution of the applied (optimum) contrast multipliers for each of the 4 classes of 'effect of processing' separately, is given in the curves of the figures 5.12 and 5.13 for respectively the 8-bit daylight and the 12-bit pictures. Also here for each of the values of Gc the percentage of the total number of processed images is given for each of the 'effect of processing' classes. For the 8-bit images the maximum number for class 1 (picture sharpening) occurs at a value 5 and for class 2 at a value 8 of the contrast multiplier. For the 12-bit images the maximum number for class 1 (picture sharpening) occurs at a value around 7 and for class 2 at a value 10 of the contrast multiplier. Class 3 'effect of processing' hardly occurs for 8-bit images; for the 12-bit images the maximum number of class 3 occurs at a value 10 of Gc (same as class 2).

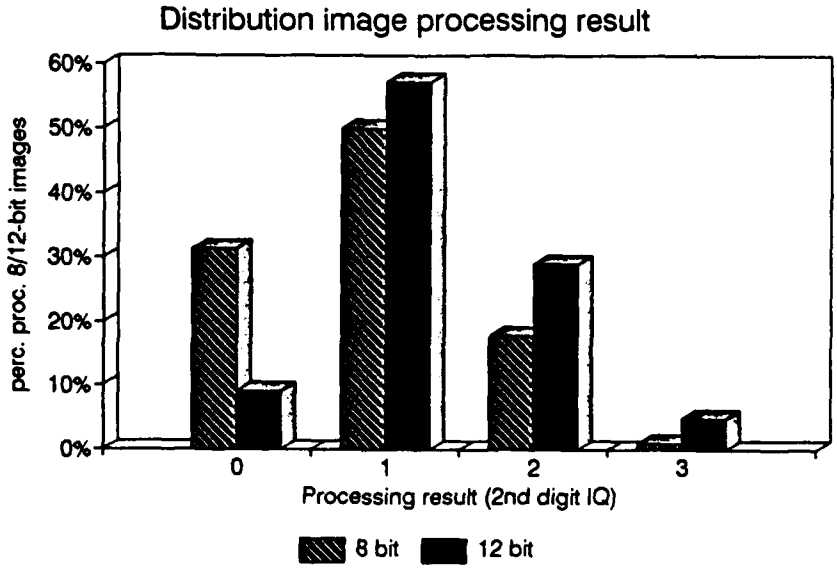

Figure 5.7: Effect of processing 8-bit daylight (light bars) and 12-bit images (dark bars); result in percentage of the total number of 8 / 12-bit processed images for each of the 4 IQ-codes for 'effect of processing'.

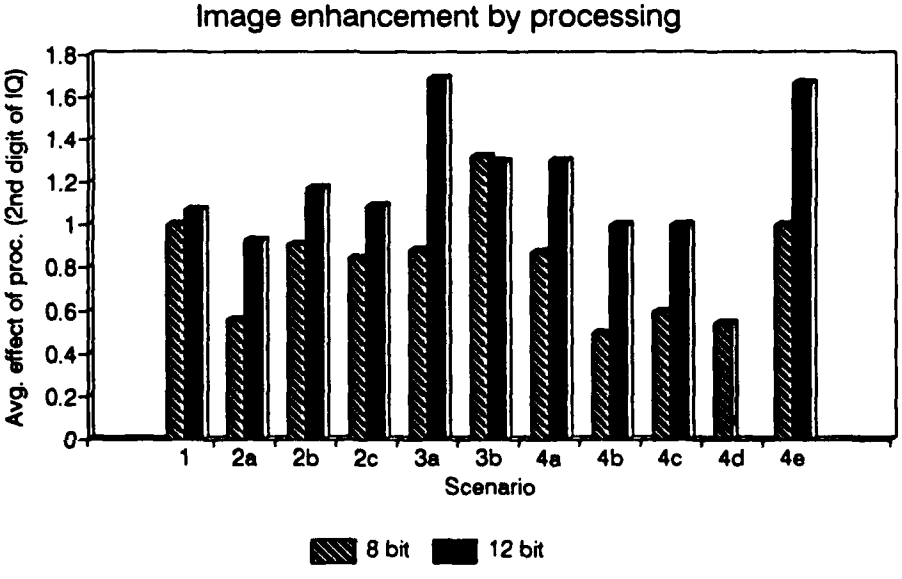

Figure 5.8: Effect of processing 8-bit daylight (light bars) and 12-bit images (dark bars) for each scenario; the processing result is given as the mean value of the 4 IQ-codes for 'effect of processing'.

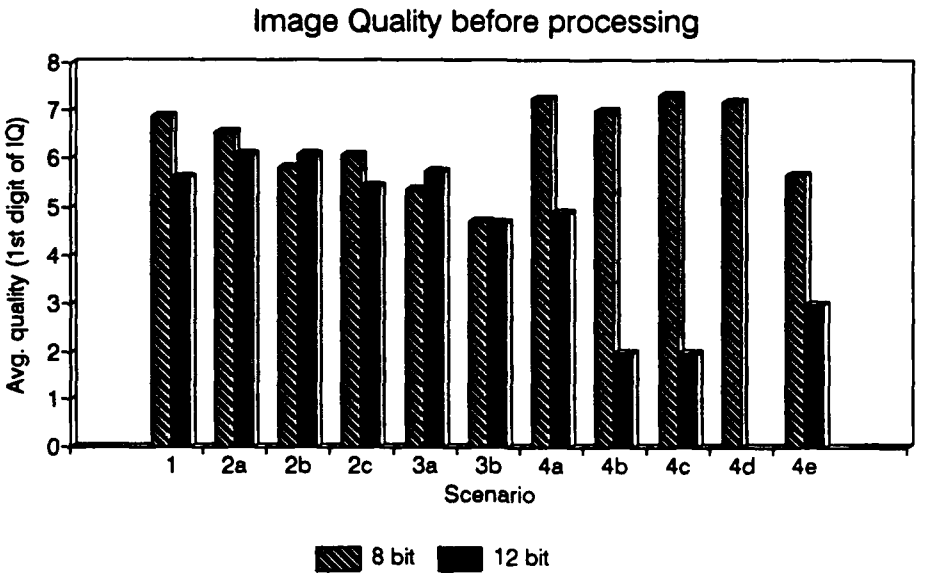

Figure 5.9: The mean value of the IQ-codes for 'image quality before processing' for each scenario; the light bars for the processed 8-bit daylight and the dark bars for the processed 12-bit images.

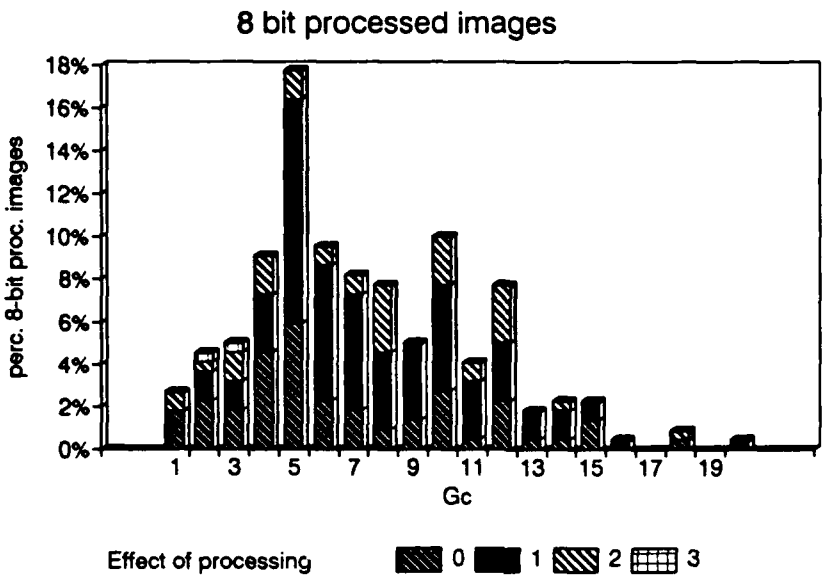

Figure 5.10: Effect of processing 8-bit daylight images for each of the used values of the contrast multiplier Gc; a percentage of the total number of 8-bit processed images is given for each of the 4 IQ-codes for 'effect of processing' and stacked at each of the multipliers.

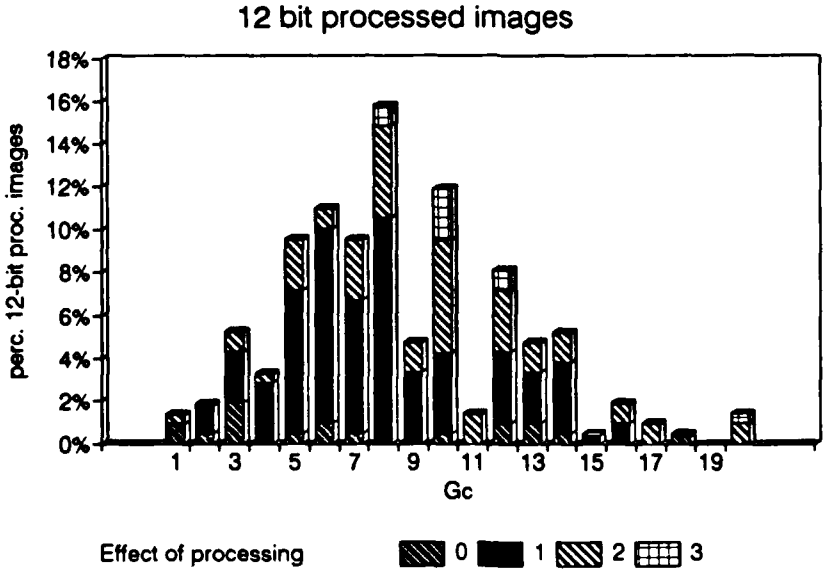

Figure 5.11: Effect of processing 12-bit images for each of the used values of the contrast multiplier Gc; a percentage of the total number of 12-bit processed images is given for each of the 4 IQ-codes for 'effect of processing' and stacked at each of the multipliers.

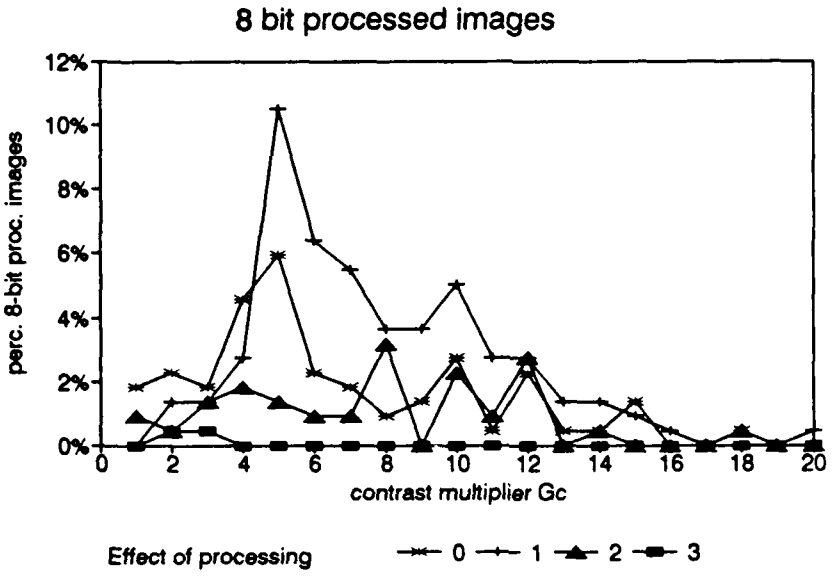

Figure 5.12: Effect of processing 8-bit daylight images for each of the used values of the contrast multiplier Gc; a percentage of the total number of 8-bit processed images is given for each of the 4 IQ-codes for 'effect of processing' separately.

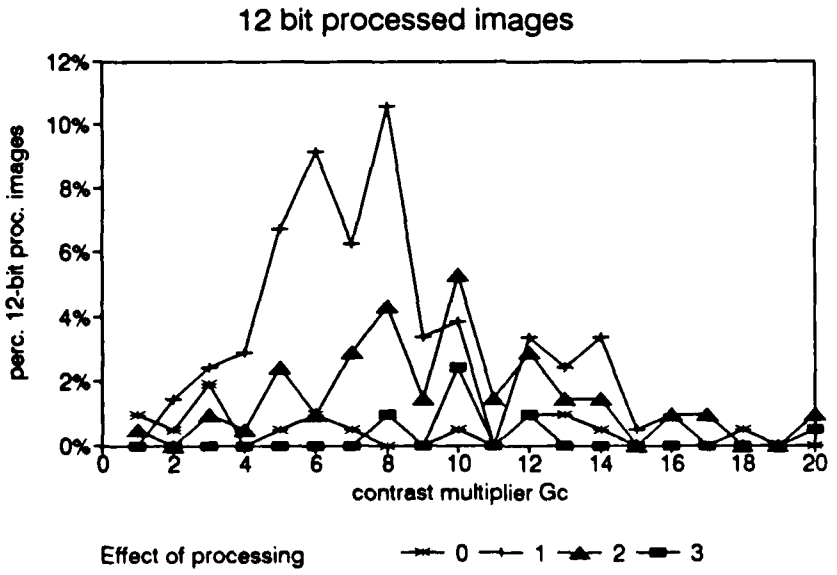

Figure 5.13: Effect of processing 12-bit images for each of the used values of the contrast multiplier Gc; a percentage of the total number of 12-bit processed images is given for each of the 4 IQ-codes for 'effect of processing' separately.

6 EXAMPLES OF PROCESSING RESULTS

6.1 Scenario 1

Detection and recognition of a single static vehicle, without further battle field effects.

In most pictures taken during these sessions the information is already quite clearly presented, because of the good weather conditions at Mourmelon and the absence of battle field effects. Image processing results mainly in a sharper picture and thus in a more obvious presentation, but hardly ever new information becomes perceivable. A good example of picture sharpening and a comfortable presentation is given by the 8-bit picture in figure 6.1.
Some relevant conditions and parameters for this picture are:

Figure 6.1: file: M0208A29.IM8 / 8-bit without photopic filter,
date: 2-8-1990 / local time: 10:12:04,
session: 2.1 / scenario: 1R,
site block: 23/24, fig.3.4A,
PIN-code= 7 / IQ-code=81,
processing input range: 16-164 / contrast multiplier Gc=5.

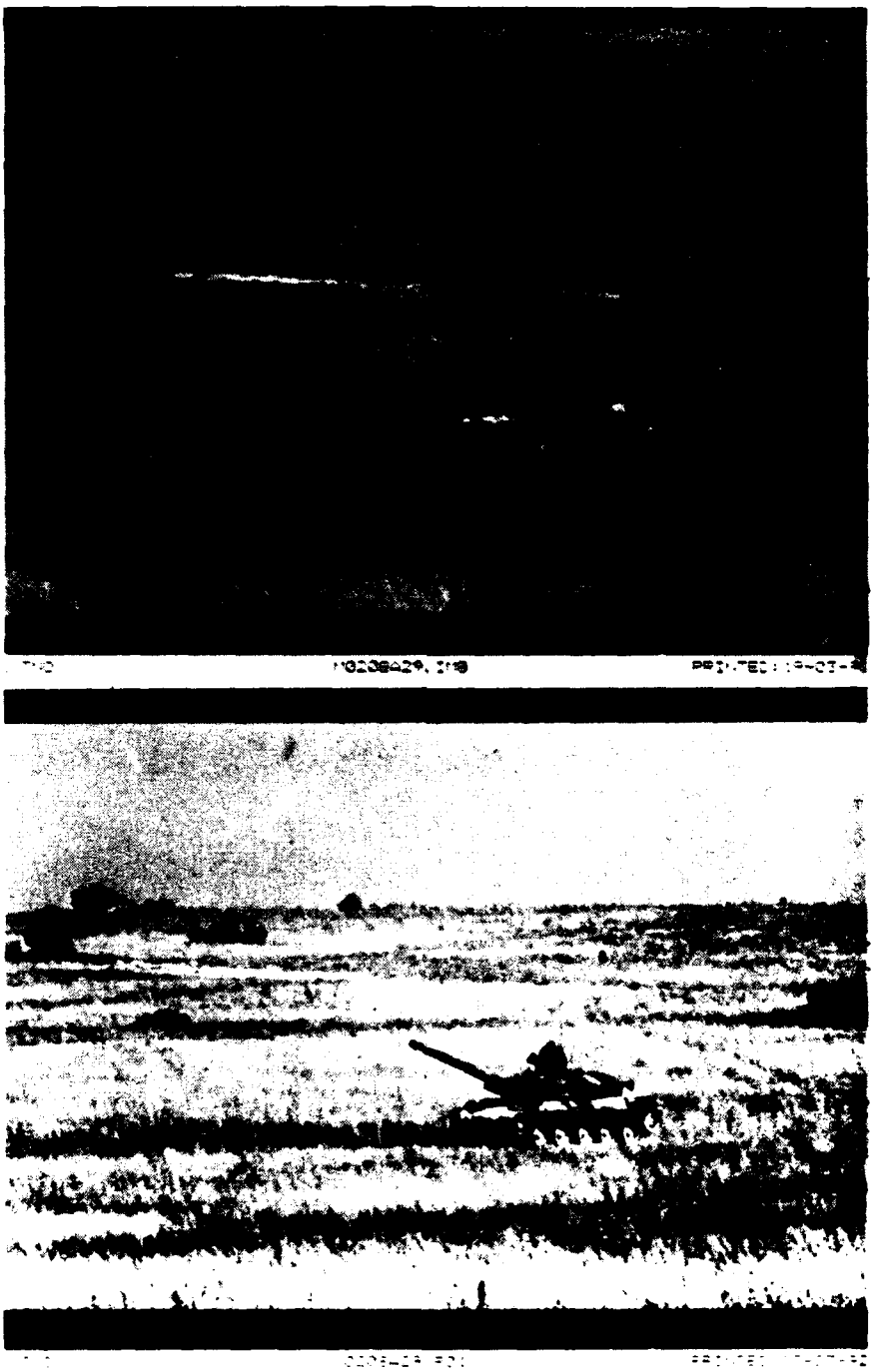

Figure 6.1: 8-bit picture with vehicle in halt position / scenario 1R.
Top before processing, bottom after processing.

6.2 Scenario 2

Detection and recognition of a single moving vehicle with battlefield effects.

In scenario 2A only vehicle raised dust is present and most dominant behind the vehicle. Most of the other parts of the scene will only be slightly blurred by dust, because of the low speed of the vehicle. This overall slightly blurring can be 'removed' by image processing in most cases. An example is given in fig.6.2 by a 12-bit picture taken without spectral filters.

Figure 6.2: File: M3107P41.IM1 / 12-bit without photopic filter,
date: 31-7-1990 / local time: 16:03:25,
session: 31.3 / scenario: 2ALF,
site block: 22, fig.3.4A ,
PIN-code= 7 / IQ-code=61,
processing input range: 1500-4095 / contrast multiplier Gc=8.

Apart from the dust cloud behind the tank the information throughout the scene is clearly presented after the processing.
Another example of a 12-bit picture is given in figure 6.3, taken 1.5 minute after the picture in fig.6.2, but from another part of the site. The 'dusty' conditions are about the same, yet some new information becomes perceivable after processing.

Figure 6.3: File: M3107P45.IM1 / 12-bit without photopic filter,
date: 31-7-1990 / local time: 16:05:05,
session: 31.3 / scenario: 2ALF,
site block: 42, fig.3.4B,
PIN-code= 7 / IQ-code=61/62,
processing input range: 1300-4095 / contrast multiplier Gc=7.

In scenario 2B also smoke generated by fire can be present beside the vehicle raised dust. The representation of the smoke clouds is darker than that of the dust clouds, especially after processing. Most of the blurring due to the smoke can be removed by processing. The contours and the origin of the smoke cloud become clearly discernible after processing. An example is given in fig. 6.4 by a 12-bit picture taken with a photopic filter (dust is hardly present in this example).

Figure 6.4: File: M0108P07.IM1 / 12-bit with photopic filter,
date: 1-8-1990 / local time: 14:25:02,
session: 1.3 / scenario: 2BLF,
site block: 34, fig.3.4A,
PIN-code= 8 / IQ-code=62,
processing input range: 600-2100 / contrast multiplier Gc=7.

In scenario 2C also dust clouds due to sand bag explosions are present.
Examples are given in fig.6.5 by an 8-bit picture taken immediately after the explosion of two sand bags between the camera and the contrast boards; in fig.6.6 by a 12-bit picture, taken 24 seconds later and in fig.6.7 by an 8-bit picture taken another 12 seconds later. All three pictures are taken with a photopic filter.

Figure 6.5: File: M3107A17.IM8 / 8-bit with photopic filter,
date: 31-7-1990 / local time: 10:22:40,
session: 31.2 / scenario: 2CLS,
site block: 42, fig.3.4B,
PIN-code= 6 / IQ-code=40,
processing input range: 20-240 / contrast multiplier Gc=10.

Figure 6.6: File: M3107A18.IM1 / 12-bit with photopic filter,
date: 31-7-1990 / local time: 10:23:04,
session: 31.2 / scenario: 2CLS,
site block: 42, fig.3.4B,
PIN-code= 8 / IQ-code=51,
processing input range: 1800-3630 / contrast multiplier Gc=10.

Figure 6.7: File: M3107A19.IM8 / 8-bit with photopic filter,
date: 31-7-1990 / local time: 10:23:16,
session: 31.2 / scenario: 2CLS,
site block: 42, fig.3.4B,
PIN-code= 8 / IQ-code=62,
processing input range: 80-215 / contrast multiplier Gc=12.

In fig.6.5 no information from scenes behind the dust cloud becomes perceivable after processing, while (after 36 seconds) in fig.6.7 many details become perceivable and after processing also a better contouring of the dust cloud can be observed. Processing the 12-bit picture in fig.6.6 (24 seconds after explosion) also gives a better contouring of the dust cloud and the blurring due to the extension of the original cloud is removed. Relevant new information does not yet become available after processing. This sequence of pictures illustrates the rate of transmission change after a sand bag explosion.

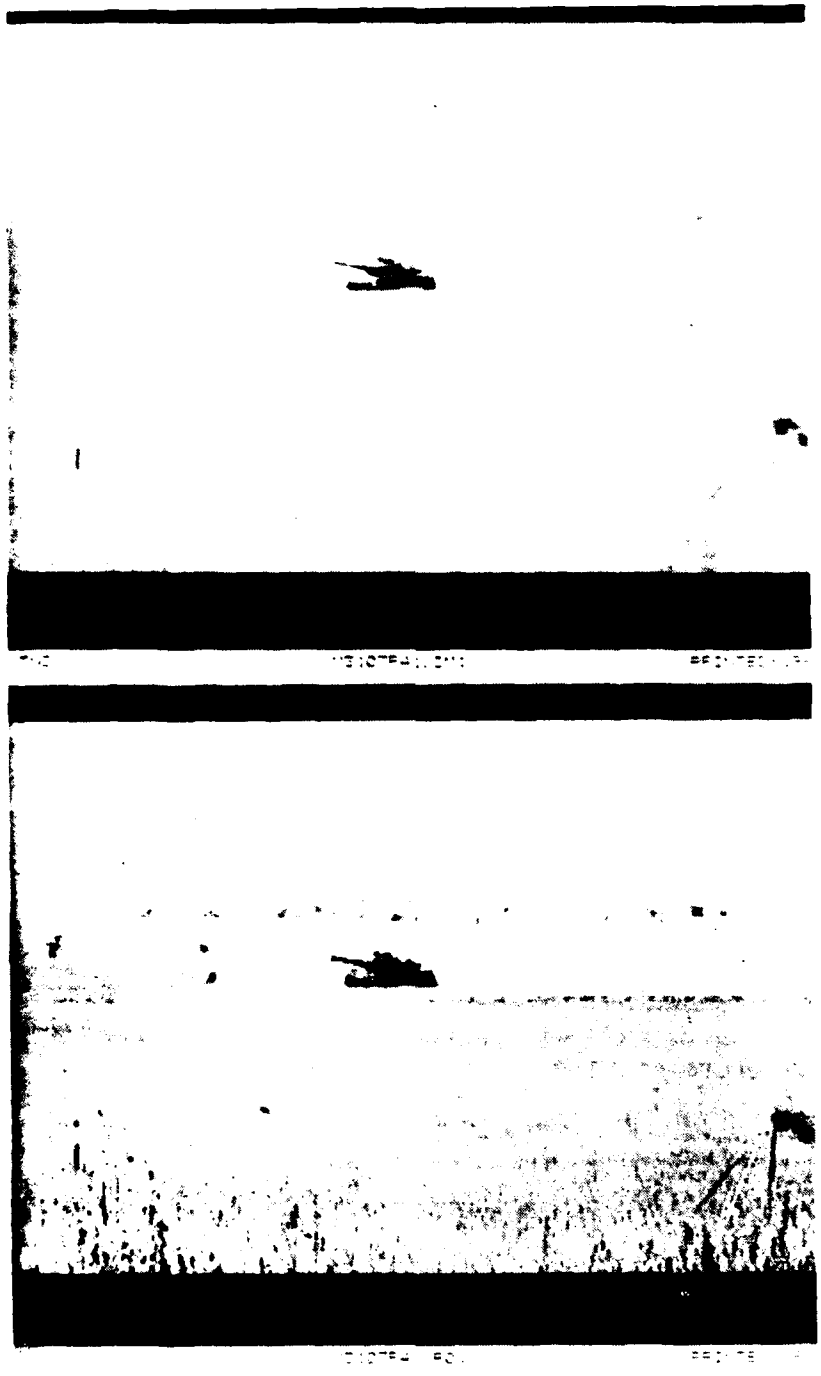

Figure 6.2: 12-bit image with vehicle raised dust / scenario 2ALF.
Top before processing, bottom after processing.

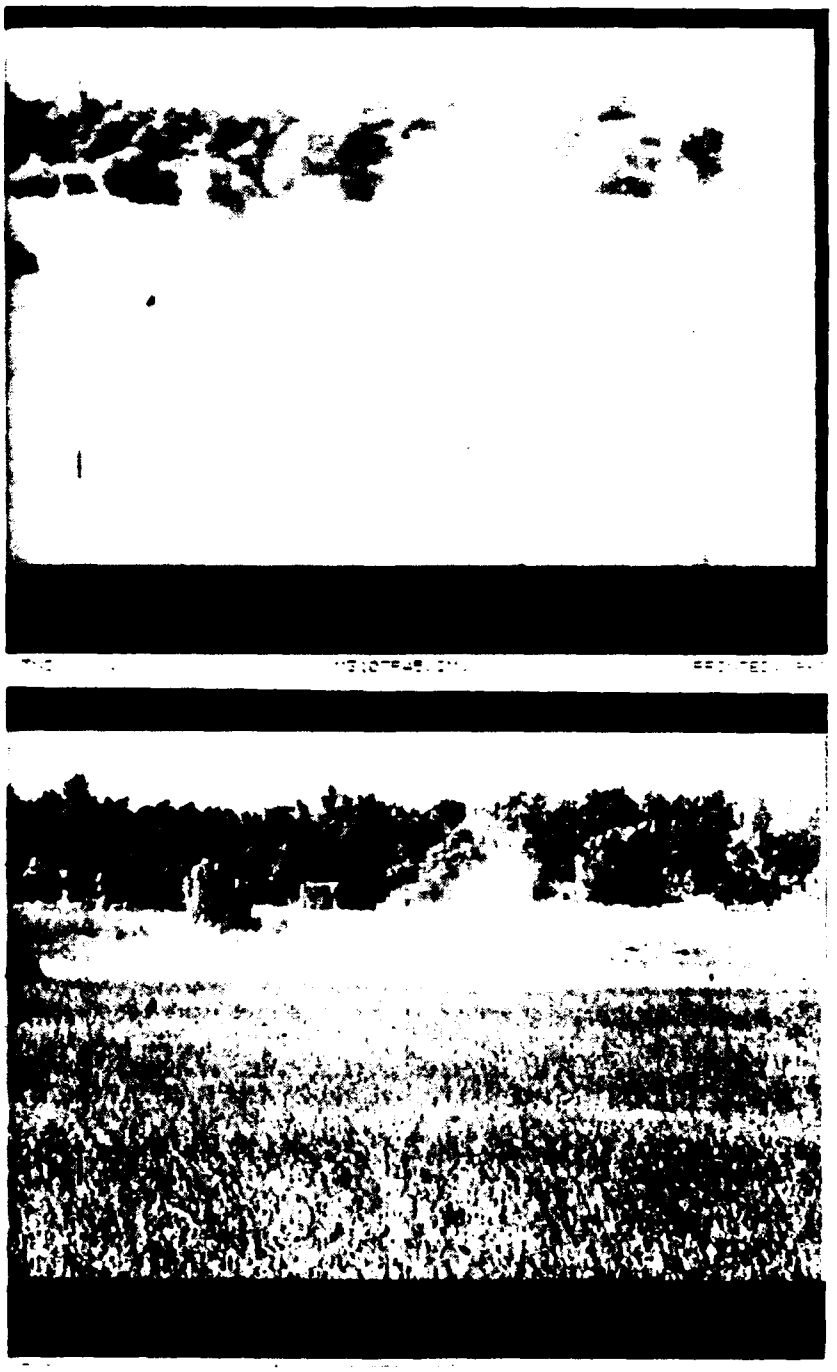

Figure 6.3: 12-bit picture with dust raised by moving vehicles / scenario 2ALF.
Top before processing, bottom after processing.

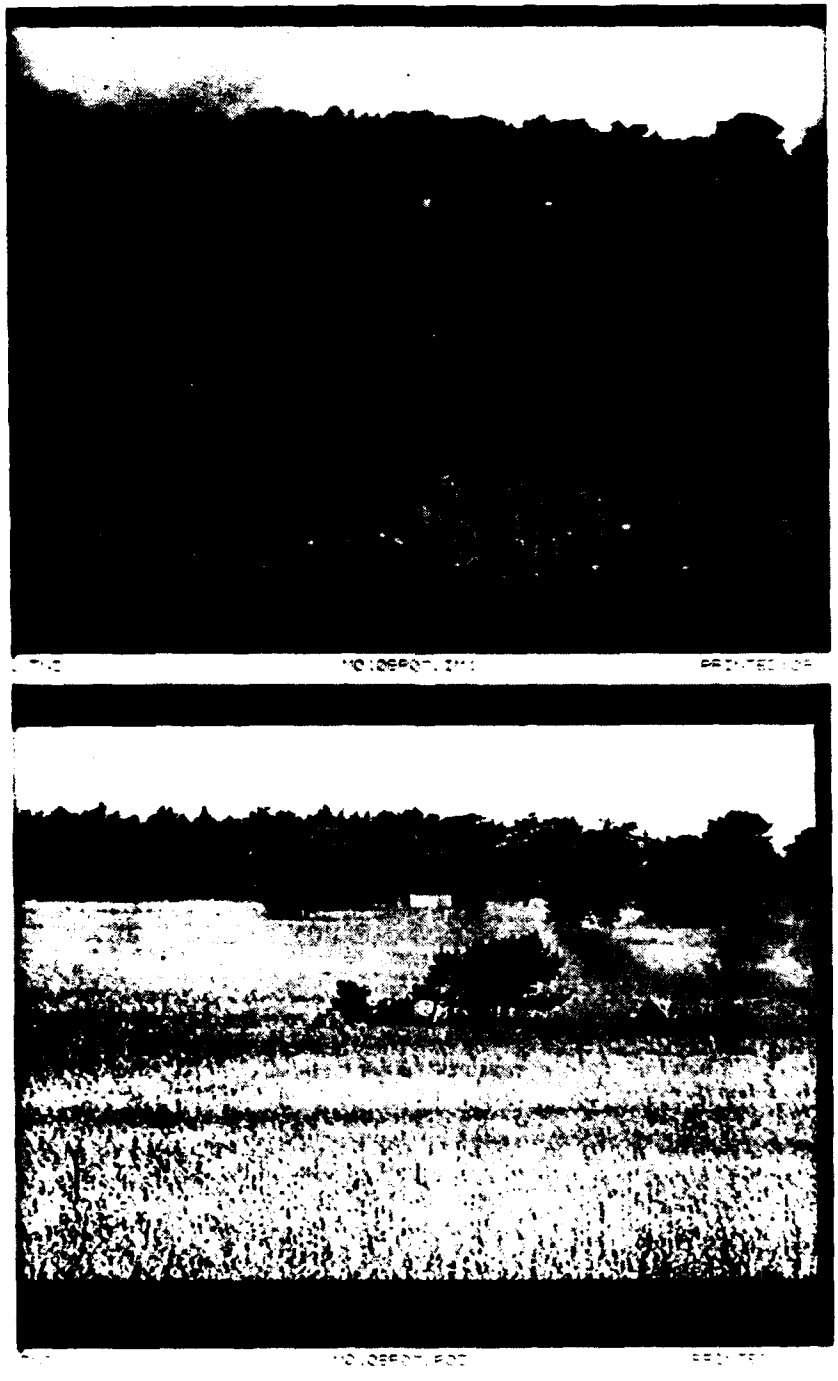

Figure 6.4: 12 bit picture with vehicle raised dust and smoke / scenario 2BLF.
Top before processing, bottom after processing.

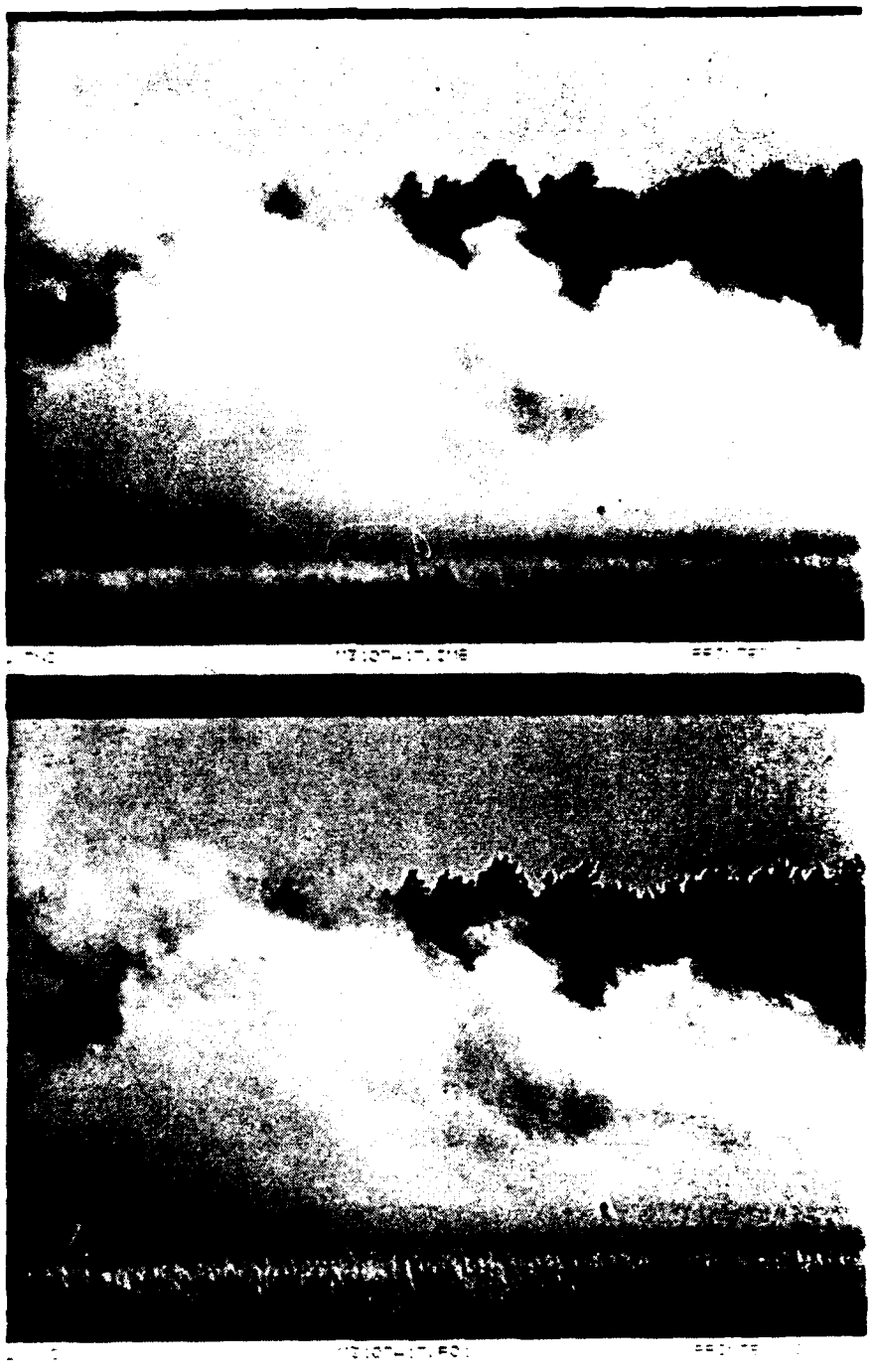

Figure 6.5: 8-bit picture with sand bag explosion / scenario 2CLS.
Top before processing, bottom after processing.

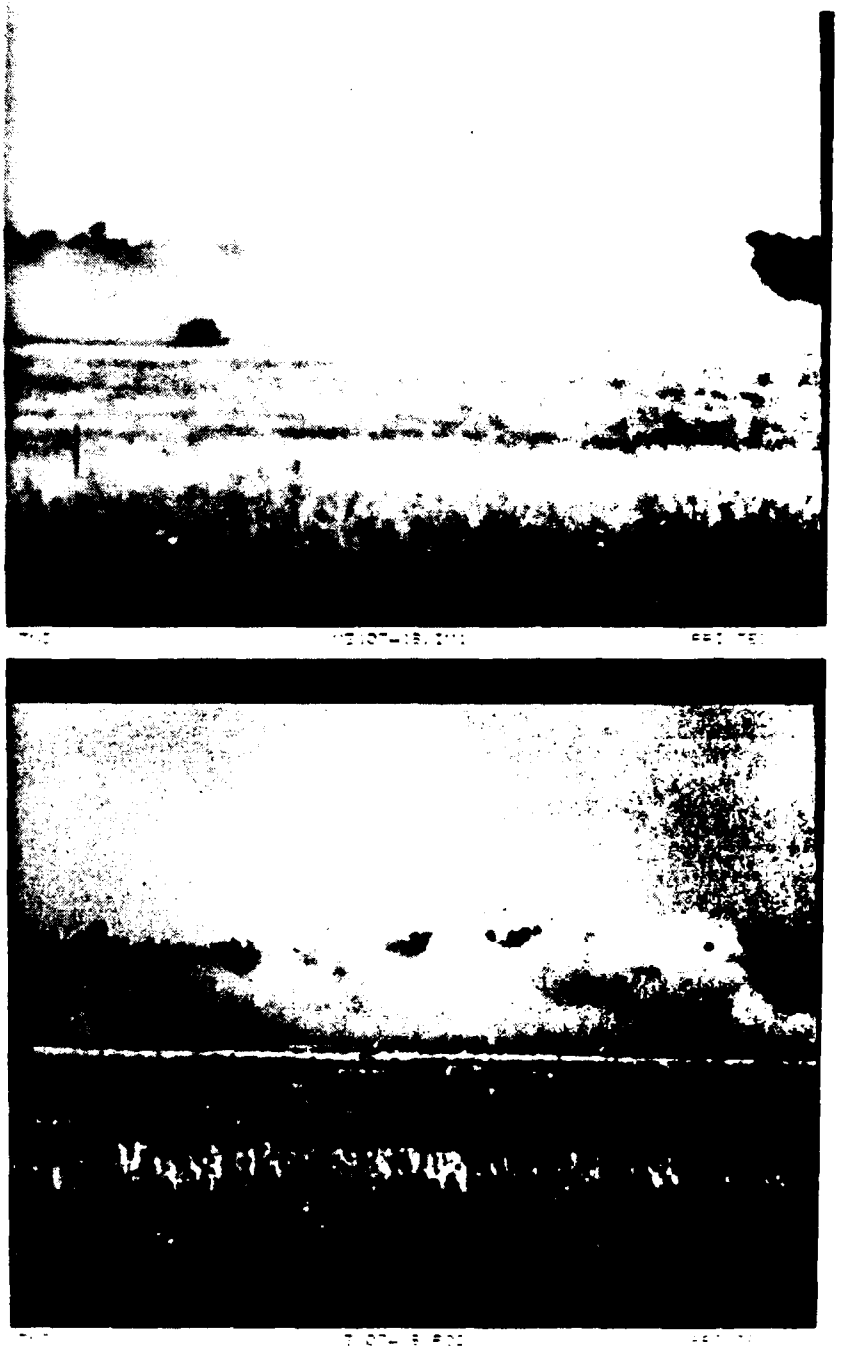

Figure 6.6: 12-bit picture after sand bag explosion; taken 24 seconds later than picture in fig.6.5 / scenario 2CLS.
Top before processing, bottom after processing.

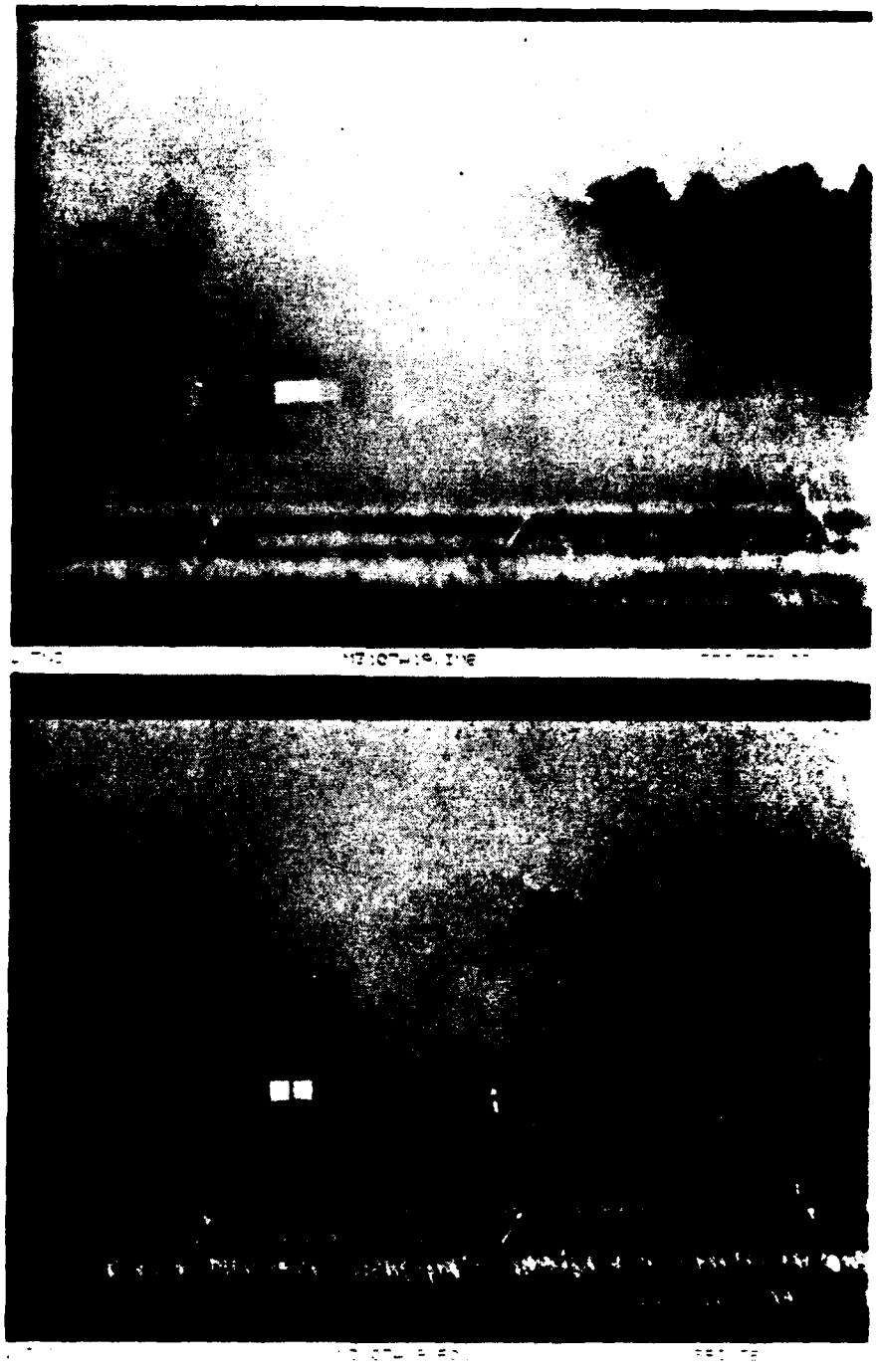

Figure 6.7: 8-bit picture as in fig.6.5, 36 seconds after sand bag explosion and 12 sec. after picture in fig.6.6 / scenario 2CLS.
Top before processing, bottom after processing.

6.3 Scenario 3

Detection/recognition of vehicles driving in column, with and without battle field effects.

In scenario 3A only vehicle raised dust is present. Large parts of the scene are often blurred by a moderate thick layer of dust because of the relative high speed (20 km/hr) and the small distance between the vehicles. This resulted in a larger offset or higher minimum grey level than in most of the other scenarios (see e.g. fig.5.1). Often most of the blurring can be removed by image processing and many details become perceivable then. The transmission of the dust clouds is dependent on a large number of conditions in a column of driving vehicles and this transmission can change fast. During a large part of session 7.3 the (often complete) obscurance of the scene was such, that the difference in performance of the 8-bit and the 12-bit camera became quite significant. The 8-bit pictures remained completely obscured even after processing, while the 12-bit pictures showed a lot of information, especially after processing. Examples are given in figure 6.8 for the 8-bit images and in figures 6.9 and 6.10 for the 12-bit images. The 12-bit picture in fig.6.9 is taken only nine seconds after the 8-bit picture in fig.6.8. In figure 6.9 the perception before processing is somewhat better than for the 8-bit image in figure 6.8, but for the 12-bit image in figure 6.10 the perception before processing is about the same as for this 8-bit picture. However the effect of processing is quite different.

Figure 6.8: File: M0708P44.IM8 / 8-bit with photopic filter
date: 7-8-1990 / local time: 14:36:52,
session: 7.3 / scenario: 3A,
site block: 42, fig.3.4B,
PIN-code= 6 / IQ-code=40,
processing input range: 40-165 / contrast multiplier Gc=12.

Figure 6.9: File: M0708P45.IM1 / 12-bit with photopic filter,
date: 7-8-1990 / local time: 14:37:01,
session: 7.3 / scenario: 3A,
site block: 42, fig.3.4B,
PIN-code= 8 / IQ-code=53,
processing input range: 1700-3900 / contrast multiplier Gc=10.

Figure 6.10: File: M0708P20.IM1 / 12-bit with photopic filter,
date: 7-8-1990 / local time: 14:37:01,
session: 7.3 / scenario: 3A,
site block: 42, fig.3.4B,
PIN-code= 9 / IQ-code=52,
processing input range: 750-4095 / contrast multiplier Gc=17.

In the 12-bit picture of figure 6.10 a considerable range of the lower valued grey levels only occurs in the foreground of the scene and a smaller input range can be applied for the image processing, without loss of information in the relevant regions. In figure 6.11 another processing result for the same 12-bit picture of figure 6.10 is given; the used input range now is 2800 to 4095 instead of 750 to 4095. The available information in the relevant region now is more obvious and clearly presented. The optimum contrast multiplier Gc now is smaller than in figure 6.10, and apparently is caused by the extended range transformation, which now contributes to a part of the contrast enhancement

Figure 6.11: File: M0708P20.IM1 / processed 12-bit with photopic filter,
date: 7-8-1990 / local time: 14:37:01,
session: 7.3 / scenario: 3A,
site block: 42, fig.3.4B,
PIN-code= 9 / IQ-code=53,
processing input range: 2800-4095 / contrast multiplier Gc=10.

Examples with large regions obscured by vehicle raised dust and fast changing transmission characteristics are given in fig.6.12 by a 12-bit picture; in fig.6.13 by a similar 8-bit picture, taken 13 seconds later and in fig.6.14 by a 12-bit picture, taken another 14 seconds later. All three pictures are taken without a photopic filter. In fig.5.14 the transmission of the dust cloud is clearly decreased now compared with the previous pictures, but still sufficient to make perceivable some more information from the scene behind the dust by means of the image processing. The contours of a vehicle for instance can be observed now. It might be clear that the 8-bit versus 12-bit performance cannot be evaluated with such sequences of pictures, because the transmission changes significantly within 10 to 20 seconds, which is often the time delay necessary for taking and saving successive pictures (see also paragraph 4.4).

Figure 6.12: File: M0808A48.IM1 / 12-bit without photopic filter,
date: 8-8-1990 / local time: 10:51:11,
session: 8.2 / scenario: 3A,
site block: 42, fig.3.4B,
PIN-code= 8 / IQ-code=62,
processing input range: 2500-4095 / contrast multiplier Gc=9.

Figure 6.13: File: M0808A49.IM8 / 8-bit without photopic filter,
date: 8-8-1990 / local time: 10:51:24,
session: 8.2 / scenario: 3A,
site block: 42, fig.3.4B,
PIN-code= 9 / IQ-code=62,
processing input range: 115-215 / contrast multiplier Gc=10.

Figure 6.14: File: M0808A50.IM1 / 12-bit without photopic filter,
date: 8-8-1990 / local time: 10:51:38,
session: 8.2 / scenario: 3A,
site block: 42, fig.3.4B,
PIN-code= 8 / IQ-code=43/52,
processing input range: 2700-4095 / contrast multiplier Gc=8.

In scenario 3B also smoke generated by fire can be present, beside the (fast moving) vehicle raised dust. An example is given in fig.6.15 by an 8-bit picture taken with a photopic filter.
The remarks on scene blurring and processing results, given with the examples under the scenarios 3A (fast moving vehicles) and 2B (smoke), are also especially valid for this example. By processing the contours of the smoke as well of the dust cloud from a passing vehicle can be made visible in a different way; smoke always with darker grey levels than dust clouds. Also the origin of the fire can clearly be observed now and many details along the forest border. In general the transmission of smoke is better than that of dust clouds.
Another example of an 8-bit picture taken without a photopic filter, with mainly smoke as the obscurant, is given in figure 6.16. Because of the darkened picture in the relevant regions, a very small input range could be applied in the processing, which results in a remarkable improvement. Also, here the origin of the fire becomes perceivable. In general, scenario 3B and scenario 3A benefited most from the image processing. Especially, when smoke is the main obscurant, image processing often results in a spectacular improvement in vision.

Figure 6.15: File: M0608P19.IM8 / 8-bit with photopic filter,
date: 6-8-1990 / local time: 15:09:11,
session: 6.3 / scenario: 3B,
site block: 41/42, fig.3.4B,
PIN-code= 8 / IQ-code=43,
processing input range: 170-255 / contrast multiplier Gc=3.

Figure 6.16: File: M0608P58.IM8 / 8-bit without photopic filter,
date: 6-8-1990 / local time: 16:38:55,
session: 6.3 / scenario: 3B,
site block: 42, fig.3.4B,
PIN-code= 9 / IQ-code=62/53,
processing input range: 15-60 / contrast multiplier Gc=13.

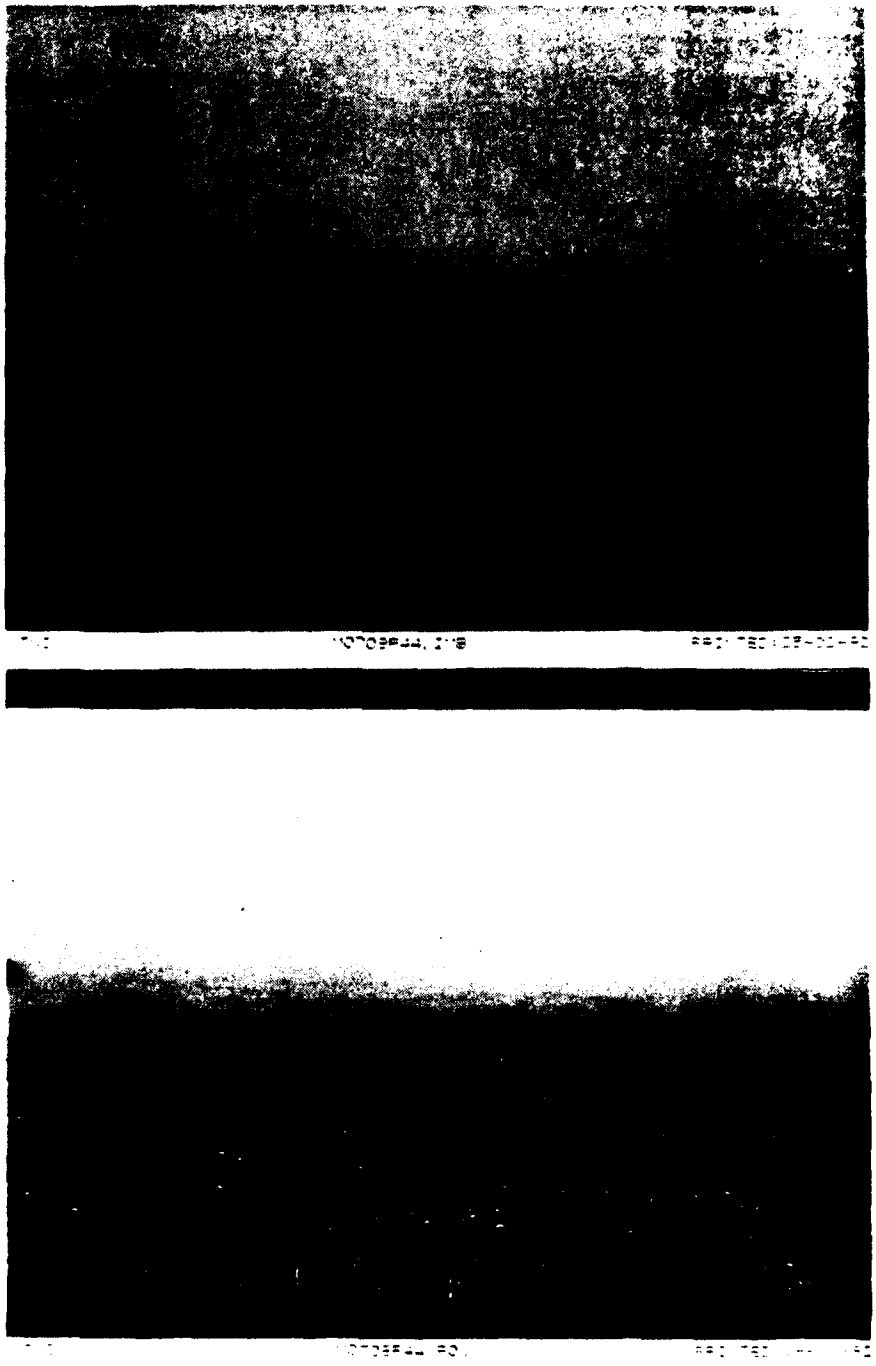

Figure 6.8: 8-bit picture with dust raised by a column of vehicles / scenario 3A.
Top before processing, bottom after processing.

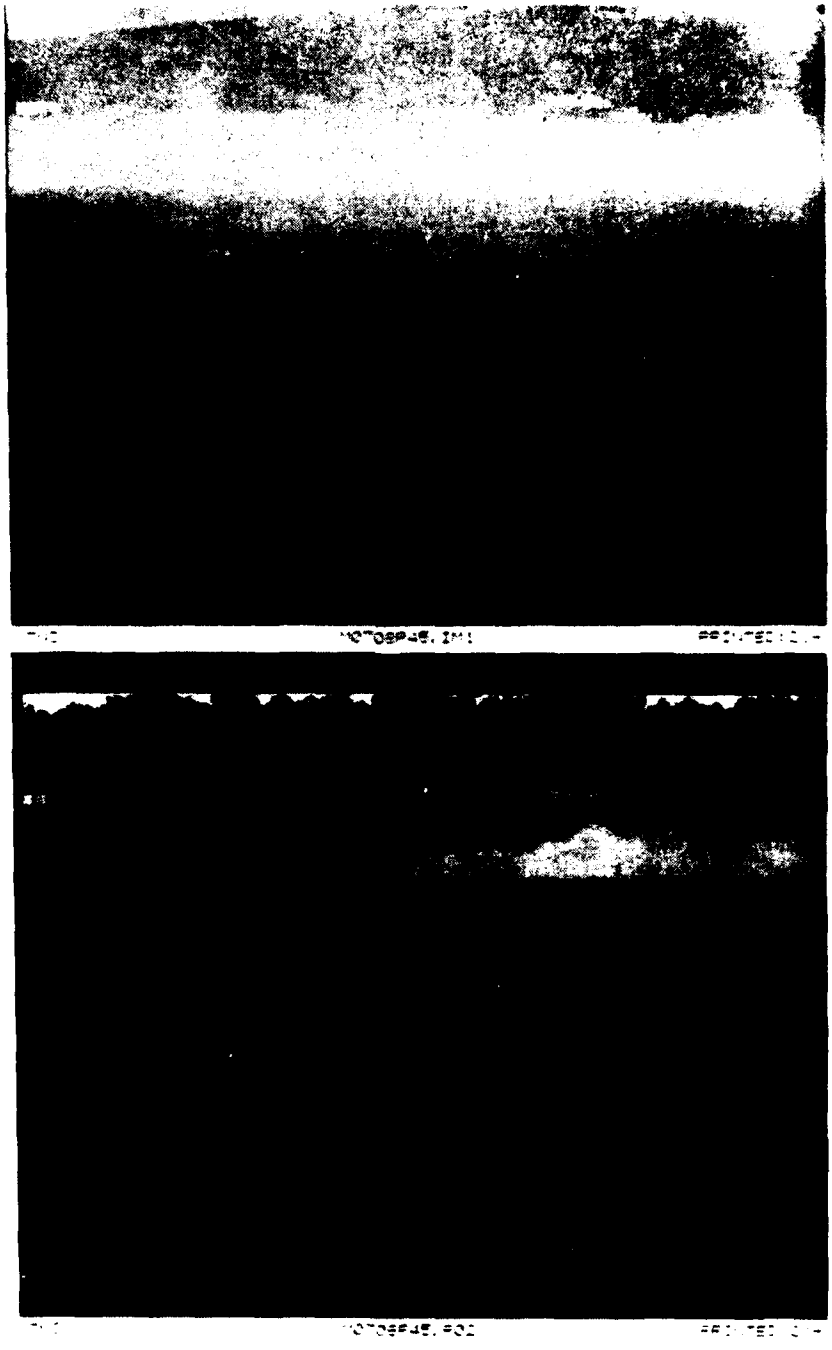

Figure 6.9: 12-bit picture with dust raised by column of vehicles; picture taken 9 seconds later than in fig.6.8 / scenario 3A.
Top before processing, bottom after processing.

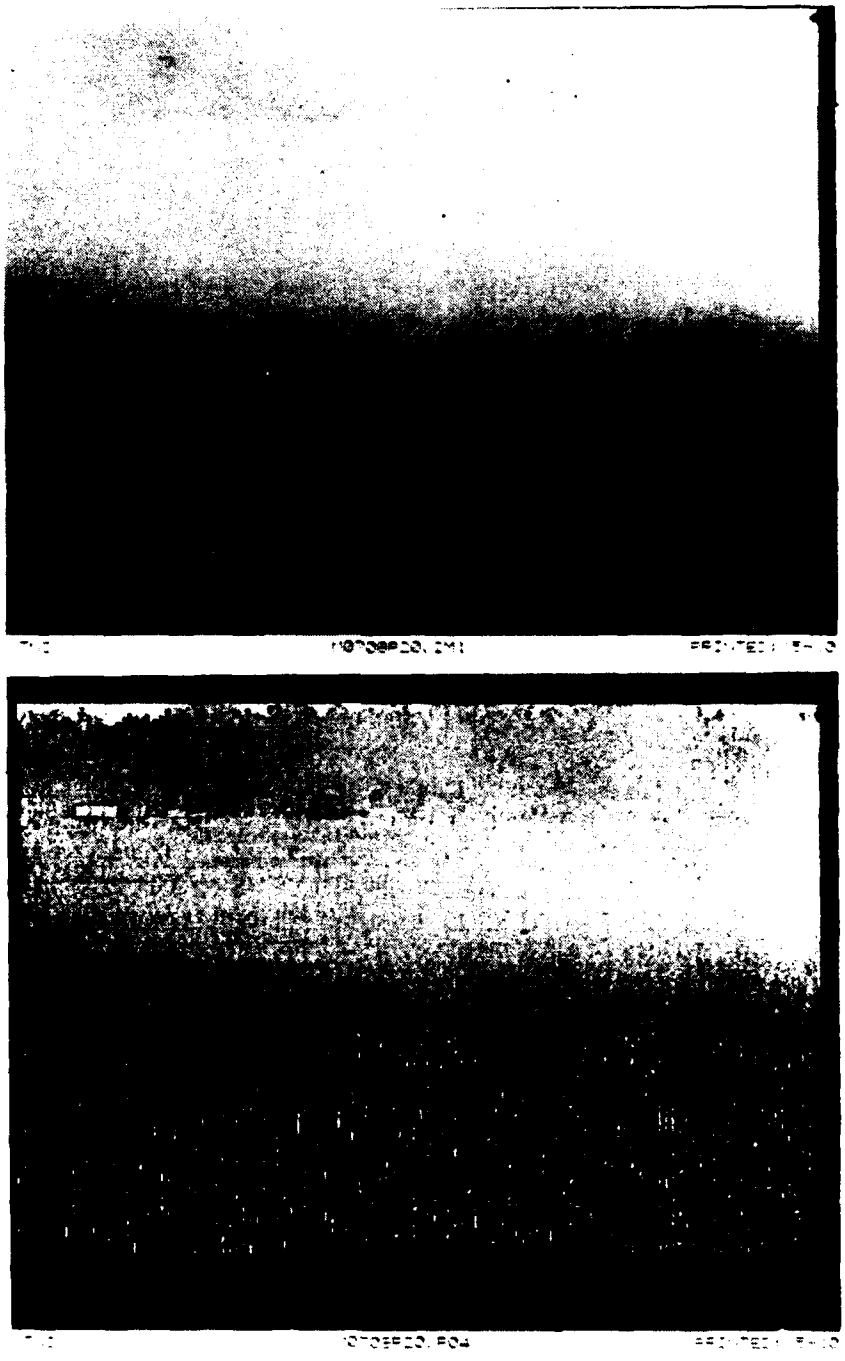

Figure 6.10: 12-bit picture with dust raised by column of vehicles / scenario 3A.
Top before processing, bottom after processing.

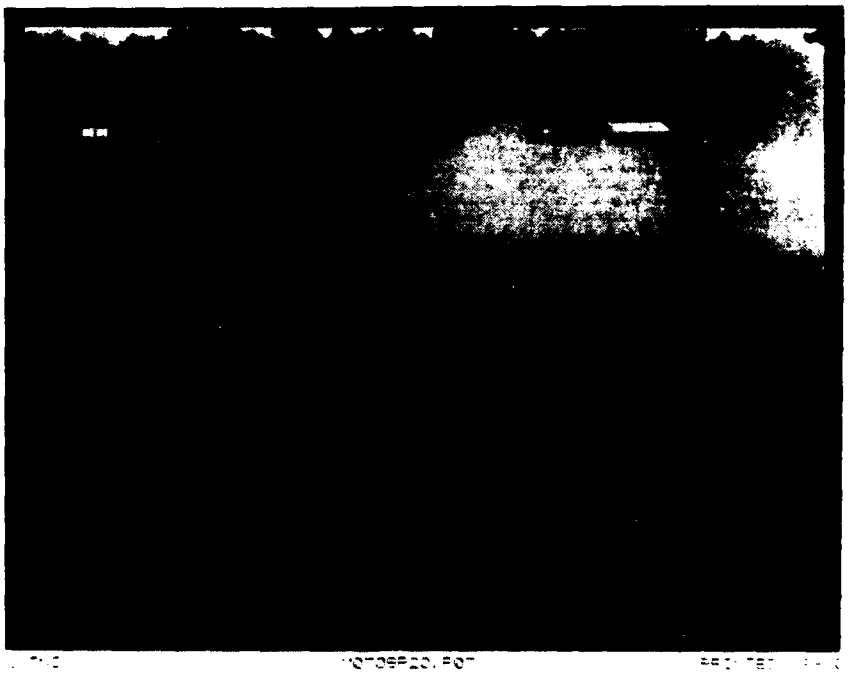

Figure 6.11: Processed 12-bit picture with dust raised by column of vehicles / scenario 3A / same picture as in fig.6.10, now processed with small input range.

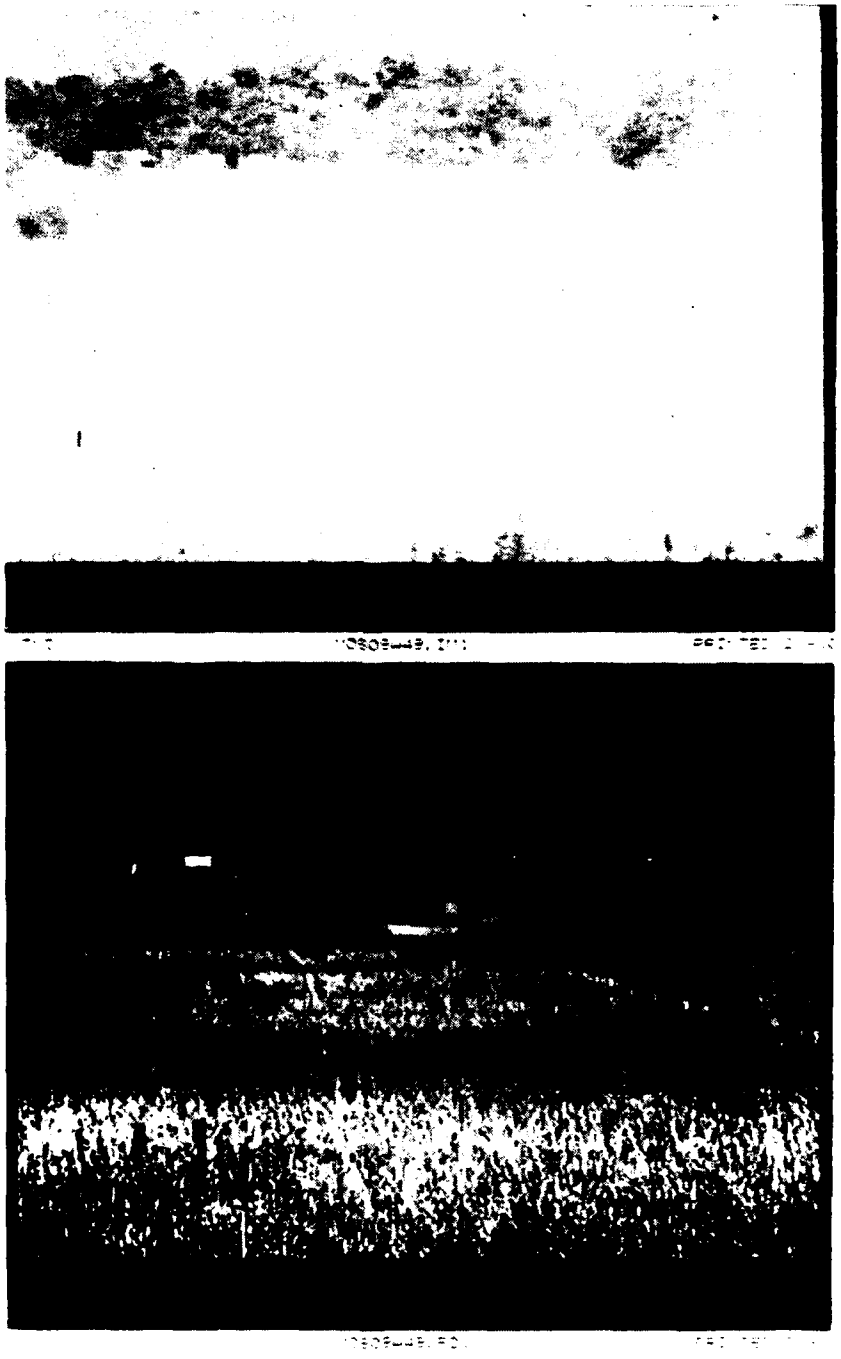

Figure 6.12: 12-bit picture with dust raised by column of vehicles / scenario 3A.
Top before processing, bottom after processing.

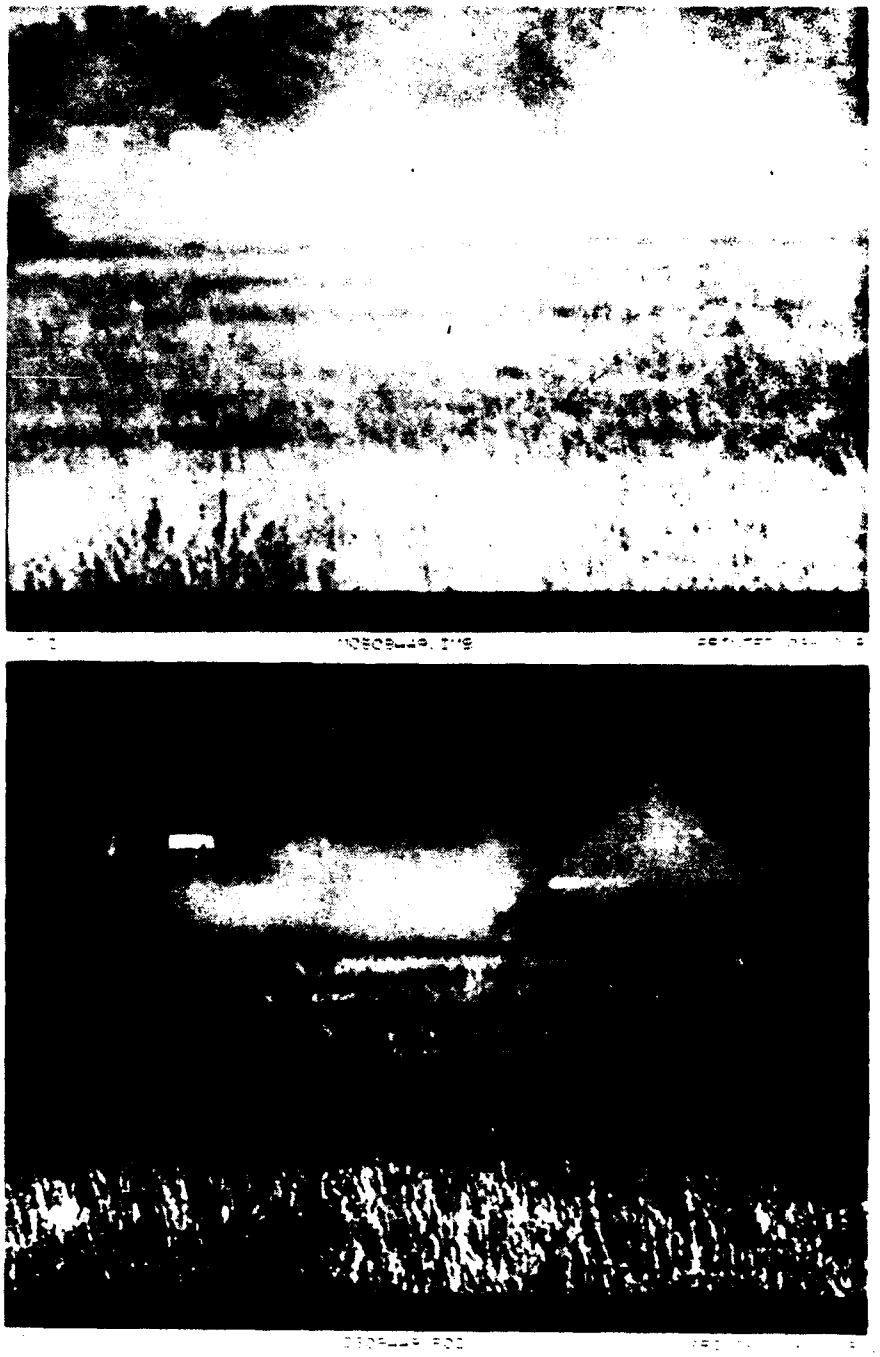

Figure 6.13: 8-bit picture with dust raised by column of vehicles / scenario 3A / picture taken 13 seconds after picture in fig.6.12.
Top before processing, bottom after processing.

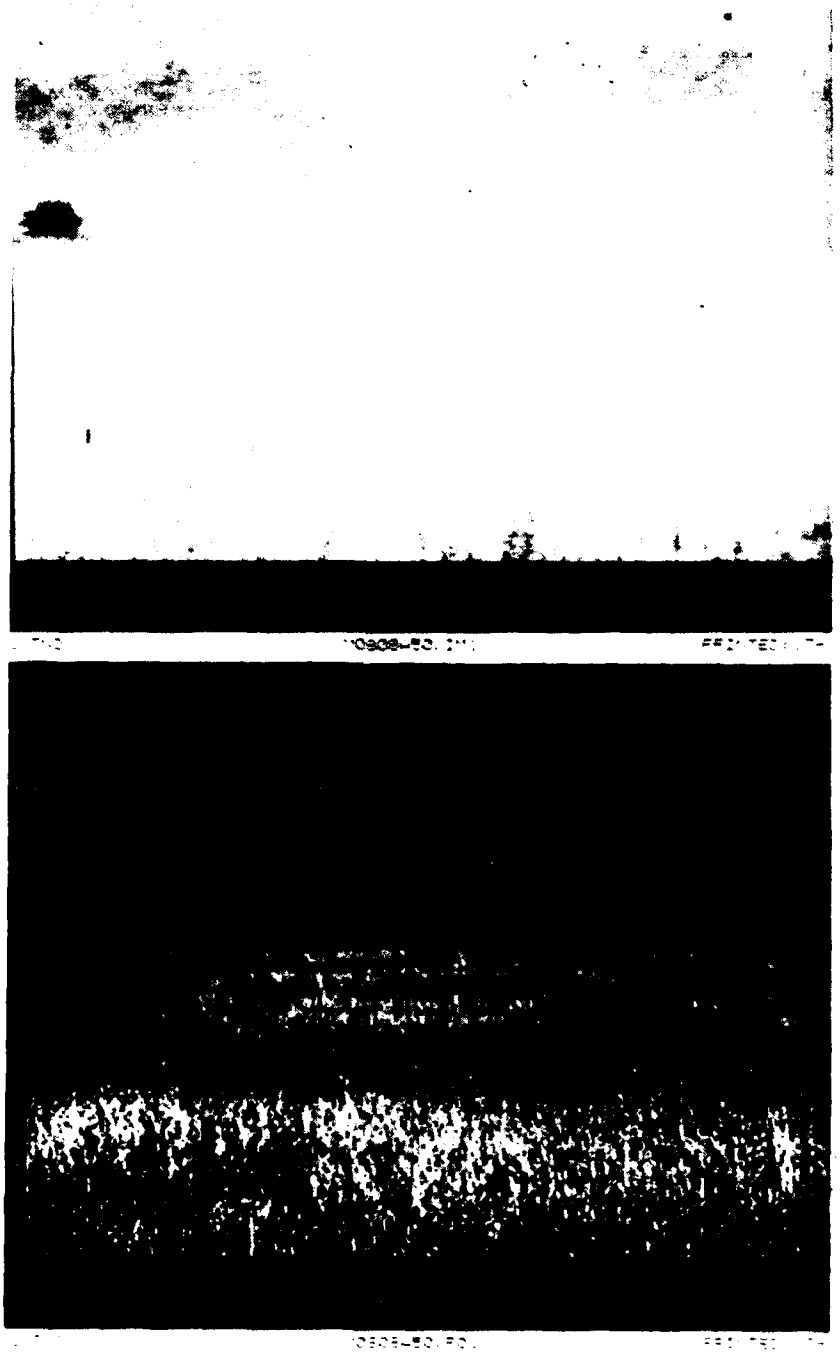

Figure 6.14: 12-bit picture with dust raised by column of vehicles / scenario 3A / picture taken 14 seconds after picture in fig.6.13.
Top before processing, bottom after processing.

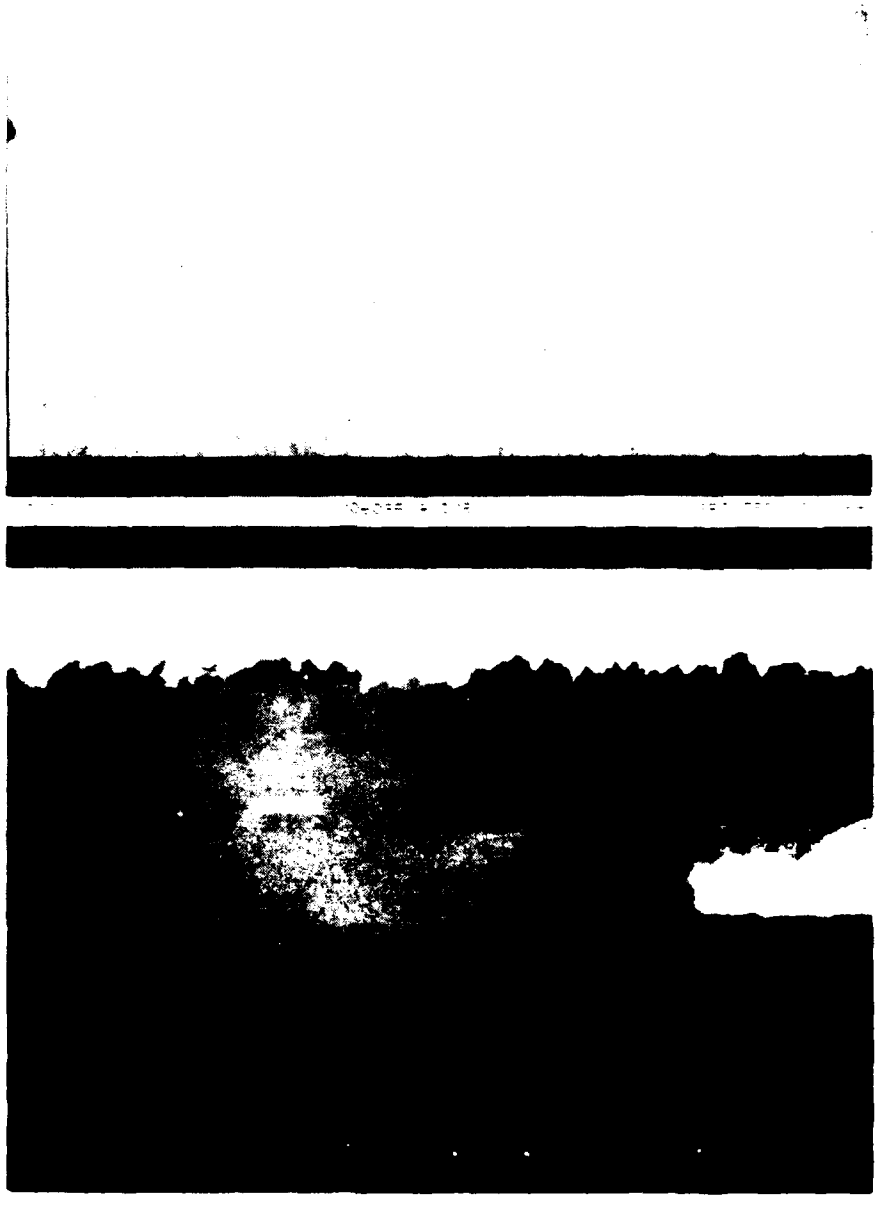

Figure 6.15: 8-bit picture with smoke and vehicle raised dust / scenario 3B.
Top before processing, bottom after processing.

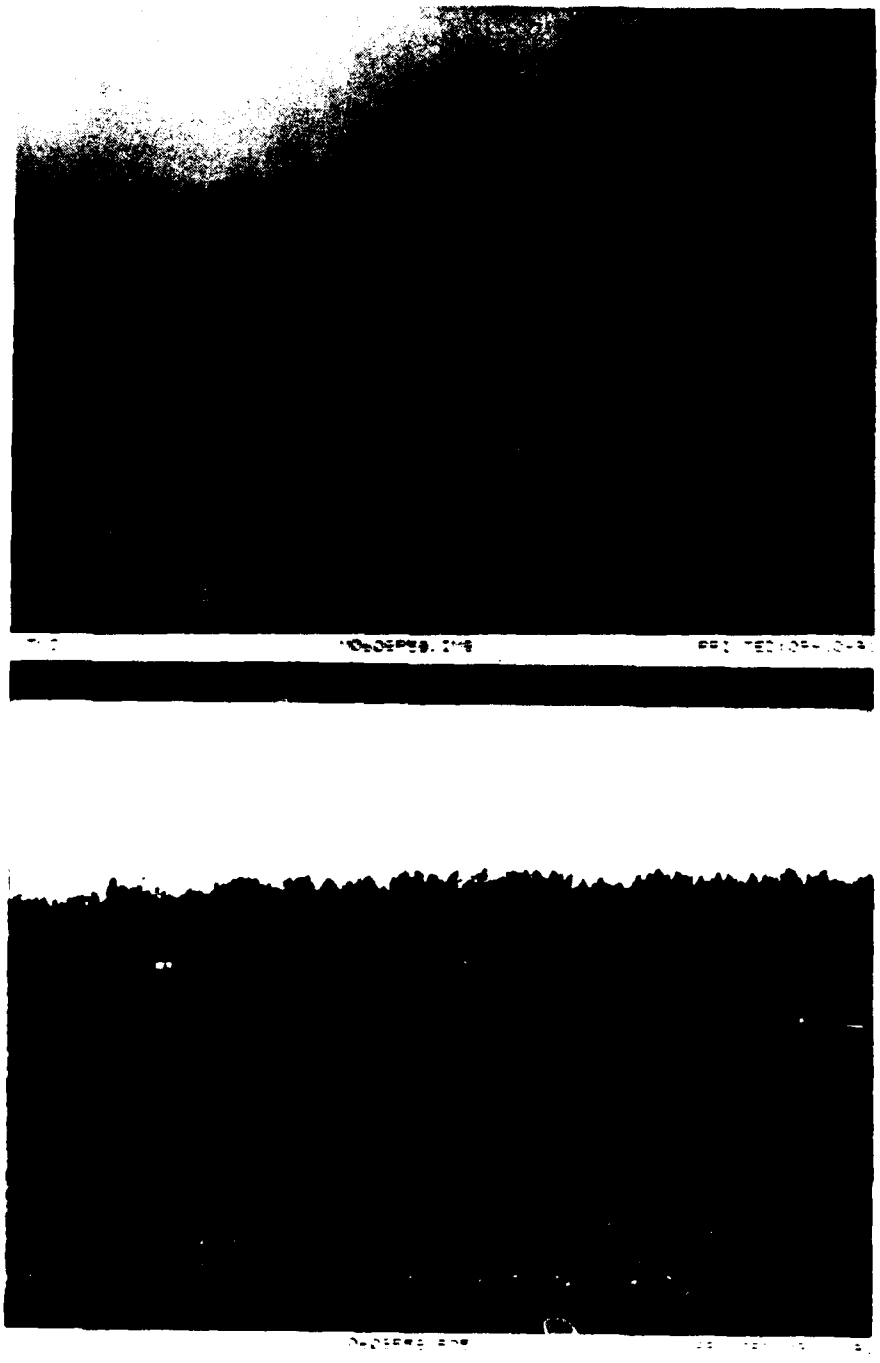

Figure 6.16: 8-bit picture with mainly smoke as obscurant / scenario 3B.
Top before processing, bottom after processing.

6.4 Scenario 4

Detection/recognition of vehicles in attack formation.

In scenario 4A only vehicle raised dust is present and in scenario 4B also dust clouds from sand bag explosions can be perceived. In scenarios 4C through 4E the battle field effects were generated near the observers at the MIA (Main Instrumentation Area) and could not be recorded by the cameras at the FIA (about 2.5 km from the MIA). Because of the relative low speed of the vehicles, the scene blurring is comparable with that in the scenarios 2 and 1. Most of the information is already perceivable before processing. Processing often results in clearer and sharper pictures, thus a comfortable presentation. Examples of such sharpened images are given with the 8-bit images in figure 6.17 for scenario 4A and in figure 6.18 for scenario 4B. Especially in figure 6.18, the perception of the jeep is considerably improved.

Figure 6.17 file: M3007P18.IM8 / 8-bit with photopic filter,
date: 30-7-1990 / local time: 15:02:54,
session: 30.3 / scenario: 4A,
site block: 42, fig.3.4B,
PIN-code= 7 / IQ-code=71,
processing input range: 15-180 / contrast multiplier Gc=5.

Figure 6.18 file: M0608A08.IM8 / 8-bit with photopic filter,
date: 6-8-1990 / local time: 12:47:34,
session: 6.2 / scenario: 4B,
site block: 42, fig.3.4B,
PIN-code= 46 / IQ-code=81,
processing input range: 25-240 / contrast multiplier Gc=10.

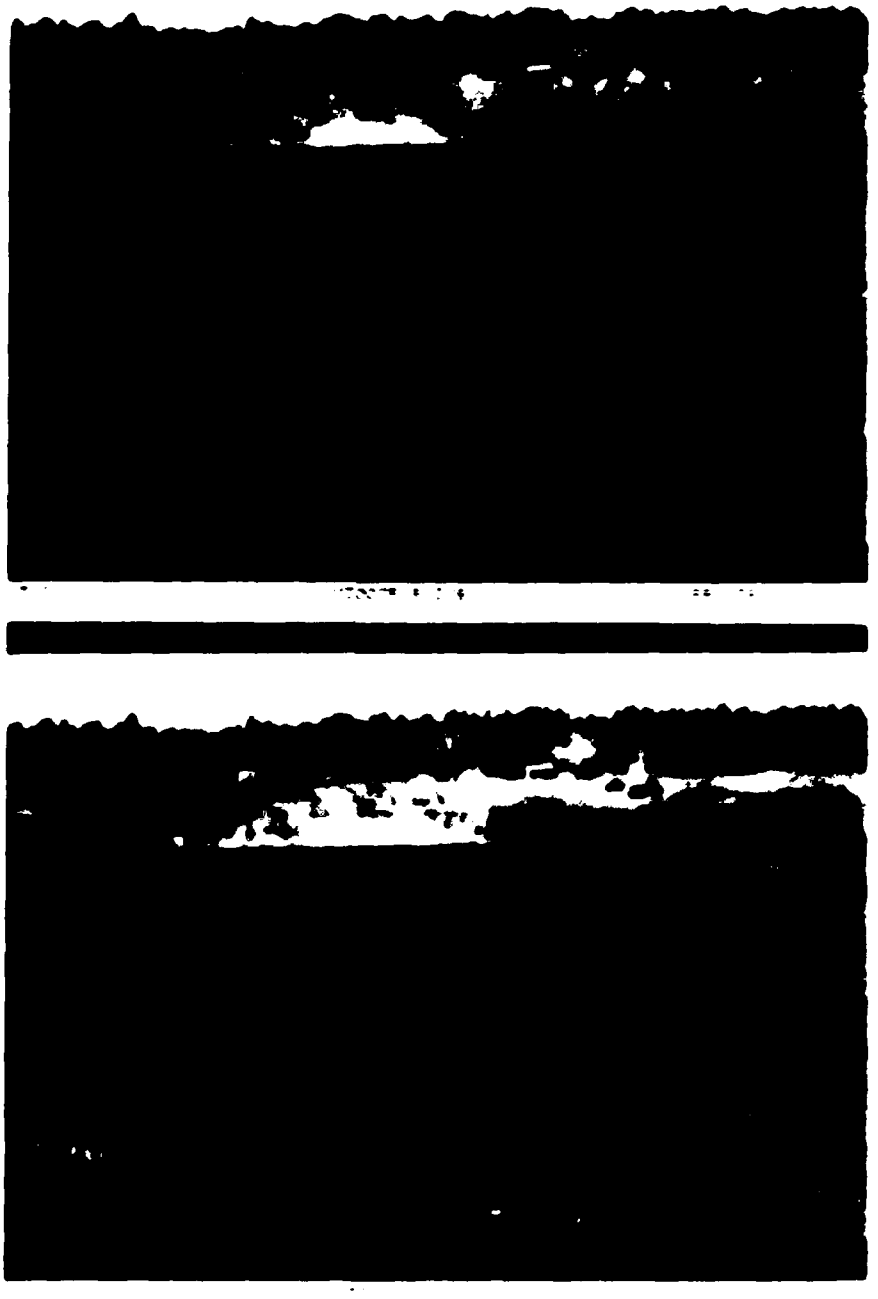

Figure 6.17: 8-bit picture with vehicles in attack formation with slight vehicle raised dust / scenario 4A
Top before processing, bottom after processing

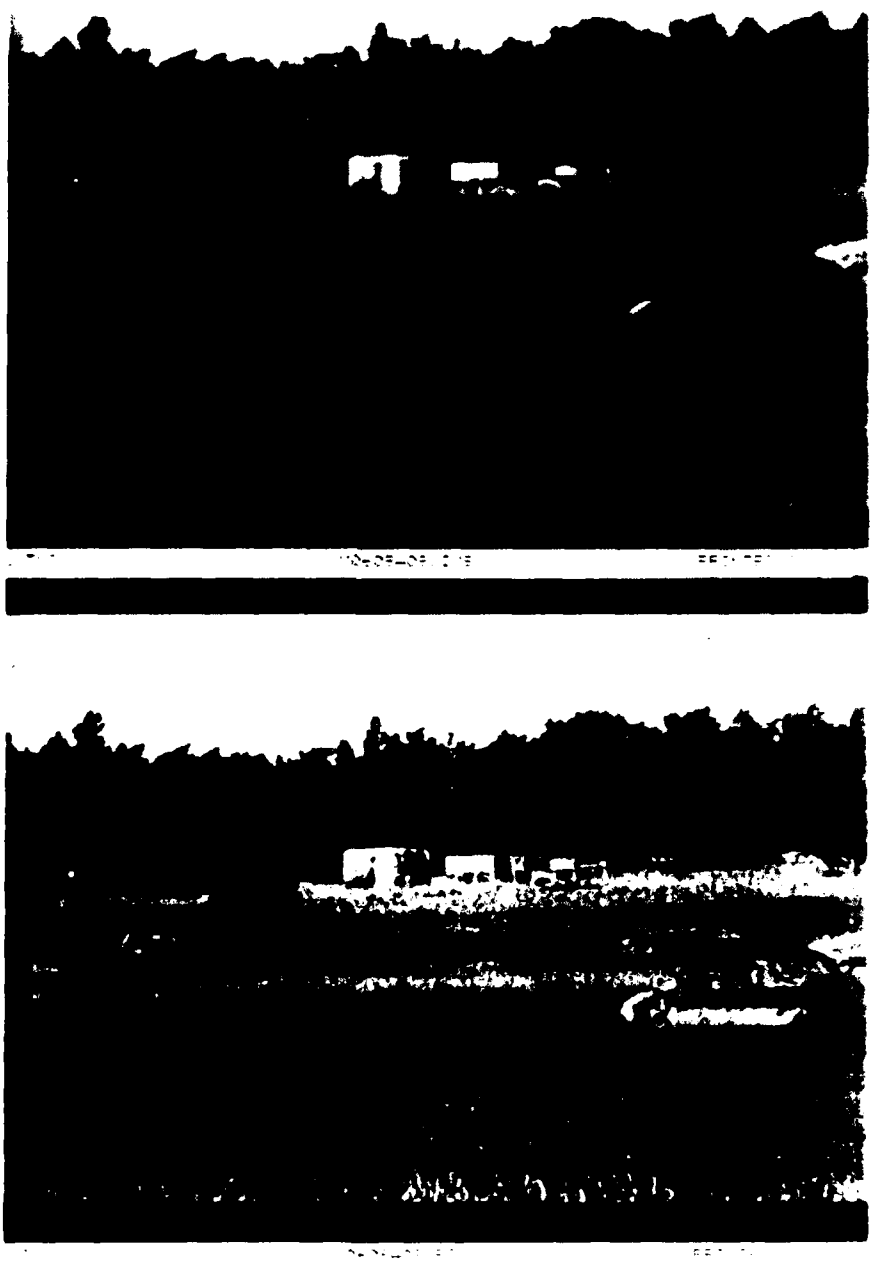

Figure 6.18: 8-bit picture with vehicles in attack formation / scenario 4B.
Top before processing, bottom after processing.

6.5 Low Light Level imaging

A two stage Image Intensified CCD-camera has been used during some night trials, to record still video pictures at very low light levels. The specification of this camera has been given in table 3.1.

Nearly all the pictures, taken at night with this II CCD-camera, are severely blurred by the 1 Hz flashlight that was used as aircraft beacon during the night trials. An example of such a picture is given in fig.6.19.

Figure 6.19: File: M0208N08.IM9 / image intensified without photopic filter,
date: 2-8-1990 / local time: 05:13:16,
session: 2.1 / scenario: 1L,
site block: 22?, fig.3.4A,
PIN-code= 8/ IQ-code=40,
processing input range: 5-250 / contrast multiplier Gc=1.

Processing renders only some better contours of the black board in the upper right of the picture. The full range of grey levels is already present in the original picture, so any relevant range transformation is not possible. Also an effective local contrast enhancement cannot be carried out (see Gc = 1) because of the very low contrast dynamics (mainly black and white spots), which is present in the original picture.

Also by daylight, pictures could be taken with the II CCD-camera due to the fast gating utility in the first stage of the image intensifier tube (MCP part). The contrast resolution in the Image Intensified daylight pictures showed to be significant lower than in the 8-bit daylight CCD-camera pictures and equal or less than that of the monitor. In general, processing then results only in a more comfortable presentation of information that can already be perceived in the unprocessed picture. Unfortunately the image intensifier gain could not be fixed at a wanted low level during the trial. It has been shown afterwards that an as low as possible gain with a corresponding longer gating time can result in considerably better pictures.

An example of an automatic gain controlled image intensified daylight picture, recorded in Mourmelon, is given in fig.6.20.

Figure 6.20: File: M0808A23.IM9 / image intensified with photopic filter,
date: 8-8-1990 / local time: 10:02:27,
session: 8.2. / scenario: 3A,
site block: 42/43, fig.3.4B,
PIN-code= 8/ IQ-code=50,
processing input range: 50-255 / contrast multiplier Gc=1.

Cooling the sensor of the 12-bit camera limits the thermal generated noise to the specified level and results in a background limited imaging system. This allows long exposure times under low light level conditions. The photo in fig.6.21 represents a picture taken early in the morning with an exposure time of four seconds and yet with the illumination just up to a small fraction of the sensors saturation level (see input range).

The processing shows nonetheless that relevant information has been recorded and can be made perceivable by processing.

Figure 6.21: File: M0208N13.IM1 / 12-bit without photopic filter,
date: 2-8-1990 / local time: 05:19:54,
session: 2.1 / scenario: 1L,
site block: 22, fig.3.4A,
PIN-code= 8 / IQ-code=41/32,
processing input range: 40-450 / contrast multiplier Gc=2.

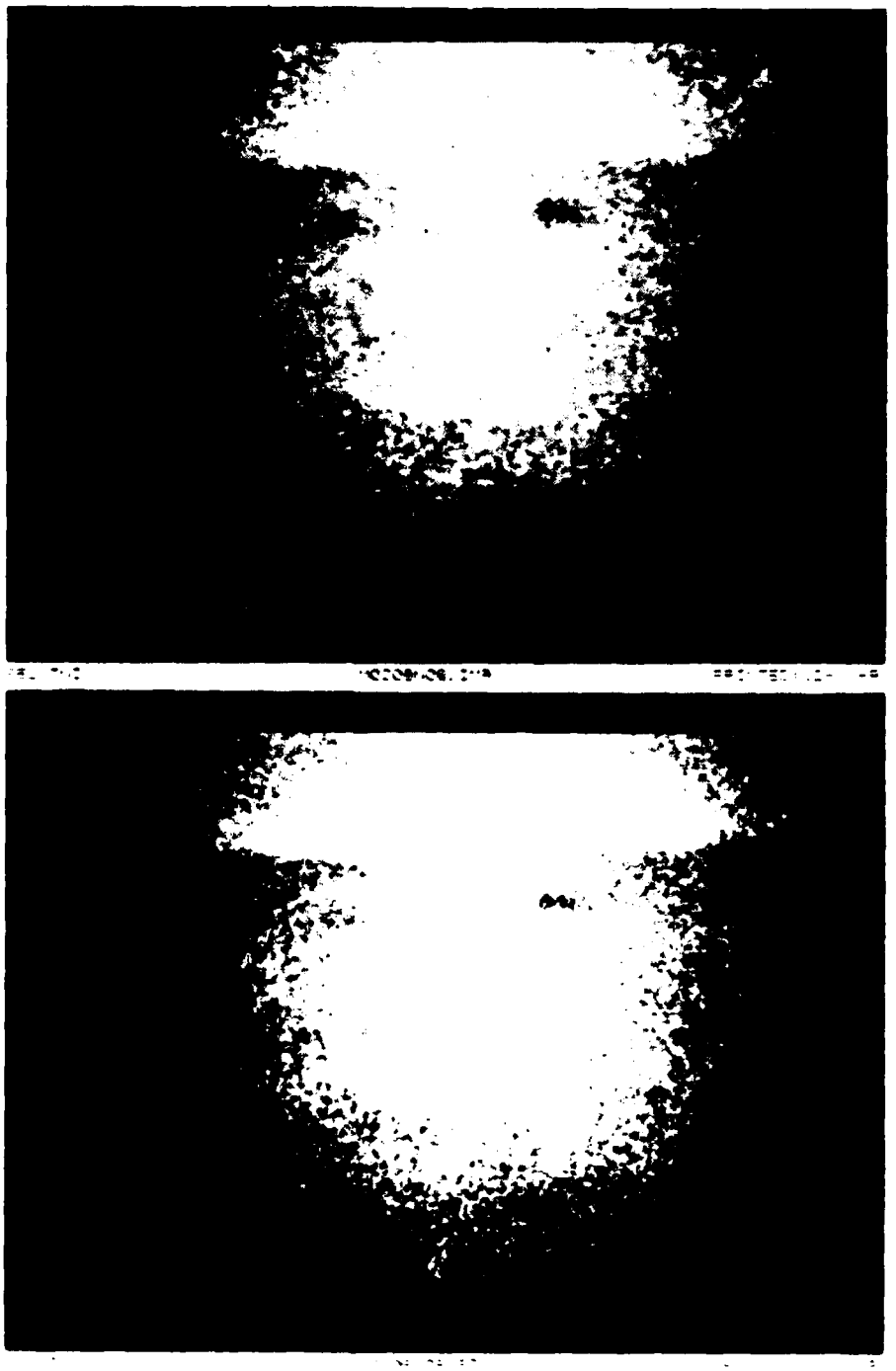

Figure 6.19: Image Intensified CCD-camera picture, taken at low light level, blurred by flashlight / scenario 1L.
Top before processing, bottom after processing.

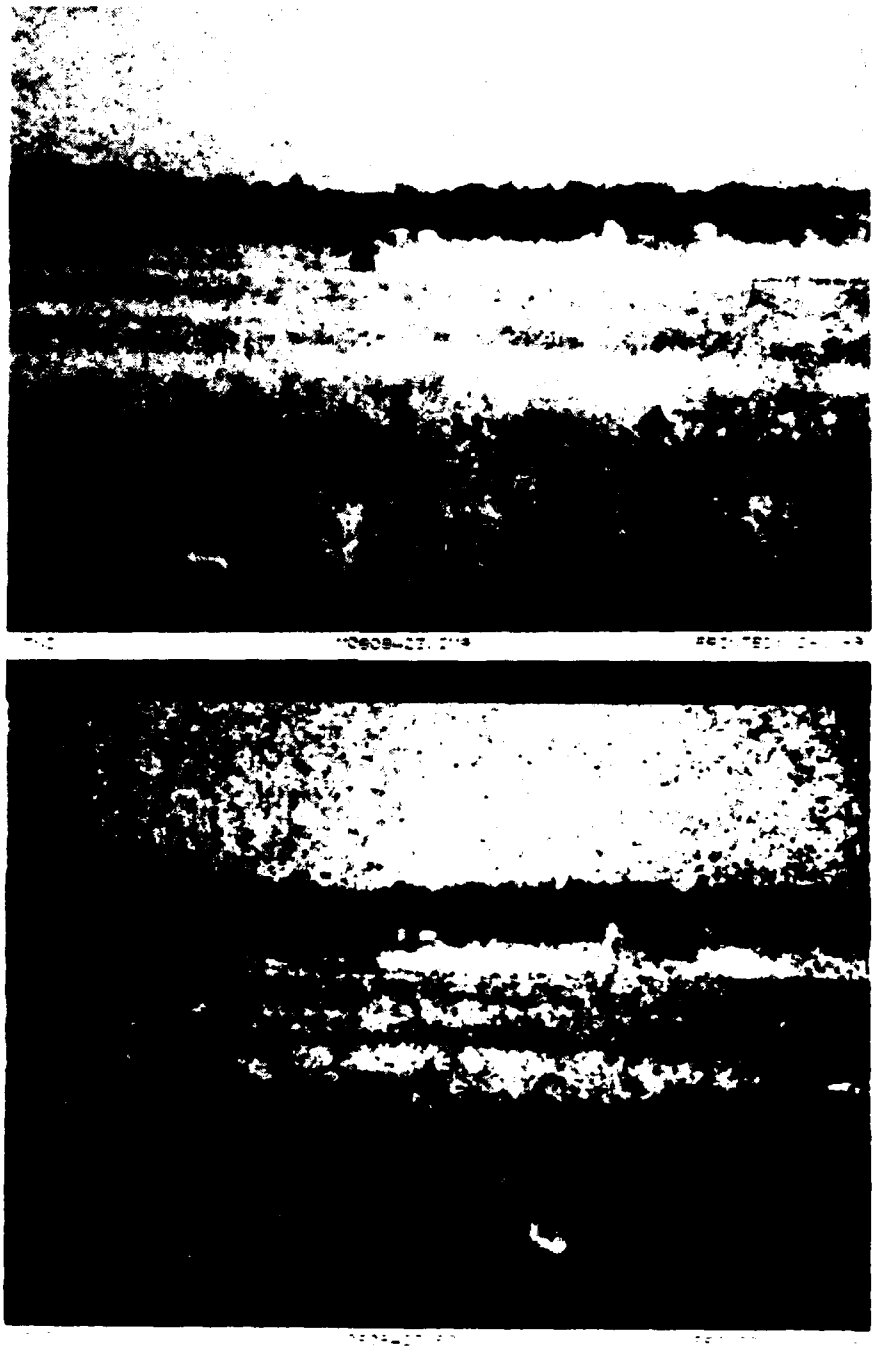

Figure 6.20: Image Intensified CCD-camera picture, taken by day with 3 microseconds gating (exposure) time / scenario 3A.
Top before processing, bottom after processing.

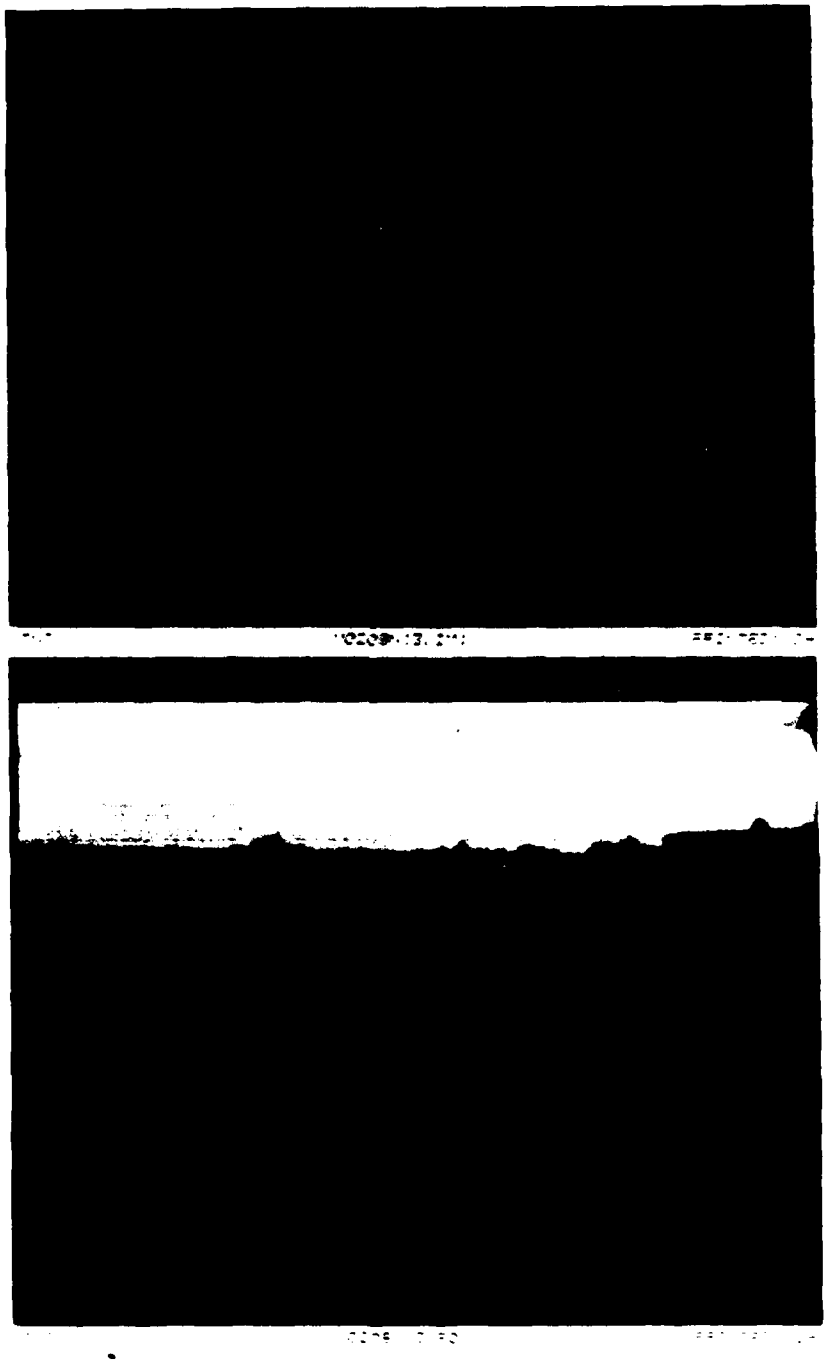

Figure 6.21: Processing result of 12-bit picture taken at low light level with 4 seconds of exposure time / scenario 1L.
Top before processing, bottom after processing.

6.6 Survey of parameters for the pictured images

Table 6.1: Parameters of the images, pictured in the figures of chapter 6.

Fig.	sess	scen	file	time	phot filt	IQ	PIN	Xmin	Xmax	Gc
6.1	2.1	1R	M2008A29.IM8	10:12:04	no	81	7	16	164	5
6.2	31.3	2ALF	M3107P41.IM1	10:03:25	no	61	7	1500	4095	8
6.3	31.3	2ALF	M3107P45.IM1	16:05:05	no	61/62	7	1300	4095	7
6.4	1.3	2BLF	M0108P07.IM1	14:25:02	yes	62	8	600	2100	7
6.5	31.2	2CLS	M3107A17.IM8	10:22:40	yes	40	6	20	240	10
6.6	31.2	2CLS	M3107A18.IM1	10:23:04	yes	51	8	1800	3630	10
6.7	31.2	2CLS	M3107A19.IM8	10:23:16	yes	62	8	80	215	12
6.8	7.3	3A	M0708P44.IM8	14:36:52	yes	40	6	40	165	12
6.9	7.3	3A	M0708P45.IM1	14:37:01	yes	53	8	1700	3900	10
6.10	7.3	3A	M0708P20.IM1	14:04:03	yes	52	9	750	4095	17
6.11	„	„	„			53		2800	4095	10
6.12	8.2	3A	M0808A48.IM1	10:51:11	no	62	8	2500	4095	9
6.13	8.2	3A	M0808A49.IM8	10:51:24	no	62	9	115	215	10
6.14	8.2	3A	M0808A50.IM1	10:51:38	no	43/52	8	2700	4095	8
6.15	6.3	3B	M0608P19.IM8	15:09:11	yes	43	8	170	255	3
6.16	6.3	3B	M0608P58.IM8	16:38:55	no	62/53	9	15	60	13
6.17	30.3	4A	M3007P18.IM8	15:02:54	yes	71	7	15	180	5
6.18	6.2	4B	M0608A08.IM8	12:47:34	yes	81	46	25	240	10
6.19	2.1	1L	M0208N08.IM9	05:13:16	no	40	8	5	250	1
6.20	8.2	3A	M0808A23.IM9	10:02:27	yes	50	8	50	255	1
6.21	2.1	1L	M0208N13.IM1	05:19:54	no	41/32	8	40	450	2

Some of the images in table 6.1 have been assigned two values for its IQ-code. The first mentioned value corresponds with the value (for the corresponding image) given in the list of recordings (Appendix C) and in the list of processed images (Appendix D). These values have been determined on basis of the monitor displayed pictures. An eventual second value of the IQ-code has been chosen on basis of the (original) video-prints as they are used in this report. The codes are not always unambiguous; the effect of processing, for instance, might be appreciated between 1 and 2 or between 2 and 3. The final choice then can depend on the way of displaying the picture.

7 CONCLUSIONS AND RECOMMENDATIONS

a Processing results in a relevant improvement of the monitor perception of still video pictures for about 90% of the processed 12-bit pictures and for about 70% of the processed 8-bit daylight pictures.

b Pictures blurred by smoke due to fires and/or blurred by dust, raised by fast-moving vehicles (scenario 3B and scenario 3A) benefited most from the dedicated image processing.
Simple analysis shows that in general the transmission through smoke has been somewhat better than through dust, at Mourmelon. The transmission of dust clouds can change considerably within 10 to 20 seconds.

c The contrast loss through dust clouds in pictures, taken immediately after sand bag explosions, is so large that neither before nor after image processing any information about the scene behind the dust cloud was observed and therefore no information had been recorded. However, within about 30 seconds after the explosion the transmission is already considerably improved, a significant effect of processing is observed as well.

d The difference in performance of the 8-bit daylight and of the 12-bit camera can clearly be shown by, and only after, image processing. An improved camera performance is relevant therefore in combination with image processing.

e Pictures, taken with automatic gain control of Image Intensified CCD-cameras, are severely bloomed by flash light sources. Sometimes a solution might be found by optimizing the gating and gain controls. In daylight pictures the intensifier gain must be kept as low as possible.
No relevant effect in processing the image intensified pictures is observed.

f With high performance cameras, relevant 'still' pictures can be made at low light levels (with a better quality than with LLL cameras down to a limited light level).

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LEGEND OF TABLES

scen : type of scenario
L=left track ; LS=left slow ; LF=left fast
R=right track ; RS=right slow

session: number according best-two testplan [2]
aa.b with aa=day number of date
b= following number of session on that day, with:
b=1 (early) night session, corresponding with N in filename
b=2 morning session, corresponding with A in filename
b=3 afternoon session, corresponding with P in filename
b=4 late night session (no CCD recordings)

time : time period within the session during which the images have been recorded (local time)

obscurant: the main obscurant during the session;
only one is indicated; more information can be extracted from the best two testplan [2].

DESCRIPTION OF TRIAL ASPECTS

run time: time of one complete run along one of the tracks.
position of the vehicles can be inferred from Valeton c.s [4].

nr.runs: number of runs in that session.

nr veh: number of vehicles per run in that session.

speed: averaged speed of the vehicles in that session
more details in Valeton c.s [4].

formation: time 'distance' in between passing of 2 vehicles, 'column' means the mentioned nr of vehicles drive in a column with a distance of about 50 meter between the vehicles; a mentioned 'time distance' together with 'column' indicates the time in between 2 columns.
'att' or 'attack' refers to a number of vehicles in attack formation and 'stop' refers to the time the formation is halted (see also [2] and [4]).

vehicle types: L2= Leopard 2 tank
Pi= tracked vehicle PRI
Pa= tracked vehicle PRAT
Ta= tank
Tr= truck or camion
Trc= camouflaged truck
A3= AMX 30 tank
A3c= camouflaged AMX 30 tank
A1= AMX 10 tank
A1c= camouflaged AMX 10 tank
J= Jeep

remarks: . remarks on the type and number of used obscurants

image file: filename during testweek: MTddmmnn.IMc
dd=day number
mm=month and nn=following number
c= camera type, with c=1 for the 12-bit daylight, c=8 for the 8-bit daylight and c=9 for the image intensified 8-bit camera.
filename during regular trials: Mddmmbnn.IMc
dd, mm, nn and c as given for the testweek, and b= type of session with b= N, A or P according the session number, given under 'session'.

12-bit orig. total number of original 12-bit images, recorded in the corresponding session.

12-bit proc.. number of processed 12-bit images, out of the corresponding session.

12-bit US-db. number of 12-bit images, selected for the US database out of the corresponding session.

12-bit Fi-db number of 12-bit images, selected for the final database out of the corresponding session.

8-bit orig. total number of original 8-bit images, recorded in the corresponding session.

8-bit proc. number of processed 8-bit images, out of the corresponding session.

8-bit US-db. number of 8-bit images, selected for the US database out of the corresponding session.

8-bit Fi-db number of 8-bit images, selected for the final database out of the corresponding session.

Appendix A: Image data distribution and description per session

scen.	session	time	obscurant	description						
				run time	nr.runs	nr.veh	speed	formation	vehicle types	remarks
1 L	26.2	09.15-10.56	vehicle dust	30 min	1	2	6 km/hr	45 min dist.each	L2-Pi	
1 R	27.3	14.08-16.26	,,	,,	1	6	,,	30 min dist.each	Ta?-Tr	
1 L	2.1	03.45-06.05	,,	,,	1	6	,,	,,	(Pi-A3c-Tr-A1c)?	
1 R	2.2	08.18-11.31	,,	,,	1	6	,,	,,	L2-A3c-Pa-A3-Pi-Tr	
1 L	3.3		,,	,,	1	5	,,	,,		
1 R	6.4		,,	,,	1	6	,,	,,		
1 L	10.2		,,	,,	1	6	,,	,,		
2A LF	31.3	13.57-16.06	,,	10 min	1	7		,,	L2-Pa-Tr-Trc-A3-Pi-A1	
,, LS	31.4	22.15-00.26	,,	15 min	1	7		,,	idem	
,, RS	8.1		,,	10 min	1	7		,,		
2B LF	1.3	14.05-16.02	oil fire	10 min	1	7		,,	Tr-Pi-A3c-A1-J-A1c-L2	3 fires
,, LS	3.4		-	15 min	1	6		,,		
2C L	31.2	09.22-11.54	art.barrage	15 min	1	8	25 km/h	20 min dist.each	A3-A1-Pa-A3c-Trc-L2-A3-A1	32 sandbags/3500m
3A	7.3	14.00-15.52	vehicle dust	8 min	4	13-8	20 km/h	column-20 min dist.	all vehicles	
	8.2	09.16-11.38	,,	,,	4	6-8-12	,,	column-45 min dist.	all vehicles	
3B	6.3	14.55-16.57	oil fire	8 min	4	7-11	6 km/hr	column-30 min dist	all vehicles	2x3 fires

Appendix A: Image data distribution and description per session

scen.	session	time	obscurant	run time	nr.runs	nr.veh	speed	formation	vehicle types	remarks
				description						
4A	27.2	10.04-11.13	-	10 min	2	4x3	6 km/hr	att/col/45min dist	all vehicles	
	30.3	13.28-16.36	-	6 min	4	4x12	,,	att/col/15-30min dist	all vehicles	
4B	6.2	12.03-12.51	art.barr.		1	22		att/stop 4x20 min		80 sandbags
4C	1.2	11.17-13.35	,,	13 min	1	7		attack	3A1-A3	
	7.2	10.58-11.07	,,	17 min	1	8		att/ stop 10-5 min	4A1-2A3-Pa-L2	
	10.3	-	,,	11 min	1	12		attack		
4D	2.3	-	LUST	30 min	1	11		attack		12xLUST at MIA
	9.2	11.01-11.06	,,	14 min	1	11		attack/ stop 7 min	5A1-2A3-A3c-L2-Pi-Pa	,,
4E	3.2	11.00-11.05	LUST+art.bar	9 min	1	8		attack	2A1-3A3-Pi-Pa-L2	6xLUST/40 sandbags
	9.3	-	,, ,, ,,	12 min	1	12		attack/stop 23 min		,,
CHAR	26.3	15.25-15.28	-	120 min	1	9		3xstop 15-15-60 min	A1-A3?-L2?	
CH-FEL	30.2	10.56-12.05	-						A1-A3-J?	
	8.3	-	-			8				1lust/1sand/1fire(300m-MIA
	9.4	-								1lust/2sand/1fire(500m-MIA

scen.	session	time	image file	12bit orig.	12bit proc.	12-bit US-db	12-bit Fi-db	8-bit orig.	8-bit proc.	8-bit US-db	8-bit Fi-db
1 L	26.2	09.15-10.56	MT2607xx.IMx	9	0	1	1	9	0	9	9
1 R	27.3	14.08-16.26	MT2707xx.IMx	15	0	11	13	23	0	22	23
1 L	2.1	03.45-06.05	M0208Nxx.IMx	28	21	23	27	12	6	9	11
1 R	2.2	08.18-11.31	M0208Axx.IMx	19	9	0	6	30	17	24	27
1 L	3.3										
1 R	6.4										
1 L	10.2										
2A LF	31.3	13.57-16.06	M3107Pxx.IMx	32	29	30	31	18	16	10	16
,, LS	31.4	22.15-00.26	M3107Nxx.IMx	1	0	0	1	1	0	1	1
,, RS	8.1										
2B LF	1.3	14.05-16.02	M0108Pxx.IMx	26	26	26	26	17	13	11	17
,, LS	3.4										
2C L	31.2	09.22-11.54	M3107Axx.IMx	13	11	12	13	17	13	14	17
3A	7.3	14.00-15.52	M0708Pxx.IMx	38	35	34	38	35	35	34	35
	8.2	09.16-11.38	M0808Axx.IMx	26	23	24	26	46	40	46	46
3B	6.3	14.55-16.57	M0608Pxx.IMx	38	27	2	22	39	30	31	35
4A	27.2	10.04-11.13	MT2707xx.IMx	10	0	1	5	11	0	7	8
	30.3	13.28-16.36	M3007Pxx.IMx	17	10	2	6	21	8	14	14
4B	6.2	12.03-12.51	M0608Axx.IMx	7	3	0	2	7	2	3	7
4C	1.2	11.17-13.35	M0108Axx.IMx	5	4	0	5	5	3	4	5
	7.2	10.58-11.07	M0708Axx.IMx	1	0	0	0	18	12	15	16
	10.3	-	-								
4D	2.3	-	-								
	9.2	11.01-11.06	M0908Axx.IMx	0	0	0	0	16	11	11	11
4E	3.2	11.00-11.05	M0308Axx.IMx	5	3	1	2	5	3	5	5
	9.3	-	-								
CHAR	26.3	15.25-15.28	MT2607xxIMxx	0	0	0	0	3	0	1	1
CH-FEL	30.2	10.56-12.05	M3007Axx.IMx	4	1	0	0	33	6	3	16
	8.3	-	-								
	9.4	-	-								
				294	202	167	224	366	215	274	320

B.1 THE PIN CODE

The PIN code (Picture Interest) is a one or two digit number, that is assigned to any of the image files. This number can be found in column 18 of the listing of recordings given in Annex C.
The first digit (if present) refers to a special class of images and the second to the interest of the picture. The interest of the picture may be determined by the effect of processing, to be expected, but may also refer to interesting aspects of the site, the trials or interesting battle field effects. Low quality pictures with few information may e.g. have a high interest number when they can be used for demonstration purposes of special effects or phenomena to be described.
A nice picture with a lot of information can be of low interest (PIN code = 5 e.g.), especially when the information already is presented in a clear and comfortable way and several specimen of this kind of pictures already are present in the data base. On the other hand, such a picture may have a high Image Quality (IQ) number (see paragraph B.3).
All the PIN code numbers have been determined by mutual arrangement of 2 or 3 independent observers.

The first digit of the PIN code refers to one of the following classes:

1 = image disturbed by camera movements
2 = condense on sensor surface
3 = dark picture (for determining noise level e.g.)
4 = over-exposed image
5 = ice on sensor surface
6, 7 and 8 are pictures, taken at the Mourmelon site, but not during the official battle field sessions. Pictures may nevertheless contain 'battle field' like aspects. These pictures are differentiated according :

- 6 = pictures of this special category and simultaneously belonging to one of the categories 1, 2 and/or 5
- 7 = pictures of this special category and simultaneously belonging to one of the categories 3 and/or 4
- 8 = pictures of this special category, but not belonging to one of the categories 1 up to and including 5

9 = private pictures and/or pictures without any connection with the Mourmelon trials.

Most of the regular pictures do not belong to one of these categories and then have only a one digit PIN code number, which refers to the interest of the picture.
The list of image files, to be given in Annex C will contain no pictures out of categories 1, 6 and 9. All the categories are mentioned here in order to explain the differences between this list and the first (draft) list, distributed at the 'Soesterberg' meeting in October 1990 [5].

The second (or single) digit of the PIN code refers to the interest of the picture in the following way :

0 = completely unsuccessful pictures ; will not be included in the final list of recordings.
1 = n.a.
2 = n.a.
3 = unsharp images ; will not be included in the final list of recordings.
4 = bad quality and uninteresting pictures ; will not be included in the final list of recordings.
5 = uninteresting pictures, because of missing any battle field effects and/or no effect of image processing is expected and/or many similar pictures are present in the data base. Nevertheless these pictures might have good image quality.
6 = moderate interesting, because of its frequent occurrence. Some effect of processing is expected.
7 = reasonably interesting pictures with respect to battle field effects or processing effects.
8 = large effect of processing expected and/or special battle field effect present.
9 = unique picture, because of its occurrence and/or processing effect.

B.2 SELECTIONS

The selections for the US-database and for the Final database have been made only by using the described picture interest (second digit in the PIN-code number or the single digit PIN-code number). In assigning the PIN-code, a wanted selection might have been taken into account.

B.2.1 Selection for the US-database

The selected images for (and transmitted to) the US-database are indicated by a letter 'd' in column 20 of the listing of recordings in Appendix C. These image files are available from the US-database.

The selection rules have been:

a of class 0 (single digit PIN-code) images with PIN-code 6,7,8 and 9
b of class 1 no images
c of class 2 images with PIN-code 8 and 9
d of class 3 images with PIN-code 7,8 and 9
e of class 4 images with PIN-code 7,8 and 9
f of class 5 images with PIN-code 8 and 9
g of class 6 no images
h of class 7 images with PIN-code 8 and 9
i of class 8 images with PIN-code 7,8 and 9
j of class 9 no images
k of Image Intensified CCD images (extension *.IM9)
the images with PIN-code 8 and 9

B.2.2 Selection for the final database

The selections for the final database (at FEL-TNO), according the here below given rules, are indicated with the letter 'r' in column 20 of the listing of recordings in appendix C. All the image files in the US-database also are included in the final database; the selection is somewhat extended; for the final database, the lowest PIN-code numbers are 1 lower than for the US-database.

For RSG15 nation members, the image files in the final database, coded with a 'r' and which are not available from the US-database, can be made available by a request to the author of this

report. In the final database, as described in appendix C, also all the processed images are included; some of these have low image quality and are not coded with a 'r'.

The selection rules for 'r' coded images in the final database have been:

a of class 0 (single digit PIN-code) images with PIN-code 5,6,7,8 and 9
b of class 1 no images
c of class 2 images with PIN-code 7,8 and 9
d of class 3 images with PIN-code 6,7,8 and 9
e of class 4 images with PIN-code 6,7,8 and 9
f of class 5 images with PIN-code 7,8 and 9
g of class 6 no images
h of class 7 images with PIN-code 7,8 and 9
i of class 8 images with PIN-code 6,7,8 and 9
j of class 9 no images
k of Image Intensified CCD images (extension * IM9) images with PIN-code 7,8 and 9

B.3 THE IQ CODE

The IQ code (Image Quality) is a two digit number describing the 'photographic' quality of the picture. This number can be found in column 19 of the listing of recordings given in Annex C. The first digit describes the image quality before processing. The second digit gives the effect of the dedicated image processing.

The first digit of the IQ code refers to the quality of the original picture before processing in the following way :

0 = completely unsuccessful image
1 = unsharp and/or blurred by camera movements
2 = condense or ice on the surface of the sensor
3 = dark picture or picture without any information, except some grass in the foreground.
4 = picture without any relevant information visible. The presence of only trees, grass (all kind of vegetation) and the sky with clouds is accepted to be of no relevance, even when these objects are clearly presented before processing.
5 = bad picture with some relevant information.
6 = relevant information clearly presented in local parts of the image ; large parts may be blurred however by battle field effects.
7 = picture with reasonable photographic quality ; yet small parts may be blurred by dust and/or smoke.
8 = nice picture ; small battle field effects may be present, but will not disturb other relevant information.
9 = fully clear pictures ; it is not expected, that image processing will result in image quality improvement.

The second digit in the IQ code number indicates the effect of the dedicated image processing in the following way :

0 = there is no effect of image processing ; no new information has become visible, nor the already visible information is more clearly presented.
1 = no new information has become visible, but the image processing has resulted in a clear and sharp picture with a more clear and comfortable presentation of the visible information.

2 = some new information has become visible and a more clear presentation of all the information has resulted.

3 = remarkable (much) new information has become available and is clearly presented.

The IQ code number has been determined by a single observer or by mutual arrangement of two observers. The IQ code numbers of a limited selection have been determined by mutual arrangement of three observers. This limited selection can be used as a test case for a single observer. The image file names of this selection are given below with the corresponding code numbers.

file name before processing	extension file name after processing	IQ code
12-bit images :		
M0108P07.IM1	P03	61
M0208N13.IM1	P01	33
M0708P09.IM1	P04	62
M0708P10.IM1	P02	62
"	P05	62
M0708P20.IM1	P04	52
M0708P41.IM1	P01	53
M0708P75.IM1	P02	53
"	P03	53
M0808A83.IM1	P01	43
M3107A18.IM1	P02	41
8-bit images :		
M3107A19.IM8	P01	61
M3107A17.IM8	P01	40
M0808A82.IM8	P01	52
M0808A56.IM8	P01	52
M0808A49.IM8	P02	62
M0808A30.IM8	P01	71
M0808A28.IM8	P01	40
M0708P74.IM8	P01	51
M0708P43.IM8	P01	30
M0608P74.IM8	P01	42
M0608P58.IM8	P05	53
Image Intensified ccd image:		
M0808A23.IM9	P01	50

BEST-TWO 1990

Legend listing of recordings

Column	Abbreviation	Explanation
1	Filename	E.g. M3007A24.IM8 M = Mourmelon ddmm = date A = 06 - 12 hour P = 12 - 18 hour N = 18 - 06 hour xx = running number
	Extension	.IM1 = 12-bits FEL/TNO CCD-camera .IM8 = 8-bits Philips CCD-camera .IM9 = 8-bits DEP II-CCD-camera
2	Date	Date (YY-MM-DD)
3	Time	PC-time = Mourmelon local time (HH:MM:SS)
4	Scen	Scenario from Best Two Schedule
5	Lens	Focal length of cameralens (mm)
6	Diaf	Cameralensstop
7	Exp.t	Exposure time or shutter time (msec) 0 = not applicable
8	Filt	Applied filter on cameralens v = photopic filter n = IR pass filter 0 = no filter d = ND filter 4x e = ND " 8x f = ND " 400x or combinations.
9	VIS	Visibility (km) from SITE.2U3
10	T04/07	Transmission (%) (0.4 - 0.7 µm) from LOWTRAN.US
11	Light	Light level (vertical) with Gossen Lunasix (kLux), at CCD location (FIA)
12	Temp	Air temperature (°C), at CCD location (FIA)
13	TEMP	Effective temperature (°C) from MIA1.GE
14	Hum	Relative humidity (%), at CCD location (FIA)
15	HUM	Effective humidity from MIA1.GE
16	DIR	Direction of the wind from MIA1.GE (0° is north)
17	Snel	Wind velocity (m/sec) from MIA1.GE
18	PIN	Picture INterest code
19	IQ	Image Quality code
	p	Processed (p=processed)
21	d	Database (d=image be present in the US database)
22	r	Selection for final FEL-TNO database
23	Comment	More details

Filename	Date	Time	Scen	Lens mm	Diaf	Exp.t mSec	Filt	Light kLux	VIS km	T04/07 %	Temp C	TEMP C	Hum %	HUM %	..WIND.. DIR °	Spd m/s	PIN	IQ	p	d	r	Comment
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	..20..			21
MT250703.IM8	90- 7-25	14:30: 3				0	v					28		26	32	1.8	86				r	Tent + jeep
MT250704.IM1	90- 7-25	15:18:46				30	v					29		24	26	2.9	86				r	Tent
MT250706.IM1	90- 7-25	15:19:45				30	v					29		24	26	3.2	86				r	Bunker
MT250706.IM8	90- 7-25	16:13:24				0	v					30		23	38	3.0	86				r	Start right
MT250707.IM8	90- 7-25	16:16:15				0	v					30		23	38	3.0	86				r	Start
MT250708.IM8	90- 7-25	16:18:20				0	v					30		23	38	3.0	86				r	2 tanks
MT250709.IM8	90- 7-25	16:18:39				0	v					30		23	38	3.0	87			d	r	Tank in dust
MT250710.IM8	90- 7-25	16:19: 8				0	v					30		23	38	3.0	86				r	2 tanks, few dust
MT250711.IM8	90- 7-25	16:20: 0				0	v					30		23	45	1.9	86				r	Tank between woods + dust
MT250700.IM8	90- 7-25	16:28:59				0	v					30		22	58	2.8	86				r	Bunker
MT260700.IM8	90- 7-26	9:15:47	1L		22	0	v		6			21		53	58	1.9	7			d	r	Leo 2 startpos.
MT260703.IM8	90- 7-26	9:54:38	1L			0	v		7			22		49	64	2.4	6			d	r	Tank
MT260704.IM8	90- 7-26	9:55: 7	1L			0	v		7			22		49	64	2.4	6			d	r	Id.
MT260705.IM9	90- 7-26	9:55:40	1L	75	16	0.004	v		7			22		49	64	2.4	7				r	
MT260706.IM9	90- 7-26	9:55:47	1L	75	16	0.002	v		7			22		49	64	2.4	7				r	
MT260707.IM9	90- 7-26	9:56:52	1L	75	16	0.002	v		7			22		49	64	2.4	7				r	
MT260708.IM8	90- 7-26	9:58:10	1L			0	v		7			22		49	58	2.8	7			d	r	Tank + target
MT260709.IM9	90- 7-26	9:58:31	1L	75		0.01	v		7			22		49	58	2.8	88			d	r	Id.
MT260711.IM8	90- 7-26	10: 6:35	1L			0	v		7			22		48	38	2.7	6			d	r	Non moving tank
MT260712.IM1	90- 7-26	10:10:13	1L	75		0.004	v		7			22		48	64	2.9	6			d	r	Dust only, no tank
MT260715.IM8	90- 7-26	10:48: 9	1L	70		0	v		8			23		44	58	2.2	6			d	r	PRI
MT260718.IM8	90- 7-26	10:50:58	1L	70	22	0	v		11			23		43	51	2.6	6			d	r	
MT260721.IM8	90- 7-26	10:53:51	1L	70	22	0	v		14			23		43	51	2.6	7			d	r	
MT260724.IM8	90- 7-26	10:56:16	1L	70	22	0	v		17			24		43	58	2.9	7			d	r	
MT260730.IM8	90- 7-26	11:30:10		70	22	0	n		20			26		40	70	2.2	77				r	Calibration target
MT260732.IM8	90- 7-26	11:33:12		70	22	0	n		20			27		39	38	2.7	86				r	Bunker + tent
MT260735.IM1	90- 7-26	12:50:22		135	22	40	nd					27		37	45	2.3	86				r	Calibration target
MT260736.IM9	90- 7-26	12:58: 9		75	8	0.005	n	88				28		37	70	2.2	87				r	Calibration target
MT260740.IM8	90- 7-26	13:25:43		70	32	0	0		20			30		30	83	3.7	86				r	Bunker + tent
MT260746.IM9	90- 7-26	13:34:42		75	8	1	0		20			31		30	45	3.0	87				r	Bunker
MT260747.IM9	90- 7-26	13:35: 0		75	8	1	0		20			31		30	45	3.0	87				r	Calibration target
MT260748.IM8	90- 7-26	15:25:21	CHAR	70	16	0	v		25			33		22	96	3.6	7			d	r	Tank 1 AMX10 ?
MT270701.IM1	90- 7-27	10: 4:34	4A	135	11	30	vd		10			26		38	115	2.1	26				r	2 runs all vehicles
MT270702.IM1	90- 7-27	10: 4:51	4A	135	11	30	vd		10			26		38	115	2.1	46				r	
MT270707.IM8	90- 7-27	10: 6:52	4A	70	16	0	v		10			26		38	115	2.1	5				r	
MT270708.IM8	90- 7-27	10: 7:11	4A	70	16	0	v		10			26		38	115	2.1	6			d	r	
MT270710.IM8	90- 7-27	10: 7:58	4A	70	16	0	v		10			27		36	96	2.5	6			d	r	

Filename	Date	Time	Scen	Lens	Diaf	Exp.t	Filt	Light	VIS	T04/07	Temp	TEMP	Hum	HUM	..WIND.. DIR	Spd	PIN	IQ	p	d	r	Comment
				mm		mSec		kLux	km	%	C	C	%	%	°	m/s						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	..20..			21
MT270711.IM1	90- 7-27	10: 8:20	4A	135	11	30	vd		10			27		36	96	2.5	57				r	
MT270712.IM8	90- 7-27	10: 9:11	4A	120	16	0	v	88	10			27		36	96	2.5	7			d	r	
MT270713.IM1	90- 7-27	10: 9:42	4A	135	11	30	vd		10			27		36	96	2.5	57				r	
MT270714.IM8	90- 7-27	10:28:27				0						28		33			36				r	Dark pict.
MT270715.IM1	90- 7-27	10:29: 5				30						28		33			36				r	Dark pict.
MT270717.IM8	90- 7-27	10:49:24	4A	120	16	0	v		15			29		30	134	2.1	7			d	r	Calibration targets
MT270719.IM8	90- 7-27	10:50: 4	4A	120	16	0	v		15			29		30	134	2.1	6			d	r	
MT270720.IM8	90- 7-27	10:52: 0	4A	120	16	0	v		15			29		30	134	2.1	6			d	r	
MT270721.IM1	90- 7-27	10:52:32	4A	135	11	30	vd		15			29		30	134	2.1	6			d	r	
MT270723.IM8	90- 7-27	10:56:18	4A	120	16	0	v		15			30		28	134	2.3	7			d	r	
MT270729.IM8	90- 7-27	14: 8:15	1R	50	16	0	n		10		37	37	37	16	179	3.3	7			d	r	Tank pos. 2
MT270730.IM1	90- 7-27	14: 8:28	1R	85	22	35	nd		10			35		20	147	2.4	7			d	r	
MT270731.IM9	90- 7-27	14: 8:46	1R	120	16	0.004	v		10			35		20	147	2.4	7				r	
MT270732.IM8	90- 7-27	14:10:44	1R	50	16	0	n		10			35		20	147	2.4	7			d	r	Tank pos. 3
MT270733.IM1	90- 7-27	14:10:57	1R	85	22	35	nd		10			35		20	147	2.4	7			d	r	
MT270734.IM9	90- 7-27	14:11: 1	1R	120	16	0.004	v		10			35		20	147	2.4	6				r	
MT270735.IM8	90- 7-27	14:13:30	1R	50	16	0	n	66	10			35		20	147	2.4	7			d	r	Tank pos. 4
MT270736.IM8	90- 7-27	14:13:48	1R	50	16	0	n		10			35		20	147	2.4	7			d	r	
MT270737.IM1	90- 7-27	14:14: 0	1R	85	22	35	nd		10			36		18	179	2.5	7			d	r	
MT270738.IM9	90- 7-27	14:14: 4	1R	120	16	0.004	v		10			36		18	179	2.5	5				r	
MT270739.IM8	90- 7-27	14:16:52	1R	50	16	0	n		10			36		18	179	2.5	7			d	r	Tank pos. 6
MT270741.IM9	90- 7-27	14:17: 9	1R	120	16	0.004	v		10			36		18			7			d	r	
MT270742.IM8	90- 7-27	14:21:41				0			10			35		19			36				r	Dark pict.
MT270743.IM1	90- 7-27	14:22: 6				35			10			35		19			36				r	Dark pict.
MT270744.IM9	90- 7-27	14:22:28				0.004			10		36	35		19	179	2.5	38			d	r	Dark pict.
MT270745.IM8	90- 7-27	14:52: 4	1R	50	8	0	0		10			32		23	147	1.5	6			d	r	Tank pos. 4. 2 lamps
MT270746.IM1	90- 7-27	14:52:16	1R	85	16	30	d		10			32		24	173	1.9	7			d	r	
MT270747.IM9	90- 7-27	14:52:21	1R	120	11	0.004	0		10			32		24	173	1.9	7				r	
MT270748.IM8	90- 7-27	14:55:23	1R	50	8	0	0		10			32		24	173	1.9	6			d	r	Tank pos. 5
MT270749.IM1	90- 7-27	14:55:35	1R	85	16	30	d		10			32		24	173	1.9	7			d	r	
MT270751.IM8	90- 7-27	14:58: 9	1R	50	8	0	0		10			32		23	160	1.8	6			d	r	Tank pos. 6
MT270752.IM1	90- 7-27	14:58:21	1R	85	16	30	d	44	10			32		23	160	1.8	7			d	r	
MT270754.IM8	90- 7-27	15: 0:10	1R	50	8	0	0		12			32		23	160	1.8	7			d	r	Tank pos. 7, b/w target
MT270755.IM1	90- 7-27	15: 0:22	1R	85	16	30	d		12			32		23	160	1.8	7			d	r	
MT270756.IM9	90- 7-27	15: 0:26	1R	120	11	0.004	0		12		32	32	40	23	160	1.8	8			d	r	Tank pos. 8
MT270757.IM8	90- 7-27	15: 3:38	1R	50	8	0	0		12			32		24	173	2.0	6			d	r	
MT270758.IM1	90- 7-27	15: 3:50	1R	85	16	30	d		12			32		24	173	2.0	7			d	r	

															..WIND..							
Filename	Date	Time	Scen	Lens	Diaf	Exp.t	Filt	Light	VIS	T04/07	Temp	TEMP	Hum	HUM	DIR	Spd	PIN	IQ	p	d	r	Comment
				mm		mSec		kLux	km	%	C	C	%	%	°	m/s						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	..20..			21
MT270759.IM9	90- 7-27	15: 3:54	1R	120	11	0.004	0		12			32		24	173	2.0	6				r	
MT270760.IM8	90- 7-27	15: 9:55	1R	50	8	0	0		12			31		23	173	2.4	6			d	r	Tank pos. 10 (9 behind woods)
MT270761.IM1	90- 7-27	15:10: 7	1R	85	16	30	d		12			31		23	192	2.6	4				r	
MT270763.IM8	90- 7-27	15:14:11	1R	50	8	0	0		12			31		23	192	2.6	6			d	r	
MT270764.IM8	90- 7-27	15:30: 4	1R	50	8	0	v		10			29		27	173	1.9	6			d	r	Tank pos. 2 8/8 clouds
MT270765.IM1	90- 7-27	15:30:16	1R	85	16	30	v		10			29		27	173	1.9	7			d	r	
MT270767.IM8	90- 7-27	15:33: 9	1R	50	8	0	v		10			29		27	173	1.9	6			d	r	Tank pos. 3
MT270768.IM1	90- 7-27	15:33:21	1R	85	16	30	v		10			29		27	173	1.9	7			d	r	
MT270770.IM8	90- 7-27	15:36:46	1R	50	8	0	v		10			29		27	147	1.1	6			d	r	Tank pos. 4
MT270771.IM1	90- 7-27	15:36:58	1R	85	16	30	v		10			29		27	147	1.1	7			d	r	
MT270772.IM9	90- 7-27	15:37: 2	1R	120	11	0.004	v		10			29		27	147	1.1	7				r	
MT270773.IM8	90- 7-27	15:41: 6	1R	50	8	0	v		10			30		27	173	1.3	6			d	r	Tank pos. 5
MT270775.IM9	90- 7-27	15:41:22	1R	120	11	0.004	v		10			30		27	173	1.3	7				r	
MT270776.IM8	90- 7-27	15:43:41	1R	50	8	0	v		10			31		26	160	2.0	7			d	r	Tank moving to pos. 6
MT270777.IM8	90- 7-27	15:52:59	1R	120	8	0	v		10			32		24	166	2.2	7			d	r	Test targets
MT270778.IM8	90- 7-27	16:16:30	1R	120	8	0	v		10			34		22	141	2.5	7			d	r	Truck pos. 3
MT270779.IM8	90- 7-27	16:18:56	1R	120	8	0.004	v		10			34		22	173	2.7	7			d	r	Truck pos. 4
MT270780.IM8	90- 7-27	16:23:28	1R	120	8	0	v		10			34		22	173	2.1	6			d	r	Truck pos. 5
MT270781.IM8	90- 7-27	16:26:37	1R	120	8	0	v		10			34		22	173	2.1	6			d	r	Truck pos. 6
M3007A00.IM8	90- 7-30	10:56:15	CHAR		22	0	v		15			28		47	128	1.0	87			d	r	AMX10
M3007A02.IM8	90- 7-30	10:58:51		Div	11	0	v		15			29		43	198	1.6	86	80	p		r	AMX10
M3007A09.IM8	90- 7-30	11:17:49		Div	11	0	v		15			30		40	211	1.0	86				r	Tank behind bush
M3007A10.IM8	90- 7-30	11:19:58		Div	11	0	v		15			30		40	211	1.0	87	80	p	d	r	Tank with truck
M3007A11.IM8	90- 7-30	11:20:50		Div	11	0	v		15			30		40	211	1.0	86				r	Tank with testtargets
M3007A12.IM8	90- 7-30	11:21:39		Div	11	0	v		15			30		40	211	1.0	77				r	Tank with testtargets
M3007A13.IM8	90- 7-30	11:22:49		Div	11	0	v		15								86	90	p		r	Tank with 3 vehicles
M3007A15.IM1	90- 7-30	11:24:21		85	22	30	v		15			30		36	154	1.6	66	20	p			
M3007A17.IM8	90- 7-30	11:39: 9		Div	11	0	v		15			31		36	45	0.6	86				r	
M3007A18.IM8	90- 7-30	11:45:52		Div	11	0	v		15			32		35	224	0.7	86				r	
M3007A20.IM8	90- 7-30	11:48:29		Div	11	0	v		15			32		34	166	1.1	86				r	AMX30 in dust AMX10
M3007A21.IM8	90- 7-30	11:48:41		Div	11	0	v		15			32		34	166	1.1	86				r	
M3007A22.IM8	90- 7-30	11:49: 5		Div	11	0	v		15			32		34	166	1.1	87	81	p	d	r	Smok-clouds from tank
M3007A25.IM8	90- 7-30	11:50:22		Div	11	0	v		15			32		34	166	1.1	86	70	p		r	
M3007A28.IM8	90- 7-30	11:54:33		Div	11	0	v		15			32		33	339	0.5	86				r	
M3007A32.IM8	90- 7-30	12: 0: 6		Div	11	0	v		15			32		34	13	1.0	86	71	p		r	Tank with cloud behind
M3007A33.IM8	90- 7-30	12: 0:46		Div	11	0	v		15			32		34	13	1.0	86				r	Tank in woods
M3007P01.IM8	90- 7-30	14:16:10	4A	30	11	0	v		20			34		24	352	0.6	6			d	r	

Filename	Date	Time	Scen	Lens	Diaf	Exp.t	Filt	Light	VIS	T04/07	Temp	TEMP	Hum	HUM	..WIND.. DIR	Spd	PIN	IQ	p	d	r	Comment
				mm		mSec		kLux	km	%	C	C	%	%	°	m/s						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	..20..			21
M3007P02.IM8	90- 7-30	14:17:32	4A	30	11	0	v		20			34		24	352	0.6	6			d	r	Run 1 2x 5 tanks
M3007P03.IM8	90- 7-30	14:18: 1	4A	30	11	0	v		20		32	34	40	24	352	0.6	6	80	p	d	r	
M3007P04.IM1	90- 7-30	14:18:21	4A	85	11	30	vd		20			34		24	352	0.6	27	21	p		r	Dust on 12-bits chip
M3007P05.IM8	90- 7-30	14:19: 0	4A	30	11	0	v		20			35		24	325	1.2	6			d	r	
M3007P07.IM8	90- 7-30	14:19:37	4A	30	11	0	v		20			35		24	325	1.2	7	81	p	d	r	2 x 4 tanks
M3007P09.IM8	90- 7-30	14:20:29	4A	30	11	0	v		20			35		24	325	1.2	7	80	p	d	r	
M3007P10.IM1	90- 7-30	14:21:11	4A	85	11	30	vd		20			35		24	325	1.2	27	62	p			
M3007P11.IM1	90- 7-30	14:21:38	4A	85	11	30	vd		20			35		24	325	1.2	27	81	p			
M3007P13.IM8	90- 7-30	15: 0:49	4A	30	11	0	v		20			35		22	26	1.6	6			d	r	As run 1
M3007P15.IM8	90- 7-30	15: 1:40	4A	30	11	0	v		20			35		22	26	1.6	6			d	r	
M3007P17.IM1	90- 7-30	15: 2:46	4A	85	22	30	nd		20			35		22	26	1.6	27	22	p		r	
M3007P18.IM8	90- 7-30	15: 2:54	4A	30	11	0	v		20			35		21	32	2.0	7	71	p	d	r	
M3007P19.IM1	90- 7-30	15: 3:43	4A	85	22	30	nd		20			35		21	32	2.0	26	21	p			
M3007P21.IM8	90- 7-30	15: 4:18	4A	30	11	0	v		20			35		21	32	2.0	7	81	p	d	r	
M3007P22.IM1	90- 7-30	15: 5: 4	4A	85	22	30	nd	88	20			35		21	32	2.0	27	22	p		r	
M3007P23.IM8	90- 7-30	15:43:18				0						35		18			36				r	Dark picture
M3007P24.IM9	90- 7-30	15:45:23				0.004						35		18			36				r	Dark picture
M3007P25.IM1	90- 7-30	15:48:48				30						36		20			36				r	Dark picture
M3007P26.IM1	90- 7-30	16: 0:29	4A	85		30	d		20			36		20	326	1.3	7	72	p	d	r	As run 1
M3007P29.IM1	90- 7-30	16: 2:15	4A	85		30	d		20			36		20	326	1.3	27	71	p		r	
M3007P31.IM8	90- 7-30	16: 3: 6	4A	50		0	0		20			36		20	64	2.8	47	72	p	d	r	
M3007P34.IM8	90- 7-30	16: 3:41	4A	50		0	0		20			36		20	64	2.8	6			d	r	
M3007P35.IM1	90- 7-30	16: 4: 8	4A	85		30	d		20			36		20	64	2.8	7	71	p	d	r	
M3007P36.IM8	90- 7-30	16: 4:23	4A	50		0	0		20			36		20	64	2.8	7	70	p	d	r	
M3007P39.IM1	90- 7-30	16:31:31	4A	85	22	30	d		20			36		20	64	2.8	45	60	p			
M3007P40.IM8	90- 7-30	16:31:45	4A	50	16	0	0		20			36		20	64	2.8	45	61	p			Time out
M3007P43.IM8	90- 7-30	16:36:37	4A	120	16	0	0		20		33	36	30	20	70	1.9	6			d	r	
M3107A00.IM8	90- 7-31	9:22:31	2CLS	120	11	0	v	11	15		25	25	62	49	51	1.8	6			d	r	Tank + deton. sandbags
M3107A01.IM8	90- 7-31	9:39:56	2CLS	120	11	0	v		15			27		45	45	1.6	5				r	Tank + deton. sandbags
M3107A02.IM8	90- 7-31	9:40:22	2CLS	120	11	0	v		15			27		45	45	1.6	7	71	p	d	r	Tank + deton. sandbags
M3107A03.IM8	90- 7-31	9:41:39	2CLS	120	11	0	v		15			27		45	45	1.6	8	61	p	d	r	
M3107A04.IM8	90- 7-31	9:42:16	2CLS	120	11	0	v		15			27		45	45	1.6	7	81	p	d	r	
M3107A05.IM1	90- 7-31	9:42:54	2CLS	85	11	30	vd		15			27		44	64	1.6	8	61	p	d	r	
M3107A06.IM8	90- 7-31	9:43: 8	2CLS	70	11	0	v		15			27		44	64	1.6	7	71	p	d	r	
M3107A07.IM1	90- 7-31	9:48:59				30			15			27		43			36				r	Dark picture
M3107A08.IM8	90- 7-31	9:51:22				0			15			27		43			36				r	Dark picture
M3107A09.IM8	90- 7-31	9:52:40	2CLS	70	11	0	v		15			27		43	51	1.5	6			d	r	

															..WIND..						
Filename	Date	Time	Scen	Lens	Diaf	Exp.t	Filt	Light	VIS	T04/07	Temp	TEMP	Hum	HUM	DIR	Spd	PIN	IQ	p	d	r	Comment
				mm		mSec		kLux	km	%	C	C	%	%	°	m/s						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	..20..			21
M3107A10.IM1	90- 7-31	9:53: 3	2CLS	85	11	30	v		15			27		43	51	1.5	7			d	r	
M3107A11.IM8	90- 7-31	10: 2:37	2CLS	120	11	0	v		15			28		38	64	1.7	9	61	p	d	r	Testtarget behind sandcloud
M3107A12.IM1	90- 7-31	10: 2:52	2CLS	85	11	30	v		15			28		38	38	1.7	9	50	p	d	r	Testtarget behind sandcloud
M3107A13.IM8	90- 7-31	10: 5:59		120	11	0	v		15			28		38	38	1.7	6	60	p	d	r	Airplane
M3107A14.IM8	90- 7-31	10:20:48	2CLS	120	11	0	v		15			29		34	77	2.4	7	61	p	d	r	Dust
M3107A15.IM1	90- 7-31	10:21:20	2CLS	85	11	30	vd		15			29		34	77	2.4	8	71	p	d	r	
M3107A16.IM8	90- 7-31	10:21:39	2CLS	120	11	0	v		15			29		34	77	2.4	8	51	p	d	r	Dust
M3107A17.IM8	90- 7-31	10:22:40	2CLS	120	11	0	v		15			29		34	77	2.4	6	40	p	d	r	Heavy dust and targets
M3107A18.IM1	90- 7-31	10:23: 4	2CLS	85	11	30	vd		15			30		34	83	1.4	8	51	p	d	r	
M3107A19.IM8	90- 7-31	10:23:16	2CLS	120	11	0	v		15			30		34	83	1.4	8	62	p	d	r	Targets in sandclouds
M3107A20.IM1	90- 7-31	10:23:44	2CLS	85	11	30	vd		15			30		34	83	1.4	7	71	p	d	r	
M3107A21.IM8	90- 7-31	10:23:57	2CLS	120	11	0	v		15			30		34	83	1.4	6	71	p	d	r	Clearing clouds
M3107A22.IM1	90- 7-31	10:47:19	2CLS	85	11	30	vd		15			30		31	102	2.2	7	61	p	d	r	2 deton. sandbags
M3107A23.IM1	90- 7-31	10:47:37	2CLS	85	11	30	vd		15			30		31	102	2.2	8	61	p	d	r	
M3107A24.IM1	90- 7-31	10:48: 7	2CLS	85	11	30	vd		15			30		30	90	2.5	8	62	p	d	r	
M3107A25.IM8	90- 7-31	10:48:19	2CLS	120	11	0	v		15			30		30	90	2.5	6	71	p	d	r	Little dust with testtargets
M3107A26.IM1	90- 7-31	10:49: 5	2CLS	85	11	30	vd		15			30		30	90	2.5	7	12	p	d	r	
M3107A27.IM1	90- 7-31	11:53: 7	2CLS	85	11	30	vd		15			35		24	26	2.7	7	51	p	d	r	More sandbags
M3107A28.IM8	90- 7-31	11:53:19	2CLS	120	11	0	v		15			35		24	26	2.7	5	40	p		r	Heavy clouds from sandbags
M3107A29.IM1	90- 7-31	11:53:59	2CLS	85	11	30	v		15			35		24	26	2.7	8	61	p	d	r	Dust 1.5m/sec dir. east
M3107P00.IM1	90- 7-31	13:57:39	2ALF	135	11	30	v		15			35		24	26	2.7	8	81	p	d	r	Testtargets staight ahead
M3107P01.IM8	90- 7-31	13:58:44	2ALF	50	11	0	v		15			35		24	26	2.7	5	61	p		r	Testtargets staight ahead
M3107P02.IM1	90- 7-31	13:59:42	2ALF	135	11	30	v		15			35		24	26	2.7	8	81	p	d	r	Testtargets on the right
M3107P03.IM8	90- 7-31	13:59:51	2ALF	50	11	0	v		15			35		24	26	2.7	5	71	p		r	
M3107P04.IM1	90- 7-31	14: 0:16	2ALF	135	11	30	v		15			35		23	32	2.4	7	80	p	d	r	B/W target
M3107P05.IM8	90- 7-31	14: 0:37	2ALF	50	11	0	v		15			35		23	32	2.4	6	80	p	d	r	B/W target
M3107P06.IM8	90- 7-31	14: 2:43	2ALF	50	11	0	v		15			35		23	25	2.2	46	60	p		r	
M3107P07.IM1	90- 7-31	14: 3: 7	2ALF	135	11	30	v		15			35		23	25	2.2	7	80	p	d	r	Tank passed
M3107P08.IM8	90- 7-31	14: 3:48	2ALF	50	11	0	v		15			35		23	25	2.2	46	60	p		r	
M3107P09.IM1	90- 7-31	14: 4:38	2ALF	135	11	30	v		15			35		23	25	2.2	7	80	p	d	r	
M3107P10.IM8	90- 7-31	14: 4:47	2ALF	50	11	0	v		15			35		23	25	2.2	6	71	p	d	r	
M3107P11.IM8	90- 7-31	14: 5:59	2ALF	50	11	0	v		15			35		23	25	2.2	6	82	p	d	r	
M3107P12.IM1	90- 7-31	14:30:48	2ALF	135	8	30	v		20			35		23	58	3.3	7	72	p	d	r	Tank with cloud
M3107P13.IM8	90- 7-31	14:31: 4	2ALF	50	11	0	v		20			35		23	58	3.3	7	60	p	d	r	
M3107P14.IM1	90- 7-31	14;31:23	2ALF	135	8	30	v		20			35		23	58	3.3	7	61	p	d	r	Tank whit dust
M3107P15.IM1	90- 7-31	14:32:32	2ALF	135	8	30	v		20			35		23	58	3.3	7	71	p	d	r	
M3107P16.IM8	90- 7-31	14:32:42	2ALF	50	11	0	v		20			35		23	58	3.3	6	71	p	d	r	

Filename	Date	Time	Scen	Lens	Diaf	Exp.t	Filt	Light	VIS	T04/07	Temp	TEMP	Hum	HUM	..WIND.. DIR	Spd	PIN	IQ	p	d	r	Comment
				mm		mSec		kLux	km	%	C	C	%	%	°	m/s						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	..20..			21
M3107P17.IM1	90- 7-31	14:33:27	2ALF	135	8	30	v		20			35		22	51	3.2	7	51	p	d	r	Testtargets
M3107P18.IM1	90- 7-31	14:48:29				30			20			36		22			37	61	p	d	r	Dark picture
M3107P19.IM8	90- 7-31	14:54:54				0			20			36		23			36				r	Dark picture
M3107P20.IM1	90- 7-31	14:55:11	2ALF	135		30			20			36		22			36				r	Dark picture
M3107P21.IM1	90- 7-31	15: 0:35	2ALF	135		30	nd		20			36		22	13	2.4	7	61	p	d	r	
M3107P22.IM8	90- 7-31	15: 0:49	2ALF	135	16	0	v		20			36		22	13	2.4	6	70	p	d	r	Truck with clouds
M3107P23.IM1	90- 7-31	15: 1:15	2ALF	135	16	30	nd		20			36		22	13	2.4	7	61	p	d	r	
M3107P24.IM1	90- 7-31	15: 2: 7	2ALF	135	16	30	nd		20		31	36	42	22	13	2.4	7	51	p	d	r	
M3107P25.IM1	90- 7-31	15: 2:52	2ALF	135	16	30	nd		20			35		22	6	3.9	7	62	p	d	r	
M3107P26.IM1	90- 7-31	15: 3: 9	2ALF	135	16	30	nd		20			35		22	6	3.9	7	61	p	d	r	
M3107P27.IM8	90- 7-31	15: 3:26	2ALF	50	11	0	v		20			35		22	6	3.9	7	71	p	d	r	Truck from rear. Detour
M3107P28.IM1	90- 7-31	15: 6:18	2ALF	135	16	30	nd		20			35		22	6	3.9	7	51	p	d	r	
M3107P29.IM1	90- 7-31	15:32: 9	2ALF	135	16	30	nd	130	20			35		22	6	3.9	7	50	p	d	r	Camouflaged truck
M3107P30.IM8	90- 7-31	15:32:22	2ALF	50	8	0	v		20			35		22	6	3.9	44	60	p			
M3107P32.IM1	90- 7-31	15:33:56	2ALF	135	16	30	nd		20			35		22	13	2.5	6			d	r	Truck
M3107P33.IM1	90- 7-31	15:34:29	2ALF	135	16	30	nd		20			35		22	13	2.5	7	51	p	d	r	
M3107P34.IM1	90- 7-31	15:34:47	2ALF	135	16	30	nd		20			35		22	13	2.5	7	61	p	d	r	No truck
M3107P35.IM8	90- 7-31	15:35: 2	2ALF	50	8	0	v		20			35		22	13	2.5	6	70	p	d	r	Truck with targets
M3107P36.IM1	90- 7-31	15:35:24	2ALF	135	16	30	nd		20			35		22	13	2.5	7	51	p	d	r	
M3107P37.IM1	90- 7-31	15:35:40	2ALF	135	16	30	nd		20			35		22	13	2.5	6	51	p	d	r	
M3107P38.IM1	90- 7-31	15:50:58	2ALF	50	9	30	d		20			35		23	64	2.3	7	51	p	d	r	
M3107P39.IM8	90- 7-31	16: 2:22	2ALF	50	8	0	v		20		33	36	40	23	58	3.6	46				r	
M3107P40.IM1	90- 7-31	16: 2:41	2ALF	135	22	30	d		20			36		22	58	2.4	7	61	p	d	r	
M3107P41.IM1	90- 7-31	16: 3:25	2ALF	135	22	30	d		20			36		22	58	2.4	7	61	p	d	r	
M3107P42.IM8	90- 7-31	16: 3:35	2ALF	50	8	0	v		20			36		22	58	2.4	46	51	p		r	
M3107P43.IM1	90- 7-31	16: 4:13	2ALF	135	22	30	d		20			36		22	58	2.4	7	51	p	d	r	
M3107P44.IM8	90- 7-31	16: 4:34	2ALF	50	8	0	v		20			36		22	58	2.4	7	71	p	d	r	
M3107P45.IM1	90- 7-31	16: 5: 5	2ALF	135	22	30	d		20			36		22	58	2.4	7	61	p	d	r	
M3107P46.IM1	90- 7-31	16: 5:26	2ALF	135	22	30	d		20			36		22	58	2.4	7	71	p	d	r	
M3107P47.IM1	90- 7-31	16: 5:46	2ALF	135	22	30	d		20			36		22	58	2.4	7	61	p	d	r	
M3107P48.IM8	90- 7-31	16: 5:56	2ALF	50	8	0	v		20			36		22	58	2.4	7	50	p	d	r	
M3107P49.IM1	90- 7-31	16: 6:15	2ALF	135	22	30	d		20		23	36	50	22	58	2.4	7	51	p	d	r	
M3107N01.IM1	90- 7-31	22:53:16	2ALS	85	2	30	0		15			20		58	38	0.9	36				r	
M3107N02.IM8	90- 7-31	23: 7:49	2ALS	50		0	0		15	45		20		58	38	0.9	7			d	r	
M0108A00.IM8	90- 8- 1	11:17:27	4C	80	22	0	0		10		26	31	40	33	19	1.4	6			d	r	3 tanks, 5x AMX10 2x AMX30
M0108A01.IM1	90- 8- 1	11:17:50	4C	135	5.6	30	f		10			31		31	45	1.6	27	20	p		r	Dist. adj. 4.5m. 400x ND filt.
M0108A02.IM8	90- 8- 1	11:18:16	4C	80	22	0	0		10			31		31	45	1.6	6	21	p	d	r	2 tanks, little dust

Filename	Date	Time	Scen	Lens	Diaf	Exp.t	Filt	Light	VIS	T04/07	Temp	TEMP	Hum	HUM	..WIND.. DIR	Spd	PIN	IQ	p	d	r	Comment
				mm		mSec		kLux	km	%	C	C	%	%	°	m/s						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	..20..			21
M0108A03.IM1	90- 8- 1	11:18:43	4C	135	5.6	30	f		10			31		31	45	1.6	27				r	
M0108A04.IM1	90- 8- 1	11:19: 8	4C	135	5.6	30	f		10			31		31	45	1.6	27	22	p		r	
M0108A05.IM8	90- 8- 1	11:19:28	4C	80	22	0	0		10			31		31	45	1.6	7	81		d	r	2 tanks with tst.targets
M0108A06.IM1	90- 8- 1	11:19:50	4C	135	5.6	30	f		10			31		31	45	1.6	27	21	p		r	
M0108A07.IM8	90- 8- 1	11:20:21	4C	80	22	0	0		10			31		31	45	1.6	7	70	p	d	r	1 tank b/w target
M0108A08.IM8	90- 8- 1	13:35:13				0			15			36		23			36		p		r	Dark picture
M0108A09.IM1	90- 8- 1	13:35:35				30			15			36		23			36		p		r	Dark picture
M0108P00.IM8	90- 8- 1	14: 4:39	2BLF	75	8	0	v	110	15	48		36		21	77	3.4	6		p		r	Truck
M0108P01.IM1	90- 8- 1	14: 5:18	2BLF	135	8	30	vd		15			36		21	77	3.4	7	80	p	d	r	Truck
M0108P02.IM8	90- 8- 1	14: 5:46	2BLF	75	8	0	v		15			36		21	77	3.4	6	60	p	d	r	Truck
M0108P03.IM1	90- 8- 1	14: 6:53	2BLF	135	8	30	vd		15			36		22	38	3.5	7	81	p	d	r	Truck
M0108P04.IM1	90- 8- 1	14: 7:18	2BLF	135	8	30	vd		15			36		22	38	3.5	7	71	p	d	r	Truck. No fire
M0108P05.IM8	90- 8- 1	14:21:41	2BLF	75	8	0	v		15			36		22	77	3.5	6		p		r	2 fires
M0108P06.IM1	90- 8- 1	14:22:58	2BLF	135	8	30	vd		15			36		22	77	3.5	8	71	p	d	r	
M0108P07.IM1	90- 8- 1	14:25: 2	2BLF	135	8	30	vd		15			36		22	90	3.2	8	62	p	d	r	
M0108P08.IM8	90- 8- 1	14:25:39	2BLF	75	8	0	v		15			36		22	90	3.2	7	61	p	d	r	Fire with targets
M0108P09.IM1	90- 8- 1	14:25:58	2BLF	135	8	30	vd		15			36		22	90	3.2	8	62	p	d	r	
M0108P10.IM1	90- 8- 1	14:26:30	2BLF	135	8	30	vd		15			36		22	90	3.2	8	61	p	d	r	
M0108P11.IM8	90- 8- 1	14:28:14	2BLF	75	8	0	v		15			36		23	64	3.9	7	51	p	d	r	Tank in pos 0, PRI
M0108P12.IM1	90- 8- 1	14:28:31	2BLF	135	8	30	vd		15		34	36	62	23	64	3.9	7	61	p	d	r	
M0108P13.IM1	90- 8- 1	14:30:42	2BLF	135	8	30	vd		15	48		36		23	64	3.9	7	61	p	d	r	
M0108P14.IM8	90- 8- 1	14:31: 4	2BLF	75	8	0	v		15			36		23	64	3.9	27	50	p		r	Tank with dustcloud
M0108P15.IM1	90- 8- 1	14:31:31	2BLF	135	8	30	vd		15			36		23	64	3.9	6	11	p	d	r	
M0108P16.IM8	90- 8- 1	14:31:43	2BLF	75	8	0	v		15			36		23	64	3.9	6	50	p	d	r	Tank with dustcloud
M0108P17.IM1	90- 8- 1	14:32: 7	2BLF	135	8	30	vd		15			36		23	64	3.9	7	61	p	d	r	
M0108P18.IM1	90- 8- 1	14:32:28	2BLF	135	8	30	vd		15			36		22	83	3.9	6	71	p	d	r	
M0108P19.IM1	90- 8- 1	14:32:59	2BLF	135	8	30	vd		15			36		22	83	3.9	7	71	p	d	r	
M0108P20.IM8	90- 8- 1	14:33:21	2BLF	75	8	0	v		15			36		22	83	3.9	7	71	p	d	r	Tank through bushes, targ. de Jong
M0108P21.IM1	90- 8- 1	15: 1:24	2BLF	135	8	30	vd		15	48		36		22	32	3.3	7	61	p	d	r	
M0108P22.IM8	90- 8- 1	15: 1:41	2BLF	75	8	0	v		15			36		22	32	3.3	6	52	p	d	r	Tank whit cloud AMX30-C
M0108P23.IM1	90- 8- 1	15: 3: 8	2BLF	135	8	30	vd		15			36		21	51	2.8	7	71	p	d	r	
M0108P24.IM1	90- 8- 1	15: 3:26	2BLF	135	8	30	vd		15			36		21	51	2.8	7	62	p	d	r	
M0108P25.IM8	90- 8- 1	15: 3:45	2BLF	75	8	0	v		15			36		21	51	2.8	7	71	p	d	r	
M0108P26.IM1	90- 8- 1	15: 4: 1	2BLF	135	8	30	vd		15			36		21	51	2.8	7	71	p	d	r	
M0108P27.IM8	90- 8- 1	15: 4:20	2BLF	75	8	0	v		15			36		21	51	2.8	5				r	No tank and dust
M0108P28.IM1	90- 8- 1	15:23:56	2BLF	135	16	30	nd	110	15		34	36	62	21	45	3.0	8	51	p	d	r	Fire
M0108P29.IM1	90- 8- 1	15:29: 4	2BLF	135	16	30	nd		15	49		35		22	19	3.1	7	42	p	d	r	

Filename	Date	Time	Scen	Lens mm	Diaf	Exp.t mSec	Filt	Light kLux	VIS km	T04/07 %	Temp C	TEMP C	Hum %	HUM %	..WIND.. DIR °	Spd m/s	PIN	IQ	p	d	r	Comment
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	..20..			21
M0108P30.IM8	90- 8- 1	15:29:20	2BLF	75	8	0	v		15		35	35		22	19	3.1	6			d	r	Tank (AMX10) on start pos.
M0108P31.IM1	90- 8- 1	15:30:25	2BLF	135	16	30	nd		15			35		22	19	3.1	7	41	p	d	r	
M0108P32.IM8	90- 8- 1	15:30:42	2BLF	75	8	0	v		15			35		22	19	3.1	7	61	p	d	r	Tank whit dustcloud
M0108P33.IM1	90- 8- 1	15:31:28	2BLF	135	16	30	nd		15			35		22	19	3.1	8	61	p	d	r	
M0108P34.IM1	90- 8- 1	15:32:35	2BLF	135	16	30	nd		15			36		21	32	3.7	8	61	p	d	r	
M0108P35.IM8	90- 8- 1	15:32:57	2BLF	75	8	0	v		15			36		21	32	3.7	7	62	p	d	r	Tank whit smoke
M0108P36.IM1	90- 8- 1	15:33:15	2BLF	135	16	30	nd		15			36		21	32	3.7	8	62	p	d	r	
M0108P37.IM8	90- 8- 1	15:33:35	2BLF	75	8	0	v		15			36		21	32	3.7	6	61	p	d	r	
M0108P38.IM1	90- 8- 1	15:33:55	2BLF	135	16	30	nd		15			36		21	32	3.7	8	71	p	d	r	
M0108P39.IM1	90- 8- 1	16: 0:26	2BLF	135	16	30	nd		10	50		36		19	83	3.3	7	62	p	d	r	Jeep
M0108P40.IM8	90- 8- 1	16: 0:57	2BLF	75	8	0	v					36		19	83	3.3	5				r	Jeep
M0108P41.IM1	90- 8- 1	16: 1:23	2BLF	135	16	30	nd					36		19	83	3.3	7	61	p	d	r	Jeep
M0108P42.IM8	90- 8- 1	16: 2:31	2BLF	75	8	0	v					36		19	83	3.3	5				r	Jeep
M0208N01.IM9	90- 8- 2	4:12:23	1L	120	2.5	0.020	0	<0.17Lu	10			17		66	45	1.7	6				r	Camoufl. tank ?(vis. w. fieldgls.)
M0208N03.IM1	90- 8- 2	4:37:33	1L	135	16	30	0		10			17		68	45	1.7	6			d	r	Most right lightbulp
M0208N07.IM1	90- 8- 2	5:11:31	1L	135	3.5	2000	0		7			16		70	45	1.5	6			d	r	
M0208N08.IM9	90- 8- 2	5:13:16	1L	120	2.5	0.005	0		7			16		70	45	1.3	8		p		r	
M0208N09.IM1	90- 8- 2	5:14: 4	1L	135	3.5	3000	0		7			16		70	45	1.3	8	42	p	d	r	
M0208N10.IM1	90- 8- 2	5:15:19	1L	135	3.5	4000	0		7			16		70	45	1.3	8	42	p	d	r	
M0208N12.IM1	90- 8- 2	5:19: 6	1L	135	3.5	4000	0	<0.17Lu	7			16		71	38	1.5	8	52	p	d	r	
M0208N13.IM1	90- 8- 2	5:19:54	1L	135	3.5	4000	0		7			16		71	38	1.5	8	51	p	d	r	
M0208N14.IM1	90- 8- 2	5:20:29	1L	135	3.5	5000	0		7			16		71	38	1.5	8	51	p	d	r	
M0208N15.IM1	90- 8- 2	5:21:25	1L	135	3.5	5500	0		7			16		71	38	1.5	8	51	p	d	r	
M0208N16.IM1	90- 8- 2	5:22:27	1L	135	3.5	5990	0		7			16		71	38	1.5	28	41	p	d	r	
M0208N18.IM1	90- 8- 2	5:25:33	1L	135	3.5	5990	0		7			16		71	45	1.3	27				r	
M0208N19.IM1	90- 8- 2	5:28:41	1L	135	3.5	5990	0		7			16		72	45	1.1	27	41	p		r	
M0208N20.IM8	90- 8- 2	5:30:10				0						16		72			36				r	Dark picture
M0208N21.IM8	90- 8- 2	5:30:24	1L	75	2.5	0	0		7			16		72	45	1.1	7	50	p	d	r	
M0208N22.IM8	90- 8- 2	5:34: 9	1L	75	2.5	0	0		7			16		72	38	1.0	7	50	p	d	r	
M0208N23.IM1	90- 8- 2	5:34:27	1L	135	3.5	5990	0		7			16		72	38	1.0	7	81	p	d	r	
M0208N26.IM8	90- 8- 2	5:39:12	1L	75	2.5	0	0		7			16		73	38	0.9	7	50	p	d	r	
M0208N27.IM1	90- 8- 2	5:39:38	1L	135	3.5	5990	0	2.8Lux	7			16		73	38	0.9	46	50	p		r	
M0208N28.IM1	90- 8- 2	5:40:51	1L	135	3.5	4000	0		7			16		73	38	0.9	47	61	p	d	r	
M0208N30.IM1	90- 8- 2	5:42:51	1L	135	3.5	3000	0		7			16		73	38	0.9	46	52	p		r	
M0208N31.IM8	90- 8- 2	5:43: 2	1L	75	2.5	0	0		7			16		74	38	0.9	5				r	
M0208N33.IM1	90- 8- 2	5:43:40	1L	135	3.5	2000	0		7			16		74	38	0.9	6	71	p	d	r	
M0208N34.IM1	90- 8- 2	5:44: 6	1L	135	3.5	1500	0		7			16		74	38	0.9	6			d	r	

Filename	Date	Time	Scen	Lens mm	Diaf	Exp.t mSec	Filt	Light kLux	VIS km	T04/07 %	Temp C	TEMP C	Hum %	HUM %	..WIND.. DIR °	Spd m/s	PIN	IQ	p d r	Comment
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	..20..	21
M0208N35.IM8	90- 8- 2	5:46:13	1L	75	2.5	0	0		7			16		74	38	0.9	6		d r	
M0208N36.IM1	90- 8- 2	5:46:33	1L	135	3.5	1500	0	18Lux	7		18	16	90	74	38	0.9	7	60	p d r	
M0208N37.IM1	90- 8- 2	5:46:59	1L	135	3.5	500	0		7			16		74	38	0.9	8	71	p d r	
M0208N38.IM1	90- 8- 2	5:47:38	1L	135	3.5	800	0		7			15		74	38	0.9	7	82	p d r	
M0208N40.IM1	90- 8- 2	5:50:28	1L	135	3.5	370	0		7			15		74	38	0.9	6		d r	
M0208N41.IM8	90- 8- 2	5:51: 3	1L	75	2.5	0	0		7			15		74	38	0.9	6		d r	
M0208N42.IM1	90- 8- 2	5:53:27	1L	135	3.5	200	0	44Lux	7			15		74	45	0.8	6		d r	Time out
M0208N43.IM8	90- 8- 2	5:53:43	1L	75	2.5	0	0		7			15		74	45	0.8	6		d r	
M0208N44.IM8	90- 8- 2	5:54:20	1L	75	2.5	0	0		7			15		74	38	0.8	7	71	p d r	
M0208N45.IM1	90- 8- 2	5:54:38	1L	135	3.5	200	0		7			15		74	38	0.8	7	71	p d r	
M0208N47.IM1	90- 8- 2	5:56:17	1L	135	3.5	200	0		7			15		74	38	0.8	7	72	p d r	
M0208N48.IM8	90- 8- 2	5:56:30	1L	75	2.5	0	0	66Lux	7			15		74	38	0.8	6	81	p d r	
M0208N49.IM1	90- 8- 2	6: 2:18	1L	135	3.5	30	0		7			15		74	38	0.8	7	72	p d r	
M0208N50.IM1	90- 8- 2	6: 3:12	1L	135	3.5	60	0	175Lux	8			15		75	38	0.6	7	81	p d r	
M0208N51.IM8	90- 8- 2	6: 4: 6	1L	75	2.5	0	0		8			15		75	38	0.6	7	81	p d r	
M0208N53.IM1	90- 8- 2	6: 5:14	1L	135	3.5	60	0		9		17	15	73	75	38	0.6	7	71	p d r	
M0208A00.IM8	90- 8- 2	8:18:19	1R	75	22	0	0		10		20	23	65	55	13	0.5	7		d r	Underexposed, pos 1, LE02
M0208A01.IM8	90- 8- 2	8:19: 1	1R	75	22	0	0		10			23		55	13	0.5	7	71	p d r	
M0208A02.IM8	90- 8- 2	8:20:12	1R	75	22	0	0		10			23		55	13	0.5	6		d r	Pos. 2
M0208A03.IM8	90- 8- 2	8:21:48	1R	75	22	0	0		10			23		55	13	0.5	6		d r	
M0208A04.IM8	90- 8- 2	8:22: 3	1R	75	22	0	0		10			23		55	13	0.5	6		d r	Pos. 5
M0208A06.IM8	90- 8- 2	8:24:22	1R	75	22	0	0		10			24		53	26	0.8	7	71	p d r	Pos. 6, well exposed
M0208A07.IM8	90- 8- 2	8:24:53	1R	75	22	0	0		10			24		53	26	0.8	7	82	p d r	Underexposed
M0208A08.IM8	90- 8- 2	8:54:46	1R	75	22	0	0	33	10			26		48	38	2.2	6		d r	Pos. 4, AMX30-C
M0208A10.IM8	90- 8- 2	8:55:51	1R	75	22	0	0		10			26		48	38	2.2	7	71	p d r	
M0208A11.IM8	90- 8- 2	8:56: 1	1R	75	22	0	0		10			26		48	38	2.2	7	62	p d r	
M0208A12.IM8	90- 8- 2	8:57:20	1R	75	22	0	0		10			26		48	38	2.2	5		r	
M0208A13.IM1	90- 8- 2	8:57:44	1R	135	22	30	d		10			26		47	45	2.4	50		d r	
M0208A14.IM8	90- 8- 2	9: 0:12	1R	75	22	0	0		10		22	26	55	47	45	2.4	6		d r	Pos. 5
M0208A16.IM8	90- 8- 2	9: 3:10	1R	75	22	0	0		10			26		46	51	2.5	7	72	p d r	Pos. 6
M0208A18.IM8	90- 8- 2	9:28: 0	1R	75	22	0	0		10			28		42	38	2.6	6		d r	PRAT
M0208A19.IM8	90- 8- 2	9:30: 4	1R	75	22	0	0		10			28		42	38	2.6	6		d r	Pos. 3
M0208A21.IM8	90- 8- 2	9:32:33	1R	75	22	0	0		10			28		42	38	2.6	5		r	Pos. 4
M0208A23.IM8	90- 8- 2	9:35:16	1R	75	22	0	0		10			28		41	51	2.6	17	71	p	Pos. 5
M0208A25.IM8	90- 8- 2	9:38: 0	1R	75	32	0	0		10			28		40	45	2.4	7	72	p d r	Pos. 6
M0208A26.IM1	90- 8- 2	9:39: 3	1R	135	22	30	d	33	10		25	28	50	40	45	2.4	24	21	p	
M0208A27.IM1	90- 8- 2	10: 6: 5	1R	135	22	30	d		12			29		36	58	3.7	27	21	p r	Pos. 3

Filename	Date	Time	Scen	Lens	Diaf	Exp.t	Filt	Light	VIS	TO4/07	Temp	TEMP	Hum	HUM	..WIND.. DIR	Spd	PIN	IQ	p	d	r	Comment
				mm		mSec		kLux	km	%	C	C	%	%	°	m/s						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	..20..			21
M0208A28.IM8	90- 8- 2	10: 6:53	1R	75	22	0	0		12			29		36	58	3.7	7	81	p	d	r	
M0208A29.IM8	90- 8- 2	10:12: 4	1R	75	22	0	0		12			29		36	58	3.3	7	81	p	d	r	Pos. 5
M0208A30.IM1	90- 8- 2	10:12:25	1R	135	22	30	d		12			29		36	58	3.3	27	21	p		r	PRI
M0208A31.IM8	90- 8- 2	10:15: 8	1R	75	32	0	0		12			30		35	64	3.7	7	71	p	d	r	Pos. 6
M0208A32.IM1	90- 8- 2	10:15:30	1R	135	22	30	d		12			30		35	64	3.7	26	71	p			
M0208A33.IM8	90- 8- 2	10:44:55	1R	75	22	0	0		12			31		33	64	3.4	6	80	p	d	r	
M0208A34.IM1	90- 8- 2	10:45:12	1R	135	22	30	d		12		30	31	49	33	64	3.4	27	71	p		r	
M0208A35.IM8	90- 8- 2	10:50:30	1R	75	22	0	0		12		30	33	49	33	70	3.4	6			d	r	
M0208A37.IM8	90- 8- 2	10:52:59	1R	75	22	0	0		12			33		33	70	3.4	6			d	r	
M0208A39.IM8	90- 8- 2	11:21:34	1R	75	22	0	0		12			32		28	90	3.4	6	81	p	d	r	Truck
M0208A40.IM1	90- 8- 2	11:22:23	1R	135	22	30	d		12			32		28	90	3.4	27	21	p		r	
M0208A41.IM8	90- 8- 2	11:23:46	1R	75	22	0	0		12			32		28	70	3.2	5				r	
M0208A42.IM1	90- 8- 2	11:24:54	1R	135	22	30	d		12			32		28	70	3.2	27	70	p		r	
M0208A43.IM8	90- 8- 2	11:27:25	1R	75	22	0	0		12			32		28	70	3.2	6	81	p	d	r	
M0208A44.IM1	90- 8- 2	11:27:47	1R			30	d		12			32		25	83	3.7	27	61	p		r	
M0208A45.IM8	90- 8- 2	11:29:52	1R			0	0		12			32		25	83	3.7	17	80	p			
M0208A46.IM8	90- 8- 2	11:30:13	1R			0	0		12			32		25	83	3.7	17	80	p			
M0208A47.IM8	90- 8- 2	11:30:31	1R			0	0		12			32		25	83	3.7	6	71	p	d	r	
M0208A48.IM1	90- 8- 2	11:31:25	1R			30	d		12			32		25	83	3.7	26	71	p			
SPECIA00.IM8	90- 8- 2	12:59:33				0	v		12			35		17	90	4.0	86				r	
SPECIA01.IM8	90- 8- 2	13: 3:44				0	v		12	50		35		15	77	5.6	86				r	
SPECIA08.IM8	90- 8- 2	13: 6:53				0	v		12			35		15	77	5.6	86				r	
SPECIA25.IM8	90- 8- 2	13:41: 4				0	v		12			36		17	70	4.4	86				r	
SPECIA27.IM8	90- 8- 2	13:42:22				0	v		12			36		17	70	4.4	86				r	
SPECIA41.IM8	90- 8- 2	14: 0:52				0	v		12			36		14	96	4.3	87			d	r	
SPECIA42.IM8	90- 8- 2	14: 1: 3				0	v		12			36		14	96	4.3	87			d	r	
SPECIA43.IM8	90- 8- 2	14: 1:39				0	v		12			36		14	96	4.3	87			d	r	
SPECIA44.IM8	90- 8- 2	14: 1:55				0	v		12			36		14	96	4.3	87			d	r	
SPECIA45.IM8	90- 8- 2	14: 2:35				0	v		12			36		14	96	4.3	86				r	
SPECIA46.IM8	90- 8- 2	14: 3: 5				0	v		12			37		12	90	4.6	87			d	r	
SPECIA47.IM8	90- 8- 2	14: 3:13				0	v		12			37		12	90	4.6	88			d	r	
SPECIA48.IM8	90- 8- 2	14: 3:38				0	v		12			37		12	90	4.6	88			d	r	
SPECIA49.IM8	90- 8- 2	14: 3:52				0	v		12			37		12	90	4.6	88			d	r	
SPECIA50.IM8	90- 8- 2	14: 5: 0				0	v		12			37		12	90	4.6	89			d	r	
SPECIA53.IM8	90- 8- 2	14: 7:10				0	v		12			37		12	90	4.6	88			d	r	
SPECIA54.IM8	90- 8- 2	14: 7:21				0	v		12			37		12	90	4.6	87			d	r	
SPECIA55.IM8	90- 8- 2	14: 7:58				0	v		12			37		13	83	4.3	89			d	r	

Filename	Date	Time	Scen	Lens	Diaf	Exp.t	Filt	Light	VIS	T04/07	Temp	TEMP	Hum	HUM	..WIND.. DIR	Spd	PIN	IQ	p	d	r	Comment
				mm		mSec		kLux	km	%	C	C	%	%	°	m/s						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	..20..			21
SPECIA56.IM8	90- 8- 2	14: 8:15				0	v		12			37		13	83	4.3	89			d	r	
SPECIA57.IM8	90- 8- 2	14:11:36				0	v		12			37		13	83	4.3	87			d	r	
SPECIA61.IM8	90- 8- 2	14:13:12				0	v		12			37		12	122	3.2	89			d	r	
M0308A00.IM8	90- 8- 3	11: 0:24	4E	85		0	v		10	48	31	32	48	27	90	2.3	6			d	r	Tanks passing by
M0308A02.IM8	90- 8- 3	11: 1:10	4E	85		0	v		10			32		27	90	2.3	6			d	r	2x AMX10
M0308A03.IM8	90- 8- 3	11: 1:50	4E	85		0	v		10			32		27	90	2.3	7	51	p	d	r	3x AMX30
M0308A04.IM8	90- 8- 3	11: 3: 7	4E	85		0	v		10			32		27	90	2.6	7	61	p	d	r	PRAT, PRI, LEO2
M0308A05.IM1	90- 8- 3	11: 3:34	4E	135	16	30	n		10			32		27	90	2.6	26	22	p			
M0308A06.IM8	90- 8- 3	11: 3:46	4E	85		0	v		10			32		27	90	2.6	47	61	p	d	r	
M0308A07.IM1	90- 8- 3	11: 4: 5	4E	135	16	30	n		10			32		27	90	2.6	6	51	p	d	r	
M0308A08.IM1	90- 8- 3	11: 4:40	4E	135	16	30	n		10			32		27	90	2.6	57				r	
M0308A09.IM1	90- 8- 3	11: 5: 6	4E	135	16	30	n	88	10	48		32		27	90	2.6	56	22	p			Overexposed?
SPECII05.IM8	90- 8- 3	11:52:55				0	v		10			35		22	109	1.9	86				r	
SPECII06.IM8	90- 8- 3	11:54:11				0	v		10			36		22	115	2.2	86				r	
SPECII08.IM8	90- 8- 3	11:54:55				0	v		10			36		22	115	2.2	88			d	r	Dust
SPECII11.IM8	90- 8- 3	11:55:43				0	v		10			36		22	115	2.2	87			d	r	
SPECII12.IM1	90- 8- 3	11:56: 2				30	v		10			36		22	115	2.2	68					2 tanks
SPECII13.IM8	90- 8- 3	11:56:27				0	v		10			36		22	115	2.2	87			d	r	
SPECII14.IM8	90- 8- 3	11:58:47				0	v		10			36		22	96	1.7	88			d	r	
SPECII18.IM8	90- 8- 3	12: 0:28				0	v		10			36		22	96	1.7	86				r	
M0608A00.IM8	90- 8- 6	12: 2:45	4B	85	11	0	v		10	51	23	25	56	43	314	4.3	46				r	Detonating sandbags
M0608A02.IM1	90- 8- 6	12:20:29	4B	85	11	30	nd		10			25		43	282	4.0	5				r	Id
M0608A03.IM8	90- 8- 6	12:45: 5	4B	85	11	0	v		10	49		26		40	294	4.5	46				r	Id. Demen. dustcl. ca 15x60m
M0608A04.IM8	90- 8- 6	12:45:28	4B	85	11	0	v		10			26		40	294	4.5	46				r	Id. Speed 3m/sec dir. east
M0608A05.IM1	90- 8- 6	12:45:48	4B	85	11	30	nd		10			26		40	294	4.5	26	20	p			Id
M0608A07.IM1	90- 8- 6	12:46:35	4B	85	11	30	nd		10			26		40	294	4.5	26	22	p			Id
M0608A08.IM8	90- 8- 6	12:47:34	4B	85	11	0	v		10			25		42	301	4.8	46	81	p		r	Id
M0608A09.IM1	90- 8- 6	12:47:55	4B	85	11	30	nd		10			25		42	301	4.8	27	21	p		r	Id
M0608A10.IM8	90- 8- 6	12:48:39	4B	85	11	0	v		10			25		42	301	4.8	6			d	r	Id
M0608A11.IM8	90- 8- 6	12:49: 6	4B	85	11	0	v		10			25		42	301	4.8	6			d	r	Id
M0608A13.IM8	90- 8- 6	12:51:40	4B	85	11	0	v	100	10		22	25	48	42	301	4.8	7	61	p	d	r	Id.
M0608P01.IM1	90- 8- 6	15: 2: 0	3B	85	11	30	nd		10			25		33	282	5.2	27	62	p		r	
M0608P02.IM8	90- 8- 6	15: 2:25	3B	85	11	0	v		10			25		33	282	5.2	46				r	12 vehicles in line
M0608P03.IM8	90- 8- 6	15: 5:13	3B	85	11	0	v		10			25		33	282	5.7	8	62	p	d	r	Leo in smoke
M0608P04.IM1	90- 8- 6	15: 5:29	3B	85	11	30	nd		10			25		33	282	5.7	27	62	p		r	Fire
M0608P05.IM8	90- 8- 6	15: 5:37	3B	85	11	0	v		10			25		33	282	5.7	47	52	p	d	r	4 runs 12 vehicles
M0608P06.IM1	90- 8- 6	15: 5:54	3B	85	11	30	nd		10			25		33	282	5.7	27	52	p		r	

Filename	Date	Time	Scen	Lens	Diaf	Exp.t	Filt	Light	VIS	T04/07	Temp	TEMP	Hum	HUM	..WIND.. DIR	Spd	PIN	IQ	p	d	r	Comment
				mm		mSec		kLux	km	%	C	C	%	%	°	m/s						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	..20..			21
M0608P07.IM8	90- 8- 6	15: 6: 6	3B	85	11	0	v		10			25		33	282	5.7	47	61	p	d	r	
M0608P08.IM1	90- 8- 6	15: 6:18	3B	85	11	30	nd		10			25		33	282	5.7	27	52	p		r	
M0608P10.IM1	90- 8- 6	15: 6:43	3B	85	11	30	nd		10			25		33	282	5.7	26	51	p			
M0608P11.IM8	90- 8- 6	15: 7: 4	3B	85	11	0	v		10			25		33	282	5.7	6	62	p	d	r	
M0608P13.IM8	90- 8- 6	15: 7:37	3B	85	11	0	v		10			26		32	269	5.0	7	62	p	d	r	
M0608P14.IM1	90- 8- 6	15: 7:49	3B	85	11	30	nd		10			26		32	269	5.0	27	51	p		r	Heavy dust
M0608P15.IM8	90- 8- 6	15: 8: 0	3B	85	11	0	v		10			26		32	269	5.0	5	40	p		r	
M0608P16.IM1	90- 8- 6	15: 8:26	3B	85	11	30	nd		10			26		32	269	5.0	27	41	p		r	
M0608P17.IM8	90- 8- 6	15: 8:38	3B	85	11	0	v		10			26		32	269	5.0	8	43	p	d	r	Truck
M0608P18.IM1	90- 8- 6	15: 8:55	3B	85	11	30	nd		10			26		32	269	5.0	27	51	p		r	
M0608P19.IM8	90- 8- 6	15: 9:11	3B	85	11	0	v		10			26		32	269	5.0	8	43	p	d	r	Dust + tank
M0608P20.IM1	90- 8- 6	15: 9:33	3B	85	11	30	nd		10			26		32	269	5.0	24	10	p			
M0608P21.IM1	90- 8- 6	15: 9:53	3B	85	11	30	nd		10			26		32	269	5.0	27	32	p		r	
M0608P22.IM1	90- 8- 6	15:10:52	3B	85	11	30	nd		10			26		32	269	5.0	27	21	p		r	
M0608P23.IM8	90- 8- 6	15:11: 1	3B	85	11	0	v		10			26		32	269	5.0	7	51	p	d	r	
M0608P24.IM1	90- 8- 6	15:12:15	3B	85	11	30	nd		10			26		32	269	5.0	27	61	p		r	
M0608P25.IM1	90- 8- 6	15:16:19	3B	85	11	30	nd	100	10			27		32	288	5.1	27	71	p		r	Black smoke
M0608P26.IM8	90- 8- 6	15:38:58	3B	85	11	0	v		10	53		26		31	288	5.4	6			d	r	Fire + dust
M0608P28.IM8	90- 8- 6	15:45: 2	3B	85	11	0	v		10			26		31	288	5.6	47	71	p	d	r	Tank in smoke
M0608P29.IM1	90- 8- 6	15:45:18	3B	85	16	30	e		10			26		31	288	5.6	27	62	p		r	
M0608P34.IM8	90- 8- 6	15:46:44	3B	85	11	0	v		10			26		31	288	5.6	46				r	Dust + testtarget b/w
M0608P35.IM8	90- 8- 6	15:46:52	3B	85	11	0	v		10			26		31	288	5.6	6			d	r	
M0608P36.IM1	90- 8- 6	15:47:15	3B	85	16	30	e		10			26		31	288	5.6	46				r	
M0608P37.IM8	90- 8- 6	15:47:35	3B	85	11	0	v	95	10			25		33	269	5.3	5				r	
M0608P38.IM1	90- 8- 6	16:15:13	3B	85	16	30	e		10			24		31	269	5.1	27	71	p		r	
M0608P39.IM8	90- 8- 6	16:15:46	3B	85	11	0	v		10			24		31	269	5.1	7	51	p	d	r	Smoke
M0608P40.IM1	90- 8- 6	16:16: 4	3B	85	16	30	e		10			24		31	269	5.1	27	61	p		r	
M0608P41.IM8	90- 8- 6	16:19:11	3B	85	11	0	v		10			23		32	269	4.9	8	72	p	d	r	
M0608P42.IM8	90- 8- 6	16:19:19	3B	85	11	0	v		10			23		32	269	4.9	7	62	p	d	r	
M0608P43.IM1	90- 8- 6	16:19:32	3B	85	16	30	e		10			23		32	269	4.9	26	71	p			
M0608P48.IM1	90- 8- 6	16:20:26	3B	85	16	30	e		10			23		32	269	4.9	44				r	
M0608P50.IM1	90- 8- 6	16:20:54	3B	85	16	30	e		10			23		32	269	4.9	26	22	p			
M0608P51.IM8	90- 8- 6	16:21: 9	3B	85	11	0	v		10			23		32	269	4.9	8	42	p	d	r	Smoke
M0608P52.IM8	90- 8- 6	16:21:18	3B	85	11	0	v		10			23		32	269	4.9	8	52	p	d	r	
M0608P53.IM1	90- 8- 6	16:21:32	3B	85	16	30	e		10			23		32	269	4.9	26	31	p			
M0608P54.IM8	90- 8- 6	16:21:45	3B	85	11	0	v		10			23		32	269	4.9	8	61	p	d	r	Vannishing smoke
M0608P55.IM1	90- 8- 6	16:22: 3	3B	85	16	30	e		10			23		32	269	4.9	27	31	p		r	

Filename	Date	Time	Scen	Lens mm	Diaf	Exp.t mSec	Filt	Light kLux	VIS km	TO4/07 %	Temp C	TEMP C	Hum %	HUM %	..WIND.. DIR °	Spd m/s	PIN	IQ	p	d	r	Comment
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	..20..			21
M0608P56.IM1	90- 8- 6	16:22:26	3B	85	16	30	e		10			23		32	269	4.9	27	62	p		r	
M0608P57.IM8	90- 8- 6	16:38:39	3B	85	22	0	0	92	10	53	24	25	43	30	294	5.6	8	62	p	d	r	
M0608P58.IM8	90- 8- 6	16:38:55	3B	85	22	0	0		10			25		30	294	5.6	9	62	p	d	r	
M0608P59.IM1	90- 8- 6	16:39:11	3B	85	16	30	e		10			25		30	294	5.6	27	53	p		r	
M0608P60.IM1	90- 8- 6	16:54:42	3B	85	16	30	e		10			26		30	275	5.5	28	71	p	d	r	
M0608P61.IM1	90- 8- 6	16:54:53	3B	85	16	30	e		10			26		30	275	5.5	28	52	p	d	r	
M0608P62.IM8	90- 8- 6	16:55: 3	3B	85	16	0	0		10			26		30	275	5.5	7	41	p	d	r	
M0608P63.IM1	90- 8- 6	16:55:14	3B	85	16	30	e		10			26		30	275	5.5	26	40	p			
M0608P64.IM8	90- 8- 6	16:55:22	3B	85	16	0	0		10			26		30	275	5.5	7	30	p	d	r	
M0608P65.IM8	90- 8- 6	16:55:28	3B	85	16	0	0		10			26		30	275	5.5	8	31	p	d	r	
M0608P66.IM8	90- 8- 6	16:55:34	3B	85	16	0	0		10			26		30	275	5.5	8	30	p	d	r	
M0608P67.IM8	90- 8- 6	16:55:41	3B	85	16	0	0		10			26		30	275	5.5	8	30	p	d	r	
M0608P68.IM8	90- 8- 6	16:55:47	3B	85	16	0	0		10			26		30	275	5.5	8	30	p	d	r	
M0608P69.IM8	90- 8- 6	16:55:52	3B	85	16	0	0		10			26		30	275	5.5	8	31	p	d	r	
M0608P70.IM8	90- 8- 6	16:55:59	3B	85	16	0	0		10			26		30	275	5.5	8	30	p	d	r	
M0608P71.IM1	90- 8- 6	16:56:10	3B	85	16	30	e		10			26		30	275	5.5	26	20	p			
M0608P72.IM8	90- 8- 6	16:56:18	3B	85	16	0	0		10			26		30	275	5.5	9	41	p	d	r	
M0608P73.IM8	90- 8- 6	16:56:24	3B	85	16	0	0		10			26		30	275	5.5	9	41	p	d	r	
M0608P74.IM8	90- 8- 6	16:56:30	3B	85	16	0	0		10			26		30	275	5.5	8	42	p	d	r	
M0608P75.IM8	90- 8- 6	16:56:35	3B	85	16	0	0		10			26		30	275	5.5	9	52	p	d	r	
M0608P76.IM1	90- 8- 6	16:56:46	3B	85	16	30	e		10	54	21	26	36	30	275	5.5	27	21	p		r	
M0708A01.IM8	90- 8- 7	11: 2:38	4C	80	16	0	0		30			21		47	275	3.2	6			d	r	8 vehicles
M0708A02.IM8	90- 8- 7	11: 3: 0	4C	80	16	0	0		30			21		47	294	2.9	6			d	r	
M0708A03.IM8	90- 8- 7	11: 3: 9	4C	80	16	0	0		30			21		47	294	2.9	6			d	r	
M0708A04.IM8	90- 8- 7	11: 3:22	4C	80	16	0	0		30			21		47	294	2.9	7	70	p	d	r	
M0708A05.IM8	90- 8- 7	11: 3:37	4C	80	16	0	0		30			21		47	294	2.9	6			d	r	
M0708A06.IM8	90- 8- 7	11: 3:49	4C	80	16	0	0		30			21		47	294	2.9	5				r	
M0708A07.IM8	90- 8- 7	11: 4: 5	4C	80	16	0	0		30			21		47	294	2.9	7	81	p	d	r	
M0708A08.IM8	90- 8- 7	11: 4:28	4C	80	16	0	0		30			21		47	294	2.9	7	81	p	d	r	
M0708A09.IM8	90- 8- 7	11: 4:58	4C	80	16	0	0		30			21		47	294	2.9	17	81	p			
M0708A10.IM8	90- 8- 7	11: 5:10	4C	80	16	0	0		30	51		21		47	294	2.9	7			d	r	
M0708A11.IM8	90- 8- 7	11: 5:26	4C	80	16	0	0		30			21		47	294	2.9	7	81	p	d	r	
M0708A12.IM8	90- 8- 7	11: 5:50	4C	80	16	0	0		30		21	21	57	47	294	2.9	16	81	p			
M0708A13.IM8	90- 8- 7	11: 6:20	4C	80	16	0	0		30			21		47	294	2.9	7	80	p	d	r	
M0708A14.IM8	90- 8- 7	11: 6:45	4C	80	16	0	0		30			21		47	294	2.9	7	80	p	d	r	
M0708A15.IM8	90- 8- 7	11: 6:53	4C	80	16	0	0		30			21		47	294	2.9	6	71	p	d	r	
M0708A16.IM8	90- 8- 7	11: 7: 5	4C	80	16	0	0		30			21		47	294	2.9	7	80	p	d	r	

Appendix C: Listing of recordings in final database

Filename	Date	Time	Scen	Lens	Diaf	Exp.t	Filt	Light	VIS	T04/07	Temp	TEMP	Hum	HUM	..WIND.. DIR	Spd	PIN	IQ	p	d	r	Comment
				mm		mSec		kLux	km	%	C	C	%	%	°	m/s						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	..20..			21
M0708A17.IM8	90- 8- 7	11: 7:16	4C	80	16	0	0		30			21		47	294	2.9	6	80	p	d	r	
M0708A18.IM8	90- 8- 7	11: 7:28	4C	80	16	0	0	22	30			20		46	326	3.2	7	71	p	d	r	
M0708P00.IM1	90- 8- 7	12:17:48				30			30			24		39			36				r	Clear frame 1.1.1, Dark picture
M0708P01.IM8	90- 8- 7	12:18:13				0			30			24		39			36				r	Dark picture
M0708P02.IM8	90- 8- 7	14: 0:49	3A	50	16	0	v		15	52	23	24	48	37	294	3.7	7	60	p	d	r	Vehicles in column
M0708P03.IM1	90- 8- 7	14: 0:57	3A	135	8	30	vd		15			24		37	294	3.7	8	61	p	d	r	
M0708P04.IM9	90- 8- 7	14: 1: 1	3A	75	8	0.001	v		15			24		37	294	3.7	7				r	Dust
M0708P05.IM8	90- 8- 7	14: 1:24	3A	50	16	0	v		15			24		37	294	3.7	8	70	p	d	r	4 runs 13 vehicles
M0708P06.IM1	90- 8- 7	14: 1:32	3A	135	8	30	vd		15			24		37	294	3.7	8	71	p	d	r	
M0708P07.IM9	90- 8- 7	14: 1:36	3A	75	8	0.001	v		15			24		37	294	3.7	7				r	Dust
M0708P08.IM1	90- 8- 7	14: 1:57	3A	135	8	30	vd		15			24		37	294	3.7	8	61	p	d	r	Height of dust ca 3-10m
M0708P09.IM1	90- 8- 7	14: 2: 9	3A	135	8	30	vd		15			24		37	294	3.7	9	62	p	d	r	
M0708P10.IM1	90- 8- 7	14: 2:29	3A	135	8	30	vd		15			25		34	307	3.5	9	61	p	d	r	
M0708P11.IM9	90- 8- 7	14: 2:48	3A	75	8	0.001	v		15			25		34	307	3.5	7				r	Dust
M0708P14.IM8	90- 8- 7	14: 3:11	3A	50	16	0	v		15			25		34	307	3.5	7	40	p	d	r	
M0708P15.IM8	90- 8- 7	14: 3:17	3A	50	16	0	v		15			25		34	307	3.5	7	41	p	d	r	
M0708P16.IM8	90- 8- 7	14: 3:23	3A	50	16	0	v		15			25		34	307	3.5	7	40	p	d	r	
M0708P17.IM1	90- 8- 7	14: 3:33	3A	135	8	30	vd		15			25		34	307	3.5	46				r	
M0708P18.IM1	90- 8- 7	14: 3:42	3A	135	8	30	vd		15			25		34	307	3.5	46				r	
M0708P19.IM1	90- 8- 7	14: 3:52	3A	135	8	30	vd		15			25		34	307	3.5	8	52	p	d	r	
M0708P20.IM1	90- 8- 7	14: 4: 3	3A	135	8	30	vd		15			25		34	307	3.5	9	53	p	d	r	
M0708P21.IM8	90- 8- 7	14: 4:14	3A	50	16	0	v		15			25		34	307	3.5	8	61	p	d	r	
M0708P22.IM8	90- 8- 7	14: 4:20	3A	50	16	0	v		15			25		34	307	3.5	8	61	p	d	r	
M0708P23.IM8	90- 8- 7	14: 4:26	3A	50	16	0	v		15			25		34	307	3.5	8	61	p	d	r	
M0708P24.IM1	90- 8- 7	14: 4:37	3A	135	8	30	vd		15			25		34	307	3.5	8	62	p	d	r	
M0708P26.IM9	90- 8- 7	14:33:14	3A	75	8	0.005	v		15			21		41	250	2.7	6				r	
M0708P27.IM1	90- 8- 7	14:33:26	3A	135	8	30	vd		15			21		41	250	2.7	8	71	p	d	r	
M0708P29.IM8	90- 8- 7	14:34: 4	3A	50	16	0	v		15			21		41	250	2.7	7	60	p	d	r	
M0708P30.IM8	90- 8- 7	14:34:21	3A	50	16	0	v		15			21		41	250	2.7	8	61	p	d	r	
M0708P31.IM1	90- 8- 7	14:34:33	3A	135	8	30	vd		15			21		41	250	2.7	7	61	p	d	r	Clear frame 1.1.1
M0708P32.IM1	90- 8- 7	14:34:58	3A	135	8	30	vd		15			21		41	250	2.7	8	61	p	d	r	
M0708P33.IM1	90- 8- 7	14:35: 9	3A	135	8	30	vd		15			21		41	250	2.7	8	62	p	d	r	
M0708P34.IM1	90- 8- 7	14:35:19	3A	135	8	30	vd		15			21		41	250	2.7	8	62	p	d	r	
M0708P37.IM8	90- 8- 7	14:35:46	3A	50	16	0	v		15			21		41	250	2.7	6	40	p	d	r	
M0708P38.IM8	90- 8- 7	14:35:52	3A	50	16	0	v		15			21		41	250	2.7	6	40	p	d	r	
M0708P39.IM8	90- 8- 7	14:35:57	3A	50	16	0	v		15			21		41	250	2.7	6	40	p	d	r	
M0708P40.IM8	90- 8- 7	14:36: 3	3A	50	16	0	v		15			21		41	250	2.7	7	40	p	d		

Filename	Date	Time	Scen	Lens mm	Diaf	Exp.t mSec	Filt	Light kLux	VIS km	T04/07 %	Temp C	TEMP C	Hum %	HUM %	..WIND.. DIR °	Spd m/s	PIN	IQ	p	d	r	Comment
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	..20..			21
M0708P41.IM1	90- 8- 7	14:36:13	3A	135	8	30	vd		15			21		41	250	2.7	8	53	p	d	r	
M0708P42.IM1	90- 8- 7	14:36:22	3A	135	8	30	vd		15			21		41	250	2.7	9	53	p		r	
M0708P43.IM8	90- 8- 7	14:36:31	3A	50	16	0	v		15			21		41	250	2.7	6	40	p	d	r	
M0708P44.IM8	90- 8- 7	14:36:52	3A	50	16	0	v		15			21		41	250	2.7	6	40	p	d	r	
M0708P45.IM1	90- 8- 7	14:37: 1	3A	135	8	30	v		15			21		41	250	2.7	8	53	p	d	r	Dust + truck
M0708P46.IM1	90- 8- 7	14:37:13	3A	135	8	30	vd		15			21		41	250	2.7	8	62	p	d	r	
M0708P47.IM8	90- 8- 7	14:37:21	3A	50	16	0	v		15			21		41	250	2.7	6	40	p	d	r	
M0708P48.IM8	90- 8- 7	14:37:27	3A	50	16	0	v	11	15		21	21	50	42	301	2.8	7	40	p	d	r	7/8 cloudy, heavy dust
M0708P49.IM8	90- 8- 7	14:37:57	3A	50	16	0	v		15			21		42	301	2.8	6	71	p	d	r	
M0708P50.IM1	90- 8- 7	14:38:17	3A	135	8	30	vd		15			21		42	301	2.8	7	71	p	d	r	Clear frame 1.1.1
M0708P51.IM8	90- 8- 7	15:12:13	3A	70	11	0	v	88	15		20	26	38	37	230	1.9	7	60	p	d	r	Moving vehicles in dust
M0708P52.IM1	90- 8- 7	15:12:30	3A	135	8	30	vd		15			26		37	230	1.9	8	71	p	d	r	
M0708P53.IM8	90- 8- 7	15:12:43	3A	70	11	0	v		15			26		37	230	1.9	7	60	p	d	r	
M0708P54.IM8	90- 8- 7	15:12:49	3A	70	11	0	v		15			26		37	230	1.9	7	50	p	d	r	6/8 cloudy
M0708P55.IM8	90- 8- 7	15:12:54	3A	70	11	0	v		15			26		37	230	1.9	7	51	p	d	r	
M0708P56.IM8	90- 8- 7	15:13: 5	3A	70	11	0	v		15			26		37	230	1.9	7	61	p	d	r	
M0708P57.IM1	90- 8- 7	15:13:38	3A	135	8	30	vd		15			26		37	230	1.9	8	72	p	d	r	
M0708P58.IM1	90- 8- 7	15:13:49	3A	135	8	30	vd		15			26		37	230	1.9	8	71	p	d	r	
M0708P59.IM1	90- 8- 7	15:14: 1	3A	135	8	30	vd		15			26		37	230	1.9	8	61	p	d	r	
M0708P60.IM8	90- 8- 7	15:14:12	3A	70	11	0	v		15			26		37	230	1.9	46	51	p		r	
M0708P61.IM8	90- 8- 7	15:14:27	3A	70	11	0	v		15			26		37	230	1.9	7	61	p	d	r	
M0708P62.IM8	90- 8- 7	15:14:32	3A	70	11	0	v		15			26		37	230	1.9	7	61	p	d	r	
M0708P63.IM1	90- 8- 7	15:14:42	3A	135	8	30	vd		15			26		37	230	1.9	8	51	p	d	r	
M0708P64.IM8	90- 8- 7	15:14:55	3A	70	11	0	v		15			26		37	230	1.9	6	41	p	d	r	
M0708P65.IM9	90- 8- 7	15:15: 5	3A	75	8	0.002	v		15			26		37	230	1.9	6			d		Dust
M0708P71.IM8	90- 8- 7	15:15:41	3A	70	11	0	v		15			26		37	230	1.9	6	50	p	d	r	
M0708P72.IM8	90- 8- 7	15:15:47	3A	70	11	0	v		15			26		37	230	1.9	6	41	p	d	r	
M0708P73.IM8	90- 8- 7	15:15:52	3A	70	11	0	v		15		25	26	46	37	230	1.9	8	51	p	d	r	
M0708P74.IM8	90- 8- 7	15:16: 7	3A	70	11	0	v		15			26		37	230	1.9	8	52	p	d	r	
M0708P75.IM1	90- 8- 7	15:16:15	3A	135	8	30	vd		15			26		37	230	1.9	9	53	p	d	r	
M0708P76.IM1	90- 8- 7	15:16:26	3A	135	8	30	vd		15			26		37	230	1.9	8	62	p	d	r	
M0708P77.IM8	90- 8- 7	15:16:32	3A	70	11	0	v		15			26		37	230	1.9	7	61	p	d	r	
M0708P78.IM8	90- 8- 7	15:16:41	3A	70	11	0	v		15			26		37	230	1.9	7	61	p	d	r	
M0708P79.IM1	90- 8- 7	15:16:56	3A	135	8	30	vd		15			26		37	230	1.9	7	71	p	d	r	
M0708P80.IM1	90- 8- 7	15:48:50	3A	135	16	30	n		15			25		35	301	2.4	46				r	
M0708P81.IM8	90- 8- 7	15:49:42	3A	50	22	0	0		15			25		35	301	2.4	7	61	p	d	r	
M0708P82.IM1	90- 8- 7	15:50:28	3A	135	16	30	n		15			25		35	301	2.4	8	51	p	d	r	

Filename	Date	Time	Scen	Lens	Diaf	Exp.t	Filt	Light	VIS	T04/07	Temp	TEMP	Hum	HUM	..WIND.. DIR	Spd	PIN	IQ	p	d	r	Comment
				mm		mSec		kLux	km	%	C	C	%	%	°	m/s						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	..20..			21
M0708P83.IM1	90- 8- 7	15:50:44	3A	135	16	30	n		15			25		35	301	2.4	7	52	p	d	r	
M0708P84.IM1	90- 8- 7	15:50:53	3A	135	16	30	n		15			25		35	301	2.4	8	51	p	d	r	
M0708P85.IM1	90- 8- 7	15:51:20	3A	135	16	30	n		15			25		35	301	2.4	8	52	p	d	r	
M0708P88.IM1	90- 8- 7	15:51:47	3A	135	16	30	n		15			25		35	301	2.4	7	30	p	d	r	
M0708P89.IM1	90- 8- 7	15:51:56	3A	135	16	30	n		15			25		35	301	2.4	8	42	p	d	r	
M0708P90.IM1	90- 8- 7	15:52: 5	3A	135	16	30	n		15			25		35	301	2.4	8	52	p	d	r	
M0708P91.IM1	90- 8- 7	15:52:14	3A	135	16	30	n		15			25		35	301	2.4	7	52	p	d	r	
M0708P92.IM1	90- 8- 7	15:52:23	3A	135	16	30	n		15			25		35	301	2.4	7	52	p	d	r	
M0808A00.IM8	90- 8- 8	9:16:31	3A	120	22	0	v		12	49	14	16	60	61	6	2.7	6			d	r	4 runs 12 vehicles
M0808A01.IM8	90- 8- 8	9:16:43	3A	120	22	0	v		12			16		61	6	2.7	6			d	r	
M0808A02.IM8	90- 8- 8	9:17: 8	3A	120	22	0	v		12			16		61	6	2.7	6			d	r	
M0808A03.IM8	90- 8- 8	9:17:24	3A	120	22	0	v		12			16		61	6	2.7	6	50	p	d	r	
M0808A04.IM8	90- 8- 8	9:17:32	3A	120	22	0	v		12			17		61	19	2.4	8	60	p	d	r	
M0808A05.IM8	90- 8- 8	9:17:45	3A	120	22	0	v		12			17		61	19	2.4	7	50	p	d	r	
M0808A06.IM8	90- 8- 8	9:18: 6	3A	120	22	0	v		12			17		61	19	2.4	8	60	p	d	r	
M0808A07.IM8	90- 8- 8	9:18:17	3A	120	22	0	v		12			17		61	19	2.4	8	60	p	d	r	
M0808A08.IM8	90- 8- 8	9:18:35	3A	120	22	0	v		12			17		61	19	2.4	9	61	p	d	r	
M0808A09.IM8	90- 8- 8	9:18:43	3A	120	22	0	v		12			17		61	19	2.4	8	61	p	d	r	
M0808A10.IM8	90- 8- 8	9:19: 1	3A	120	22	0	v		12			17		61	19	2.4	9	62	p	d	r	
M0808A11.IM8	90- 8- 8	9:19:10	3A	120	22	0	v		12			17		61	19	2.4	9	62	p	d	r	
M0808A12.IM8	90- 8- 8	9:19:26	3A	120	22	0	v		12			17		61	19	2.4	9	62	p	d	r	
M0808A13.IM8	90- 8- 8	9:19:34	3A	120	22	0	v		12			17		61	19	2.4	9	62	p	d	r	
M0808A14.IM8	90- 8- 8	9:19:42	3A	120	22	0	v		12			17		61	19	2.4	9	61	p	d	r	
M0808A15.IM8	90- 8- 8	9:19:50	3A	120	22	0	v		12			17		61	19	2.4	7	52	p	d	r	
M0808A16.IM8	90- 8- 8	9:19:55	3A	120	22	0	v		12			17		61	19	2.4	7	51	p	d	r	
M0808A17.IM8	90- 8- 8	9:20:16	3A	120	22	0	v		12			17		61	19	2.4	7	61	p	d	r	
M0808A18.IM1	90- 8- 8	9:22:22	3A	135	22	30	nd	33	12		16	17	80	61	19	2.4	7	71	p	d	r	Clear frame 2.2.2
M0808A19.IM1	90- 8- 8	9:57:10	3A	135	22	30	nd		15	49		19		52	13	1.8	7	71	p	d	r	Chip clean
M0808A20.IM8	90- 8- 8	9:57:28	3A	70	22	0	v		15			19		52	13	1.8	6			d	r	
M0808A21.IM9	90- 8- 8	9:58:55	3A	75	8	0.003	v		15			19		52	13	1.8	6				r	
M0808A22.IM9	90- 8- 8	10: 2:21	3A	75	8	0.003	v		15			19		52	13	1.8	7				r	
M0808A23.IM9	90- 8- 8	10: 2:27	3A	75	8	0.003	v		15			19		52	13	1.6	8			d	r	Dust
M0808A24.IM9	90- 8- 8	10: 2:34	3A	75	8	0.003	v		15			19		52	13	1.6	7				r	
M0808A25.IM9	90- 8- 8	10: 2:39	3A	75	8	0.003	v		15			19		52	13	1.6	6				r	
M0808A27.IM8	90- 8- 8	10: 2:52	3A	70	22	0	v		15			19		52	13	1.6	9	62	p	d	r	
M0808A28.IM8	90- 8- 8	10: 3: 5	3A	70	22	0	v		15			19		52	13	1.6	8	51	p	d	r	
M0808A29.IM8	90- 8- 8	10: 3:12	3A	70	22	0	v		15			19		52	13	1.6	8	61	p	d	r	

Filename	Date	Time	Scen	Lens	Diaf	Exp.t	Filt	Light	VIS	T04/07	Temp	TEMP	Hum	HUM	..WIND.. DIR	Spd	PIN	IQ	p	d	r	Comment
				mm		mSec		kLux	km	%	C	C	%	%	°	m/s						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	..20..			21
M0808A30.IM8	90- 8- 8	10: 3:22	3A	70	22	0	v		15			19		52	13	1.6	8	61	p	d	r	
M0808A31.IM1	90- 8- 8	10: 3:33	3A	135	22	30	nd		15			19		52	13	1.6	8	62	p	d	r	
M0808A32.IM1	90- 8- 8	10: 3:52	3A	135	22	30	nd		15			19		52	13	1.6	8	62	p	d	r	
M0808A33.IM8	90- 8- 8	10: 4: 1	3A	70	22	0	v		15			19		52	13	1.6	7	61	p	d	r	Passing vehicles in column
M0808A34.IM1	90- 8- 8	10: 4:25	3A	135	22	30	nd		15			19		52	13	1.6	8	62	p	d	r	
M0808A35.IM8	90- 8- 8	10: 4:35	3A	70	22	0	v		15			19		52	13	1.6	6			d	r	
M0808A37.IM8	90- 8- 8	10: 5: 5	3A	70	22	0	v		15			19		52	13	1.6	6			d	r	
M0808A38.IM1	90- 8- 8	10: 5:16	3A	135	22	30	n	11	15		18	19	65	52	13	1.6	47	51	p	d	r	
M0808A39.IM9	90- 8- 8	10: 5:25	3A	75	8	0.003	v		15			19		52	13	1.6	7				r	13 vehicles in column
M0808A40.IM1	90- 8- 8	10:49:39	3A	135	16	30	e		20	50		22		45	326	1.7	7	71	p	d	r	Clear frame 2.2.2
M0808A41.IM1	90- 8- 8	10:49:49	3A	135	16	30	e		20			22		45	326	1.7	7	72	p	d	r	
M0808A42.IM8	90- 8- 8	10:50: 0	3A	75	22	0	0		20			22		45	326	1.7	7	71	p	d	r	
M0808A43.IM8	90- 8- 8	10:50:17	3A	75	22	0	0		20			22		45	326	1.7	8	71	p	d	r	
M0808A44.IM1	90- 8- 8	10:50:30	3A	135	16	30	e		20			22		45	326	1.7	7	63	p	d	r	
M0808A45.IM8	90- 8- 8	10:50:41	3A	75	22	0	0		20			22		45	326	1.7	9	62	p	d	r	
M0808A46.IM9	90- 8- 8	10:50:52	3A	75	22	0.002	0		20			22		45	326	1.7	6				r	Dust
M0808A47.IM8	90- 8- 8	10:50:58	3A	75	22	0	0		20			22		45	326	1.7	9	62	p	d	r	
M0808A48.IM1	90- 8- 8	10:51:11	3A	135	16	30	e		20			22		45	326	1.7	8	62	p	d	r	
M0808A49.IM8	90- 8- 8	10:51:24	3A	75	22	0	0		20			22		45	326	1.7	9	62	p	d	r	
M0808A50.IM1	90- 8- 8	10:51:38	3A	135	16	30	e		20			22		45	326	1.7	8	43	p	d	r	
M0808A51.IM8	90- 8- 8	10:51:45	3A	75	22	0	0		20			22		45	326	1.7	8	52	p	d	r	
M0808A52.IM1	90- 8- 8	10:51:59	3A	135	16	30	e		20			22		45	326	1.7	8	53	p	d	r	
M0808A53.IM8	90- 8- 8	10:52:11	3A	75	22	0	0		20			22		45	326	1.7	6	61	p	d	r	
M0808A54.IM1	90- 8- 8	10:52:23	3A	135	16	30	e		20			22		45	326	1.7	6	71	p	d	r	
M0808A55.IM1	90- 8- 8	10:52:38	3A	135	16	30	e		20			22		45	314	1.9	47	52	p	d	r	
M0808A56.IM8	90- 8- 8	10:52:52	3A	135	22	0	0		20			22		45	314	1.9	8	62	p	d	r	
M0808A57.IM8	90- 8- 8	10:53: 4	3A	75	22	0	0		20			22		45	314	1.9	8	60	p	d	r	
M0808A58.IM1	90- 8- 8	10:53:18	3A	135	16	30	e	88	20		21	22	58	45	314	1.9	7	41	p	d	r	
M0808A64.IM8	90- 8- 8	11:33:23	3A	80	22	0	v		30			24		40	345	2.2	8	71	p	d	r	
M0808A65.IM1	90- 8- 8	11:33:40	3A	135	11	30	vd		30			24		40	345	2.2	7	72	p	d	r	
M0808A66.IM1	90- 8- 8	11:33:53	3A	135	11	30	vd		30			24		40	345	2.2	7	61	p	d	r	
M0808A67.IM1	90- 8- 8	11:34:20	3A	135	11	30	vd		30			24		40	345	2.2	8	62	p	d	r	
M0808A68.IM1	90- 8- 8	11:34:35	3A	135	11	30	vd	88	30			24		40	345	2.2	47	51	p	d	r	
M0808A69.IM8	90- 8- 8	11:34:43	3A	80	22	0	v		30			24		40	345	2.2	8	50	p	d	r	
M0808A70.IM8	90- 8- 8	11:35: 1	3A	80	22	0	v		30			24		40	345	2.2	7	61	p	d	r	
M0808A71.IM1	90- 8- 8	11:35:11	3A	135	11	30	vd		30			24		40	345	2.2	47	61	p	d	r	
M0808A72.IM1	90- 8- 8	11:35:25	3A	135	11	30	vd		30			24		40	345	2.2	8	63	p	d	r	

Filename	Date	Time	Scen	Lens mm	Diaf	Exp.t mSec	Filt	Light kLux	VIS km	TO4/07 %	Temp C	TEMP C	Hum %	HUM %	..WIND.. DIR °	Spd m/s	PIN	IQ	p	d	r	Comment
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19		..20..		21
M0808A73.IM8	90- 8- 8	11:35:38	3A	80	22	0	v		30			24		40	345	2.2	7	51	p	d	r	
M0808A74.IM8	90- 8- 8	11:35:47	3A	80	22	0	v		30			24		40	345	2.2	7	52	p	d	r	
M0808A75.IM8	90- 8- 8	11:35:53	3A	80	22	0	v		30			24		40	345	2.2	8	61	p	d	r	
M0808A76.IM8	90- 8- 8	11:36: 0	3A	80	22	0	v		30			24		40	345	2.2	7	51	p	d	r	
M0808A77.IM1	90- 8- 8	11:36:12	3A	135	11	30	vd		30			24		40	345	2.2	46				r	
M0808A78.IM1	90- 8- 8	11:36:23	3A	135	11	30	vd		30			24		40	345	2.2	6			d	r	
M0808A79.IM1	90- 8- 8	11:36:33	3A	135	11	30	vd		30			24		40	345	2.2	46				r	
M0808A80.IM8	90- 8- 8	11:36:41	3A	80	22	0	v		30			24		40	345	2.2	7	31	p	d	r	
M0808A81.IM8	90- 8- 8	11:36:46	3A	80	22	0	v		30			24		40	345	2.2	7	31	p	d	r	
M0808A82.IM8	90- 8- 8	11:36:51	3A	80	22	0	v		30			24		40	345	2.2	8	52	p	d	r	
M0808A83.IM1	90- 8- 8	11:37: 3	3A	135	11	30	vd		30			24		40	345	2.2	8	52	p	d	r	
M0808A84.IM1	90- 8- 8	11:37:14	3A	135	11	30	vd		30			24		40	345	2.2	8	62	p	d	r	
M0808A85.IM8	90- 8- 8	11:37:24	3A	80	22	0	v		30		22	24	53	40	345	2.2	7	61	p	d	r	
M0808A86.IM1	90- 8- 8	11:37:57				30						24		40			36				r	Dark picture
M0808A87.IM8	90- 8- 8	11:38: 7				0						24		40			36				r	Dark picture
M0808A88.IM9	90- 8- 8	11:38:26				0.005						24		40			38			d	r	Dark picture
M0908A00.IM8	90- 8- 9	11: 1:11	4D	70	16	0	v		15	52		27		30	301	1.0	6	80	p	d	r	2x 3 vehicles, 5 byond
M0908A01.IM8	90- 8- 9	11: 1:22	4D	70	16	0	v		15			27		30	301	1.0	7	70	p	d	r	
M0908A02.IM8	90- 8- 9	11: 1:50	4D	70	16	0	v		15			27		30	301	1.0	7	80	p	d	r	
M0908A03.IM8	90- 8- 9	11: 2:52	4D	70	16	0	v		15			26		30	211	1.4	7	71	p	d	r	
M0908A04.IM8	90- 8- 9	11: 3: 5	4D	70	16	0	v		15			26		30	211	1.4	7	70	p	d	r	
M0908A05.IM8	90- 8- 9	11: 3:16	4D	70	16	0	v	88	15		24	26	48	30	211	1.4	8	71	p	d	r	Clear weather
M0908A06.IM8	90- 8- 9	11: 3:31	4D	70	16	0	v		15			26		30	211	1.4	6	70	p	d	r	
M0908A07.IM8	90- 8- 9	11: 3:39	4D	70	16	0	v		15			26		30	211	1.4	8	71	p	d	r	
M0908A08.IM8	90- 8- 9	11: 3:47	4D	70	16	0	v		15			26		30	211	1.4	7	61	p	d	r	
M0908A09.IM8	90- 8- 9	11: 4:24	4D	70	16	0	v		15			26		30	211	1.4	7	81	p	d	r	
M0908A15.IM8	90- 8- 9	11: 5:39	4D	70	16	0	v		15			26		30	211	1.4	8	71	p	d	r	

Appendix D: Listing of processed images and processing parameters

LEGEND OF LISTING

filename	extension *.IMn: original (unprocessed) images see appendix A and C extension *.Pxx: processed image of coresponding original image with same name before extension.
scen	scenario
pr date	video print available (with print date)
Gc	contrast multiplier
Vn(%)	percentage determining the threshold for the adaptivity
Vn	processor constant determining the adaptivity parameter.
Xmin	lowest used grey level value of input range in processing
Xmax	highest used grey level value of input range in processing
Ymin	lowest used grey level value of output range in processing
Ymax	highest used grey level value of output range in processing
IQ	image quality code (see 4.4.4)
comment	comments on trial aspects or processing aspects.

Filename	Scen.	Pr	Date	Gc	Vn(%)	Vn	Xmin	Xmax	Ymin	Ymax	IQ	Comment
M0108A01.IM1	4C	-										5 tanks
M0108A01.P01	4C	-		13	100		1650	3880	15	235	20	
M0108A02.IM8	4C	-										2 tanks
M0108A02.P01	4C	-		7	100		35	255	10	245	21	Improved horizon
M0108A04.IM1	4C	-										3 tanks
M0108A04.P01	4C	-		8	100		1600	4095	15	235	22	Improved testtargets
M0108A05.IM8	4C	-										2 vehicles
M0108A05.P01	4C	-		7	100		45	255	10	235	81	
M0108A06.IM1	4C	-										Overexposed, 3 vehicles
M0108A06.P01	4C	-		8	100		1570	4095	15	235	21	
M0108A07.IM8	4C	-										Track vehicle + tank
M0108A07.P01	4C	-		4	100		70	255	10	235	70	
M0108P01.IM1	2B	-										Truck + dust
M0108P01.P01	2B	-		7	100		670	3100	5	235	80	
M0108P02.IM8	2B	-										Truck, overexposed
M0108P02.P01	2B	-		1	100		0	190	3	220	60	
M0108P03.IM1	2B	-										No smoke, dust
M0108P03.P01	2B	-		5	100		840	3080	10	245	81	
M0108P04.IM1	2B	19-Mar-92										Testtargets, dust away
M0108P04.P01	2B	19-Mar-92		6	100		512	3860	10	245	71	
M0108P06.IM1	2B	-										
M0108P06.P01	2B	-		12	95	1.67E-02	950	2550	20	235	71	
M0108P06.P02	2B	-		9	95	1.67E-02	950	2550	20	235	71	
M0108P07.IM1	2B	09-Oct-91										Fire
M0108P07.P03	2B	11-Oct-91		7	100		600	2100	20	230	62	More objects
M0108P08.IM8	2B	-										Smoke
M0108P08.P01	2B	-		11	100		30	210	5	240	61	Smoke almost away
M0108P09.IM1	2B	-										
M0108P09.P01	2B	-		13	95	1.48E-02	1100	2500	20	235	62	
M0108P10.IM1	2B	-										
M0108P10.P01	2B	-		13	95	1.48E-02	1100	2500	20	235	61	
M0108P11.IM8	2B	-										Overexposed
M0108P11.P01	2B	-		5	100		13	255	5	235	51	
M0108P12.IM1	2B	-										Like *P11
M0108P12.P01	2B	-		6	100		670	4095	10	245	61	
M0108P13.IM1	2B	-										
M0108P13.P01	2B	-		6	100		855	4095	10	245	61	Off the road vehicle very clear
M0108P14.IM8	2B	-										Overexposed
M0108P14.P01	2B	-		3	100		0	255	5	220	50	
M0108P15.IM1	2B	-										Camera movement
M0108P15.P01	2B	-		8	100		1850	4095	15	245	11	
M0108P16.IM8	2B	-										Overexposed

Filename	Scen.	Pr Date	Gc	Vn(%)	Vn	Xmin	Xmax	Ymin	Ymax	IQ	Comment
M0108P16.P01	2B	-	5	100		45	255	10	240	50	
M0108P17.IM1	2B	-									Sky overexposed
M0108P17.P01	2B	-	7	100		1410	4095	15	245	61	
M0108P18.IM1	2B	-									
M0108P18.P01	2B	-	9	100		1075	3690	10	235	71	Improved smoke contours
M0108P19.IM1	2B	-									Testtargets, some dust
M0108P19.P01	2B	-	5	100		1300	4095	15	245	71	
M0108P20.IM8	2B	-									Tanks moved
M0108P20.P01	2B	-	5	100		33	246	10	240	71	
M0108P21.IM1	2B	-									Camouflaged tank
M0108P21.P01	2B	-	9	100		385	4095	10	240	61	Dust almost away
M0108P22.IM8	2B	19-Mar-92									Overexposed horizon
M0108P22.P01	2B	23-Mar-92	4	100		6	177	5	240	52	
M0108P23.IM1	2B	-									Camouflaged tank
M0108P23.P01	2B	-	10	100		960	3900	10	240	71	Some dust remained
M0108P24.IM1	2B	19-Mar-92									No vehicles
M0108P24.P01	2B	19-Mar-92	11	100		1400	3200	10	235	62	Light dust removed
M0108P25.IM8	2B	-									Dust + targets overexposed
M0108P25.P01	2B	-	5	100		30	244	5	245	71	
M0108P26.IM1	2B	19-Mar-92									Tank
M0108P26.P01	2B	24-Mar-92	5	100		930	3510	10	245	71	
M0108P28.IM1	2B	-									
M0108P28.P03	2B	-	3	100		1200	4000	20	230	51	
M0108P29.IM1	2B	19-Mar-92									Vehicles with tree background
M0108P29.P01	2B	24-Mar-92	5	100		1625	4095	10	245	42	
M0108P31.IM1	2B	-									Like *P29
M0108P31.P01	2B	-	6	100		1650	4095	10	245	41	
M0108P32.IM8	2B	-									Dustclouds overexposed
M0108P32.P01	2B	-	5	100		6	192	5	245	61	
M0108P33.IM1	2B	-									
M0108P33.P01	2B	-	14	100		3000	4095	20	235	61	
M0108P33.P02	2B	-	16	100		1350	4095	20	235	61	
M0108P34.IM1	2B	-									
M0108P34.P01	2B	-	5	100		1500	4095	20	230	61	
M0108P35.IM8	2B	19-Mar-92									Off the road vehicle
M0108P35.P01	2B	23-Mar-92	11	100		40	225	5	240	62	
M0108P36.IM1	2B	-									
M0108P36.P01	2B	-	14	100		2550	4095	20	235	62	
M0108P37.IM8	2B	-									Dust from car overexposed
M0108P37.P01	2B	-	11	100		45	215	5	240	61	
M0108P38.IM1	2B	-									
M0108P38.P02	2B	-	5	100		1100	4095	20	200	71	

Filename	Scen.	Pr Date	Gc	Vn(%)	Vn	Xmin	Xmax	Ymin	Ymax	IQ	Comment
M0108P38.P03	2B	-	2	100		1100	4095	20	230	71	
M0108P39.IM1	2B	19-Mar-92									Vehicle
M0108P39.P01	2B	24-Mar-92	5	100		650	4095	10	245	62	
M0108P41.IM1	2B	-									Tank + vehicle overexposed
M0108P41.P01	2B	-	6	100		650	4095	10	245	61	
M0208A01.IM8	1	-									
M0208A01.P01	1	-	6	100		20	230	15	240	71	Visibility tank a bit improved
M0208A06.IM8	1	-									Tank + testtargets
M0208A06.P01	1	-	9	100		50	255	5	240	71	
M0208A07.IM8	1	-									Large tank
M0208A07.P01	1	-	4	100		0	110	15	240	82	Details more clear
M0208A10.IM8	1	-									Tank + camouflage
M0208A10.P01	1	-	9	100		95	255	5	240	71	
M0208A11.IM8	1	19-Mar-92									
M0208A11.P01	1	23-Mar-92	8	100		135	255	10	240	62	
M0208A16.IM8	1	-									Large tank
M0208A16.P01	1	-	7	100		37	230	15	240	72	Reasonable more details
M0208A23.IM8	1	-									Off the road car
M0208A23.P01	1	-	6	100		11	210	10	240	71	
M0208A25.IM8	1	19-Mar-92									*Tracked vehicle*
M0208A25.P01	1	23-Mar-92	7	100		30	170	10	245	72	No details, sharper
M0208A26.IM1	1	-									Tracked vehicle
M0208A26.P01	1	-	8	100		1015	4095	10	240	21	
M0208A27.IM1	1	19-Mar-92									Tank
M0208A27.P01	1	19-Mar-92	8	100		150	3130	10	240	21	Considerably sharper
M0208A28.IM8	1	19-Mar-92									Tank
M0208A28.P01	1	24-Mar-92	8	100		10	245	20	235	81	Considerably sharper
M0208A29.IM8	1	19-Mar-92									Tank in foreground
M0208A29.P01	1	23-Mar-92	5	100		16	164	10	240	81	
M0208A30.IM1	1	19-Mar-92									Like *A29
M0208A30.P01	1	24-Mar-92	7	100		685	3295	5	245	21	
M0208A31.IM8	1	-									
M0208A31.P01	1	-	4	100		18	255	5	245	71	
M0208A32.IM1	1	-									Some condens
M0208A32.P01	1	-	6	100		760	4095	5	245	71	
M0208A33.IM8	1	-									
M0208A33.P01	1	-	4	100		23	255	5	245	80	
M0208A34.IM1	1	-									Some condens
M0208A34.P01	1	-	5	100		695	3000	5	245	71	
M0208A39.IM8	1	-									Extended scene than *A28
M0208A39.P01	1	-	6	100		25	170	10	245	81	
M0208A40.IM1	1	-									Scene like *A39

Filename	Scen.	Pr Date	Gc	Vn(%)	Vn	Xmin	Xmax	Ymin	Ymax	IQ	Comment
M0208A40.P01	1	-	7	100		690	3130	10	240	21	
M0208A42.IM1	1	-									Some condens
M0208A42.P01	1	-	6	100		1040	4095	10	240	70	
M0208A43.IM8	1	-									Truck
M0208A43.P01	1	-	5	100		15	196	10	245	81	
M0208A44.IM1	1	-									Some condens
M0208A44.P01	1	-	6	100		680	4095	10	240	61	
M0208A45.IM8	1	-									
M0208A45.P01	1	-	5	100		12	230	5	245	80	
M0208A46.IM8	1	19-Mar-92									Truck movement
M0208A46.P01	1	23-Mar-92	5	100		14	255	5	245	80	
M0208A47.IM8	1	-									Truck in foreground
M0208A47.P01	1	-	7	100		18	200	10	245	71	
M0208A48.IM1	1	-									Like *A47
M0208A48.P01	1	-	8	95	1.23E-02	775	4095	10	240	71	Truck clearly visible
M0208N08.IM9	1	12-Nov-91									
M0208N08.P01	1	12-Nov-91	1	100		5	250	20	235		
M0208N09.IM1	1	-									Dark picture
M0208N09.P01	1	-	1	100		30	180	20	230	42	
M0208N10.IM1	1	-									
M0208N10.IMP	1	-	5	100		52	204	10	240		
M0208N10.P01	1	-	1	100		30	220	5	240	42	
M0208N12.IM1	1	-									Dark picture
M0208N12.P02	1	-	1	100		60	360	20	250	52	
M0208N13.IM1	1	12-Nov-91									
M0208N13.P01	1	12-Nov-91	2	100		40	450	5	240	51	
M0208N13.P02	1	-	1	100		40	230	10	180		2 regions: X2 230-450/Y2 180-240
M0208N14.IM1	1	-									
M0208N14.P01	1	-	3	100		75	600	10	240	51	
M0208N14.P02	1	-	1	100		75	310	10	200		2 regions: X2 380-600/Y2 180-240
M0208N15.IM1	1	-									
M0208N15.P01	1	-	3	100		85	700	10	240	51	
M0208N15.P02	1	-	2	100		85	375	10	180	51	2 regions: X2 490-700/Y2 180-240
M0208N16.IM1	1	-									Some condens
M0208N16.P01	1	-	4	100		120	975	10	245	41	
M0208N18.IMP	1	-	10	95	?	162	1545	10	240		
M0208N19.IM1	1	-									Some condens
M0208N19.P01	1	-	4	100		320	2080	10	245	41	
M0208N21.IM8	1	-									Night image
M0208N21.P01	1	-	1	100		0	75	15	230	50	Target sharpness improved
M0208N22.IM8	1	-									Night image
M0208N22.P01	1	-	1	100		0	115	15	230	50	Target sharpnes improved

Filename	Scen.	Pr Date	Gc	Vn(%)	Vn	Xmin	Xmax	Ymin	Ymax	IQ	Comment
M0208N23.IM1	1	19-Mar-92									T=6s, tank without smoke
M0208N23.P01	1	19-Mar-92	7	100		750	2360	10	240	81	More clear
M0208N26.IM8	1	-									Tank without smoke
M0208N26.P01	1	-	1	100		0	130	15	230	50	
M0208N27.IM1	1	-									
M0208N27.P01	1	-	1	100		2255	4095	10	200	50	
M0208N28.IM1	1	-									
M0208N28.P01	1	-	5	100		1800	4095	10	230	61	Grass well processed
M0208N30.IM1	1	-									Long exposure
M0208N30.P01	1	-	10	100		1500	4095	10	245	52	
M0208N33.IM1	1	-									
M0208N33.P01	1	-	8	100		1200	4095	20	235	71	
M0208N36.IM1	1	-									Overexposed
M0208N36.P01	1	-	6	100		2000	4095	10	230	60	
M0208N37.IM1	1	-									Low light level
M0208N37.P01	1	-	5	100		700	2000	20	230	71	
M0208N38.IM1	1	19-Mar-92									No vehicles
M0208N38.P01	1	19-Mar-92	8	100		1380	3480	10	240	82	
M0208N44.IM8	1	-									Overexposed
M0208N44.P01	1	-	4	100		90	235	15	240	71	
M0208N45.IM1	1	-									
M0208N45.P01	1	-	6	100		1225	3150	10	245	71	
M0208N47.IM1	1	19-Mar-92									Blooming
M0208N47.P01	1	19-Mar-92	7	100		1475	3800	10	240	72	
M0208N48.IM8	1	19-Mar-92									Lightsources in fov.
M0208N48.P01	1	23-Mar-92	7	100		90	255	5	245	81	
M0208N49.IM1	1	-									Blooming, no hehicle
M0208N49.P01	1	-	6	100		620	1880	10	240	72	No details, clear
M0208N50.IM1	1	19-Mar-92									Like *N48
M0208N50.P01	1	24-Mar-92	6	100		1320	3450	10	245	81	
M0208N51.IM8	1	-									
M0208N51.P01	1	-	5	100		72	200	15	240	81	
M0208N53.IM1	1	-									
M0208N53.P01	1	-	7	100		1530	3911	10	240	71	Testtargets visible
M0308A03.IM8	4E	-									Tank in track, viewing direction
M0308A03.P01	4E	-	8	100		50	255	10	235	51	
M0308A04.IM8	4E	-									2 tanks
M0308A04.P01	4E	-	8	100		40	255	10	235	61	
M0308A05.IM1	4E	19-Mar-92									Condens, tank
M0308A05.P01	4E	19-Mar-92	8	100		1490	4095	15	235	22	
M0308A06.IM8	4E	19-Mar-92									
M0308A06.P01	4E	23-Mar-92	10	100		35	205	10	235	61	Dust almost away

Filename	Scen.	Pr Date	Gc	Vn(%)	Vn	Xmin	Xmax	Ymin	Ymax	IQ	Comment
M0308A07.IM1	4E	-									Condens, tank
M0308A07.P01	4E	-	7	100		2000	4095	15	235	51	Testtargets visible
M0308A09.IM1	4E	19-Mar-92									Condens
M0308A09.P01	4E	-	8	100		2000	4095	15	235	22	2 tanks visibility improved
M0608A05.IM1	4B	-									Dark, ice
M0608A05.P01	4B	-	10	100		1800	4000	15	235	20	
M0608A07.IM1	4B	19-Mar-92									Ice
M0608A07.P01	4B	19-Mar-92	10	100		1500	4095	15	235	22	Tent visibility improved
M0608A08.IM8	4B	20-Mar-92									3 vehicles without dust
M0608A08.P02	4B	23-Mar-92	10	100		25	240	10	245	81	
M0608A09.IM1	4B	19-Mar-92									5 vehicles + Landrover + condens
M0608A09.P01	4B	24-Mar-92	9	100		1150	3750	15	234	21	Perception details in tank better
M0608A13.IM8	4B	24-Mar-92									2 off the road vehicles
M0608A13.P01	4B	23-Mar-92	4	100		58	240	10	240	61	
M0608P01.IM1	3B	-									Car, some condens
M0608P01.P01	3B	-	8	100		580	2950	10	235	62	
M0608P03.IM8	3B	-									Fresh dust, old smoke
M0608P03.P01	3B	-	8	100		100	255	20	230	62	No more objects
M0608P04.IM1	3B	-									
M0608P04.P01	3B	-	13	100		1100	2700	20	235	62	
M0608P05.IM8	3B	-									Tent
M0608P05.P01	3B	-	12	100		65	255	5	240	52	
M0608P06.IM1	3B	-									
M0608P06.P01	3B	-	6	100		600	3680	5	240	52	
M0608P07.IM8	3B	-									Vehicle in dust + smoke
M0608P07.P01	3B	-	10	100		100	255	20	235	61	Background more visible
M0608P08.IM1	3B	-									
M0608P08.P01	3B	-	7	100		1600	3700	10	235	52	
M0608P09.IM8	3B	-									Camera movement
M0608P09.P01	3B	-	10	100		100	255	20	235		
M0608P10.IM1	3B	-									Smoke, more fires, condens
M0608P10.P01	3B	-	10	100		1600	3500	20	240	51	
M0608P11.IM8	3B	25-Feb-92									Dust + smoke, no vehicles
M0608P11.P01	3B	26-Feb-92	12	100		90	255	20	235	62	Smoke clouds contoured
M0608P13.IM8	3B	25-Feb-92									Vehicle behind dust + smoke
M0608P13.P01	3B	26-Feb-92	14	100		130	255	20	235	62	Vehicle discernible
M0608P14.IM1	3B	27-Feb-92									Condens
M0608P14.P01	3B	27-Feb-92	12	100		1550	3100	20	240	51	No more info.
M0608P15.IM8	3B	25-Feb-92									Heavy dust
M0608P15.P01	3B	26-Feb-92	18	100		110	250	20	235	40	No more info., overexposed
M0608P16.IM1	3B	-									
M0608P16.P01	3B	-	13	100		1700	2800	20	235	41	

Filename	Scen.	Pr Date	Gc	Vn(%)	Vn	Xmin	Xmax	Ymin	Ymax	IQ	Comment
M0608P17.IM8	38	15-Oct-91									Dust/smoke + truck
M0608P17.P01	38	15-Oct-91	2	100		140	245	20	230	43	Some more info.
M0608P18.IM1	38	-									
M0608P18.P01	38	-	10	100		1650	3200	20	235	51	
M0608P19.IM8	38	08-Nov-91									Dust/smoke + tank
M0608P19.P01	38	15-Oct-91	3	100		170	255	20	230	43	Sharper, more trees + tent
M0608P20.IM1	38	-									
M0608P20.P01	38	-	1	100		1450	3100	10	250	10	
M0608P20.P02	38	-	10	100		1450	3100	20	235		
M0608P21.IM1	38	-									
M0608P21.P01	38	-	17	100		1650	3200	20	235	32	
M0608P22.IM1	38	-									
M0608P22.P01	38	-	4	100		1660	3150	10	235	21	
M0608P23.IM8	38	-									Landrover
M0608P23.P01	38	-	8	100		165	255	5	220	51	
M0608P24.IM1	38	-									
M0608P24.P01	38	-	6	100		1225	3415	10	235	61	
M0608P25.IM1	38	-									
M0608P25.P01	38	-	8	100		1345	4095	10	235	71	
M0608P28.IM8	38	-									Tank not complete visible
M0608P28.P01	38	-	10	100		35	255	5	235	71	
M0608P29.IM1	38	-									
M0608P29.P01	38	-	10	100		2000	4095	10	235	62	
M0608P38.IM1	38	-									
M0608P38.P01	38	-	8	100		1310	3500	10	235	71	
M0608P39.IM8	38	-									
M0608P39.P01	38	-	14	100		100	255	10	240	51	
M0608P40.IM1	38	-									
M0608P40.P01	38	-	7	100		1510	3530	10	235	61	New info. near bunker
M0608P41.IM8	38	-									
M0608P41.P01	38	-	5	100		100	255	20	230	72	
M0608P42.IM8	38	-									Tent + targets
M0608P42.P01	38	-	10	100		80	255	10	235	62	Target more visible
M0608P43.IM1	38	-									
M0608P43.P01	38	-	10	100		1560	4095	10	235	71	
M0608P50.IM1	38	-									
M0608P50.P01	38	-	10	100		1895	3255	5	240	22	
M0608P51.IM8	38	16-Oct-91									Fire + smoke
M0608P51.P02	38	16-Oct-91	4	100		110	230	20	230	42	Cloud contours
M0608P52.IM8	38	-									
M0608P52.P01	38	-	8	100		135	220	20	230	42	
M0608P53.IM1	38	-									Heavy smoke

Filename	Scen.	Pr	Date	Gc	Vn(%)	Vn	Xmin	Xmax	Ymin	Ymax	IQ	Comment
M0608P53.P01	3B		-	14	100		1200	2400	15	240	31	No more info. (condens)
M0608P54.IM8	3B		-									Vanishing smoke
M0608P54.P01	3B		-	7	100		120	215	20	230	61	
M0608P54.P02	3B		-	7	100		120	215	10	240	61	
M0608P55.IM1	3B		-									Smoke, no vehicle
M0608P55.P01	3B		-	12	100		750	2400	15	235	52	
M0608P56.IM1	3B		25-Feb-92									
M0608P56.P02	3B		26-Feb-92	8	100		970	3450	10	235	62	
M0608P57.IM8	3B		25-Feb-92									
M0608P57.P01	3B		26-Feb-92	3	100		10	60	20	230	62	
M0608P58.IM8	3B		19-Nov-91									Histogram stretch 15-50
M0608P58.IM8	3B		19-Nov-91									Histogram equalize
M0608P58.IM8	3B		19-Nov-91									Standard VFG log. output luts
M0608P58.IM8	3B		09-Oct-91									Underexposed, smoke
M0608P58.P05	3B		09-Oct-91	13	100		15	60	20	230		More visible at forest border
M0608P58.P07	3B		21-Oct-91	5	100		15	60	10	240	62	
M0608P59.IM1	3B		25-Feb-92									Some smoke, condens
M0608P59.P01	3B		26-Feb-92	8	100		800	1500	10	245	53	More info.
M0608P60.IM1	3B		25-Feb-92									Vehicle in dust + smoke
M0608P60.P01	3B		26-Feb-92	8	100		450	1700	10	245	71	*New info., contours of vehicle + dust*
M0608P61.IM1	3B		25-Feb-92									Smoke + extended dust
M0608P61.P01	3B		26-Feb-92	10	100		650	1800	10	245	52	More info.
M0608P62.IM8	3B		25-Feb-92									Heavy dust + smoke
M0608P62.P01	3B		26-Feb-92	6	100		40	210	20	235	41	No more info.
M0608P63.IM1	3B		25-Feb-92									Heavy dust + smoke, condens
M0608P63.P01	3B		26-Feb-92	12	100		650	2000	10	245	40	*No more info.*
M0608P64.IM8	3B		25-Feb-92									Heavy smoke, extended
M0608P64.P01	3B		26-Feb-92	8	100		80	255	20	235	30	No more info.
M0608P65.IM8	3B		-									
M0608P65.P01	3B		-	5	100		140	230	20	230	31	
M0608P66.IM8	3B		-									
M0608P66.P01	3B		-	5	100		140	225	20	230	30	
M0608P67.IM8	3B		-									
M0608P67.P01	3B		-	5	100		140	225	20	230	30	
M0608P68.IM8	3B		-									
M0608P68.P01	3B		-	5	100		145	225	20	230	30	
M0608P69.IM8	3B		-									
M0608P69.P01	3B		-	6	100		140	225	20	230	31	
M0608P70.IM8	3B		-									
M0608P70.P01	3B		-	6	100		145	225	20	230	30	
M0608P71.IM1	3B		-									
M0608P71.P01	3B		-	12	100		615	2045	5	240	20	

Filename	Scen.	Pr Date	Gc	Vn(%)	Vn	Xmin	Xmax	Ymin	Ymax	IQ	Comment
M0608P72.IM8	3B	-									Smoke too dense
M0608P72.P01	3B	-	20	100		150	215	20	230	41	
M0608P73.IM8	3B	12-Nov-91									Heavy smoke
M0608P73.P04	3B	12-Nov-91	15	100		110	220	20	230	41	
M0608P74.IM8	3B	12-Nov-91									
M0608P74.P01	3B	12-Nov-91	4	100		100	225	20	235	42	
M0608P75.IM8	3B	21-Oct-91									Heavy smoke
M0608P75.P04	3B	21-Oct-91	12	100		140	230	20	240	52	
M0608P76.IM1	3B	-									
M0608P76.P01	3B	-	12	100		695	2250	5	240	21	
M0708A04.IM8	4C	-									
M0708A04.P01	4C	-	3	100		0	255	0	235	70	
M0708A07.IM8	4C	-									Tank better visible
M0708A07.P01	4C	-	6	100		30	245	5	240	81	
M0708A08.IM8	4C	-									Tank + targets
M0708A08.P01	4C	-	6	100		15	150	5	235	81	
M0708A09.IM8	4C	-									
M0708A09.P01	4C	-	5	100		5	170	5	240	81	
M0708A10.PM8	4C	-	5	100		60	254	10	240		
M0708A11.IM8	4C	-									
M0708A11.P01	4C	-	5	100		12	140	5	235	81	
M0708A12.IM8	4C	-									
M0708A12.P01	4C	-	5	100		10	135	5	235	81	
M0708A13.IM8	4C	-									2 vehicles
M0708A13.P01	4C	-	3	100		10	175	10	235	80	No improvment possible
M0708A14.IM8	4C	-									3 vehicles + testtargets
M0708A14.P01	4C	-	3	100		20	145	10	235	80	
M0708A15.IM8	4C	-									Tank with 2 targets in front
M0708A15.P01	4C	-	10	100		20	180	5	240	71	
M0708A16.IM8	4C	-									Tank + 2 track veh. + targets
M0708A16.P01	4C	-	2	100		6	175	10	235	80	
M0708A17.IM8	4C	-									Tank + targets
M0708A17.P01	4C	-	4	100		0	180	0	240	80	
M0708A18.IM8	4C	19-Mar-92									Tank + testtargets
M0708A18.P01	4C	23-Mar-92	3	100		6	165	10	235	71	
M0708P01.IM8	3A	-									
M0708P02.IM8	3A	-									2 tanks
M0708P02.P01	3A	-	9	100		35	225	10	240	60	
M0708P03.IM1	3A	-									
M0708P03.P01	3A	-	5	100		460	2310	20	235	61	
M0708P03.P02	3A	-	5	100		460	1550	15	190	61	2 areas: X2 1650-2310/Y2 170-240
M0708P05.IM8	3A	-									Camera movement

Filename	Scen.	Pr Date	Gc	Vn(%)	Vn	Xmin	Xmax	Ymin	Ymax	IQ	Comment
M0708P05.P01	3A	-	5	95	1.99E-02	25	200	20	235	70	
M0708P06.IM1	3A	-									
M0708P06.P01	3A	-	10	90	1.23E-02	700	3680	20	235	71	
M0708P08.IM1	3A	-									
M0708P08.P01	3A	-	7	100		1080	3875	20	230	61	Only more clear
M0708P09.IM1	3A	14-Oct-91									Dust + tank
M0708P09.P04	3A	14-Oct-91	20	80	7.07E-03	800	4095	20	200	62	More targets, tank visibility improved
M0708P10.IM1	3A	14-Oct-91									Dust + tank
M0708P10.P02	3A	14-Oct-91	30	100		900	4095	30	200	61	More clear
M0708P10.P05	3A	21-Oct-91	12	100		1635	3550	20	230	62	
M0708P14.IM8	3A	-									
M0708P14.P01	3A	-	11	100		25	252	10	240	40	
M0708P15.IM8	3A	-									
M0708P15.P01	3A	-	12	100		25	245	5	245	41	
M0708P16.IM8	3A	-									
M0708P16.P01	3A	-	12	100		25	242	5	245	40	
M0708P19.IM8	3A	-									
M0708P19.P01	3A	-	12	100		1000	3960	10	235	52	Background becomes visible
M0708P20.IM1	3A	15-Oct-91									Dust
M0708P20.IM8	3A	-									
M0708P20.P01	3A	-	5	100		100	225	20	235		
M0708P20.P04	3A	15-Oct-91	17	100		750	4095	20	230	52	
M0708P20.P07	3A	18-Oct-91	10	100		2800	4095	20	240	53	Targets much more visible
M0708P21.IM8	3A	15-Oct-91									Dust
M0708P21.P01	3A	15-Oct-91	7	100		45	220	20	230	61	No new info.
M0708P22.IM8	3A	-									
M0708P22.P01	3A	-	6	100		60	245	15	240	61	
M0708P23.IM8	3A	-									
M0708P23.P01	3A	-	5	100		115	220	20	235	61	
M0708P24.IM1	3A	-									
M0708P24.P01	3A	-	10	100		1100	2900	5	240	62	
M0708P27.IM1	3A	-									
M0708P27.P02	3A	-	6	95	1.81E-02	300	3600	20	230	71	
M0708P29.IM8	3A	-									
M0708P29.P01	3A	-	10	100		18	142	5	245	60	
M0708P30.IM8	3A	-									
M0708P30.P01	3A	-	12	100		10	160	20	230	61	
M0708P31.IM1	3A	-									
M0708P31.P01	3A	-	14	100		740	3680	5	240	61	New info. at targets
M0708P32.IM1	3A	-									
M0708P32.P01	3A	-	10	100		1000	3830	20	250	61	
M0708P33.IM1	3A	-									

Filename	Scen.	Pr	Date	Gc	Vn(%)	Vn	Xmin	Xmax	Ymin	Ymax	IQ	Comment
M0708P33.P01	3A		-	11	100		1000	3850	20	240	62	
M0708P34.IM1	3A		-									
M0708P34.P02	3A		-	8	100		1100	3850	20	230	62	Only more contrast
M0708P37.IM8	3A		-									Heavy dust
M0708P37.P01	3A		-	15	100		35	140	20	235	40	
M0708P38.IM8	3A		-									Heavy dust
M0708P38.P01	3A		-	15	100		35	140	20	235	40	No more info.
M0708P39.IM8	3A		25-Feb-92									Heavy dust
M0708P39.P01	3A		26-Feb-92	15	100		30	140	20	235	40	No more info.
M0708P40.IM8	3A		25-Feb-92									Heavy dust
M0708P40.P01	3A		26-Feb-92	12	100		25	140	20	235	40	No more info.
M0708P41.IM1	3A		12-Nov-91									
M0708P41.P01	3A		12-Nov-91	10	100		1400	3750	20	245	53	
M0708P42.IM1	3A		18-Oct-91									Dust
M0708P42.P04	3A		18-Oct-91	12	100		1800	3830	20	240	53	More visible
M0708P43.IM8	3A		12-Nov-91									
M0708P43.P01	3A		12-Nov-91	8	100		15	140	15	235	40	
M0708P44.IM8	3A		25-Feb-92									Heavy dust
M0708P44.P01	3A		26-Feb-92	12	100		40	165	20	235	40	No more info.
M0708P45.IM1	3A		16-Oct-91									Dust + truck
M0708P45.P02	3A		16-Oct-91	10	100		1700	3900	20	230	53	Truck + background more info., dust co
M0708P46.IM1	3A		12-Nov-91									Few dust, no vehicle
M0708P46.P01	3A		12-Nov-91	9	100		1650	3650	25	240	62	Comfortable vision
M0708P47.IM8	3A		25-Feb-92									
M0708P47.P02	3A		26-Feb-92	10	100		18	165	5	235	40	No info.
M0708P48.IM8	3A		18-Mar-92									Heavy dust
M0708P48.P01	3A		18-Mar-92	10	100		40	165	20	235	40	No new info.
M0708P49.IM8	3A		18-Mar-92									Few dust, no vehicle
M0708P49.P01	3A		18-Mar-92	5	100		50	165	20	235	71	No new info.
M0708P50.IM1	3A		-									
M0708P50.P02	3A		-	8	100		1200	3150	20	235	71	Obvious improvment
M0708P51.IM8	3A		-									
M0708P51.P02	3A		-	5	90	?	5	235	5	235	60	No new info.
M0708P52.IM1	3A		-									
M0708P52.P01	3A		-	5	95	4.93E-02	350	4095	20	230	71	
M0708P52.P02	3A		-	7	95	4.93E-02	350	2000	20	100	71	2 areas: X2 2950-4095/Y2 110-230
M0708P53.IM8	3A		-									
M0708P53.P01	3A		-	6	100		17	255	5	245	60	
M0708P54.IM8	3A		-									
M0708P54.P01	3A		-	12	100		30	250	5	245	50	
M0708P55.IM8	3A		-									
M0708P55.P01	3A		-	15	100		25	237	5	245	51	More info. in vehicle

Filename	Scen.	Pr	Date	Gc	Vn(%)	Vn	Xmin	Xmax	Ymin	Ymax	IQ	Comment
M0708P56.IM8	3A		-									
M0708P56.P01	3A		-	11	100		25	250	5	245	61	Wreck sharper
M0708P57.IM1	3A		-									
M0708P57.P02	3A		-	7	90	1.88E-02	900	4000	20	230	72	Visibility tank in dustcloud improved
M0708P58.IM1	3A		-									
M0708P58.P01	3A		-	8	95	3.28E-02	750	4095	20	225	71	
M0708P59.IM1	3A		-									
M0708P59.P01	3A		-	13	100		900	4095	20	235	61	
M0708P60.IM8	3A		-									
M0708P60.P01	3A		-	13	100		50	255	5	245	51	
M0708P61.IM8	3A		-									
M0708P61.P01	3A		-	11	100		8	125	5	235	61	
M0708P62.IM8	3A		-									
M0708P62.P01	3A		-	13	100		25	220	5	235	61	
M0708P63.IM1	3A		-									
M0708P63.P01	3A		-	13	100		1250	4095	20	235	51	
M0708P64.IM8	3A		-									
M0708P64.P01	3A		-	13	100		25	208	5	240	41	
M0708P71.IM8	3A		-									
M0708P71.P01	3A		-	14	100		40	210	20	235	50	
M0708P71.P02	3A		-	14	100		30	80	15	90	51	2 areas: X2 130-210/Y2 90-240
M0708P71.P03	3A		-	16	100		30	80	15	50	51	2 areas: X2 110-210/Y2 40-240
M0708P72.IM8	3A		18-Mar-92									
M0708P72.P01	3A		18-Mar-92	14	100		40	210	20	235	41	
M0708P72.P02	3A		18-Mar-92	18	100		25	70	15	50	42	2 areas: X2 160-210/Y2 60-245
M0708P73.IM8	3A		18-Mar-92									
M0708P73.P01	3A		18-Mar-92	10	100		35	225	20	230	51	
M0708P74.IM8	3A		15-Oct-91									Dust + tank
M0708P74.P01	3A		15-Oct-91	12	100		40	225	20	230	52	Tank more details
M0708P75.IM1	3A		14-Oct-91									Dust + vehicle
M0708P75.P02	3A		14-Oct-91	20	70	4.97E-03	750	4095	30	200	52	Targets + lamp better
M0708P75.P03	3A		18-Oct-91	10	100		1450	3550	20	240	53	More details
M0708P76.IM1	3A		18-Mar-92									
M0708P76.P01	3A		18-Mar-92	5	100		1200	3400	20	235	62	
M0708P77.IM8	3A		-									
M0708P77.P01	3A		-	11	100		42	210	5	240	61	
M0708P78.IM8	3A		-									
M0708P78.P01	3A		-	10	100		40	220	10	245	61	
M0708P79.IM1	3A		-									
M0708P79.P01	3A		-	14	100		985	3480	5	245	71	
M0708P81.IM8	3A		-									2 tanks
M0708P81.P01	3A		-	12	100		55	255	10	245	61	Tanks sharper

Filename	Scen.	Pr	Date	Gc	Vn(%)	Vn	Xmin	Xmax	Ymin	Ymax	IQ	Comment
M0708P82.IM1	3A		-									
M0708P82.P01	3A		-	14	100		1700	4095	20	245	51	
M0708P82.P02	3A		-	14	100		1700	4095	20	245	51	Gamma correction 0.65
M0708P83.IM1	3A		-									
M0708P83.P01	3A		-	14	100		1055	3880	5	240	52	Target becomes visible
M0708P84.IM1	3A		-									
M0708P84.P01	3A		-	8	100		1700	3700	20	230	51	
M0708P85.IM1	3A		-									
M0708P85.P01	3A		-	12	100		1800	4095	20	240	52	
M0708P88.IM1	3A		-									
M0708P88.P01	3A		-	18	100		1800	3975	5	240	30	
M0708P89.IM1	3A		-									
M0708P89.P01	3A		-	5	100		2000	3500	20	230	42	
M0708P90.IM1	3A		-									
M0708P90.P01	3A		-	4	100		1750	2800	20	235	52	
M0708P91.IM1	3A		-									
M0708P91.P01	3A		-	16	100		1775	3240	10	240	52	
M0708P92.IM1	3A		-									
M0708P92.P01	3A		-	16	100		1890	3400	10	235	52	
M0808A03.IM8	3A		-									
M0808A03.P01	3A		-	9	100		16	255	5	240	50	
M0808A04.IM8	3A		-									
M0808A04.P01	3A		-	3	100		70	255	20	235	60	
M0808A05.IM8	3A		-									
M0808A05.P01	3A		-	9	100		20	255	5	240	50	
M0808A06.IM8	3A		-									
M0808A06.P01	3A		-	13	100		30	250	20	230	60	
M0808A07.IM8	3A		-									
M0808A07.P01	3A		-	4	100		80	255	20	235	60	
M0808A08.IM8	3A		09-Oct-91									Dust + tank
M0808A08.P05	3A		09-Oct-91	10	90	5.48E-03	55	255	20	230	61	Hardly better
M0808A09.IM8	3A		15-Oct-91									Dust + tank
M0808A09.P01	3A		15-Oct-91	6	100		55	235	20	230	61	Better visisible, more details tank
M0808A10.IM8	3A		21-Oct-91									
M0808A10.P04	3A		21-Oct-91	8	100		120	240	20	230	62	
M0808A11.IM8	3A		-									
M0808A11.P04	3A		-	10	100		170	235	20	230	62	
M0808A12.IM8	3A		16-Oct-91									Dust + tank
M0808A12.P03	3A		16-Oct-91	15	100		115	250	20	230		Background improved, tank better visib
M0808A12.P04	3A		18-Oct-91	8	100		115	250	20	230	62	More details at vehicle
M0808A13.IM8	3A		09-Oct-91									Dust + tank
M0808A13.P03	3A		09-Oct-91	8	100		130	230	20	230	62	More contrast background

Filename	Scen.	Pr Date	Gc	Vn(%)	Vn	Xmin	Xmax	Ymin	Ymax	IQ	Comment
M0808A14.IM8	3A	-									
M0808A14.P03	3A	-	8	100		130	225	20	230	61	
M0808A15.IM8	3A	-									Bunker + testtargets
M0808A15.P01	3A	-	11	100		112	235	5	240	52	
M0808A16.IM8	3A	-									Bunker + testtargets
M0808A16.P01	3A	-	11	100		110	230	5	240	51	
M0808A17.IM8	3A	-									Bunker + testtargets
M0808A17.P01	3A	-	9	100		118	240	5	240	61	
M0808A18.IM1	3A	-									Bunker + testtargets
M0808A18.P01	3A	-	10	100		1290	3500	10	240	71	
M0808A19.IM1	3A	-									Bunker + testtargets
M0808A19.P01	3A	-	6	100		960	3608	10	240	71	
M0808A23.IM9	3A	12-Nov-91									
M0808A23.P01	3A	12-Nov-91	1	100		50	255	20	235		
M0808A26.IM9	3A	18-Mar-92									
M0808A27.IM8	3A	18-Oct-91									Dust + tank
M0808A27.P03	3A	18-Oct-91	6	100		115	230	10	240	62	More targets visible
M0808A28.IM8	3A	17-Oct-91									Heavy dust + tank
M0808A28.P01	3A	17-Oct-91	7	100		100	230	20	230	51	New info. in tent + targets
M0808A29.IM8	3A	-									
M0808A29.P01	3A	-	4	100		110	230	20	235	61	
M0808A30.IM8	3A	17-Oct-91									Dust + tank
M0808A30.P01	3A	17-Oct-91	5	100		110	230	20	230	61	Clear scene
M0808A31.IM1	3A	-									
M0808A31.P01	3A	-	11	100		1750	3500	20	230	62	
M0808A32.IM1	3A	21-Oct-91									
M0808A32.P02	3A	21-Oct-91	10	100		1750	2500	20	230	62	
M0808A32.P03	3A	21-Oct-91	10	100		1750	2500	20	220	62	2 areas: X2=2900-3600 / y2=150-220
M0808A33.IM8	3A	-									Bunker + testtargets
M0808A33.P01	3A	-	9	100		95	220	5	240	61	
M0808A34.IM1	3A	-									
M0808A34.P01	3A	-	10	100		1650	3500	20	235	62	
M0808A38.IM1	3A	-									Much thin dust
M0808A38.P01	3A	-	13	100		1800	4095	20	235	51	No more info.
M0808A40.IM1	3A	-									Tank in few dust
M0808A40.P01	3A	-	8	90	6.97E-03	1100	4095	10	235	71	Comfortable vision
M0808A41.IM1	3A	-									
M0808A41.P01	3A	-	8	100		1650	4095	10	235	72	
M0808A42.IM8	3A	25-Feb-92									
M0808A42.P01	3A	26-Feb-92	9	100		65	255	20	250	71	
M0808A43.IM8	3A	25-Feb-92									Tank in thin dust
M0808A43.P01	3A	26-Feb-92	4	100		70	235	20	235	71	Tank better visible

Filename	Scen.	Pr Date	Gc	Vn(%)	Vn	Xmin	Xmax	Ymin	Ymax	IQ	Comment
M0808A44.IM1	3A	27-Feb-92									Vehicle in heavy dust
M0808A44.P01	3A	26-Feb-92	20	100		2200	4095	20	235	63	Vehicle becomes visible
M0808A45.IM8	3A	27-Feb-92									Vehicle in local heavy dust
M0808A45.P02	3A	26-Feb-92	10	100		100	200	20	230	62	
M0808A46.IM9	3A	25-Feb-92									
M0808A46.P01	3A	26-Feb-92	1	100		90	230	20	235		
M0808A47.IM8	3A	09-Oct-91									Dust + tank
M0808A47.P02	3A	09-Oct-91	10	100		115	230	20	230	62	Much improved
M0808A48.IM1	3A	17-Oct-91									Dust + vehicle
M0808A48.P01	3A	17-Oct-91	9	100		2500	4095	20	230	62	More info, sharper then 8-bit
M0808A49.IM8	3A	09-Oct-91									Dust + truck
M0808A49.P02	3A	09-Oct-91	10	100		115	215	20	230	62	Truck more clear
M0808A50.IM1	3A	17-Oct-91									Dust + vehicle
M0808A50.P01	3A	17-Oct-91	8	100		2700	4095	20	230	43	More info.
M0808A51.IM8	3A	18-Oct-91									Dust
M0808A51.P02	3A	18-Oct-91	12	100		110	210	10	240	52	Bunker + targets better visible
M0808A52.IM1	3A	25-Feb-92									Few dust
M0808A52.P01	3A	26-Feb-92	12	100		2100	4095	10	245	53	
M0808A53.IM8	3A	25-Feb-92									Few dust
M0808A53.P01	3A	26-Feb-92	12	100		100	230	20	250	61	
M0808A54.IM1	3A	27-Feb-92									Clear image
M0808A54.P01	3A	27-Feb-92	14	100		2000	4095	10	245	71	Sharp result
M0808A55.IM1	3A	25-Feb-92									Heavy dust in background
M0808A55.P01	3A	26-Feb-92	10	100		2250	4095	15	235	52	Vehicle becomes visible
M0808A56.IM8	3A	17-Oct-91									Dust + truck
M0808A56.P01	3A	17-Oct-91	8	100		70	210	20	230	62	Truck more clear
M0808A57.IM8	3A	-									
M0808A57.P01	3A	-	4	100		100	210	20	235	60	
M0808A58.IM1	3A	-									
M0808A58.P01	3A	-	8	100		2100	4095	10	240	41	
M0808A64.IM8	3A	-									
M0808A64.P01	3A	-	8	100		35	255	5	235	71	
M0808A65.IM1	3A	02-Apr-92									
M0808A65.P01	3A	02-Apr-92	9	100		760	3360	10	240	72	
M0808A66.IM1	3A	-									
M0808A66.P01	3A	-	8	100		1000	2760	10	240	61	
M0808A67.IM1	3A	18-Oct-91									Dust + tank
M0808A67.P01	3A	18-Oct-91	10	100		1500	3400	20	230	62	Targets better visible, + dust contour
M0808A68.IM1	3A	-									
M0808A68.P01	3A	-	6	100		2300	4095	10	235	51	
M0808A69.IM8	3A	-									
M0808A69.P01	3A	-	10	100		100	255	20	230	50	

Filename	Scen.	Pr Date	Gc	Vn(%)	Vn	Xmin	Xmax	Ymin	Ymax	IQ	Comment
M0808A70.IM8	3A	-									Bunker + targets + tanks
M0808A70.P01	3A	-	6	100		93	255	5	240	61	
M0808A71.IM1	3A	-									
M0808A71.P01	3A	-	8	100		2250	4095	10	235	61	
M0808A72.IM1	3A	-									
M0808A72.P01	3A	-	10	100		2200	4095	15	235	63	
M0808A73.IM8	3A	-									Tank
M0808A73.P01	3A	-	7	100		88	255	5	240	51	
M0808A74.IM8	3A	-									
M0808A74.P01	3A	-	6	100		90	246	5	240	52	
M0808A75.IM8	3A	-									
M0808A75.P01	3A	-	6	100		120	240	10	235	61	
M0808A76.IM8	3A	-									
M0808A76.P01	3A	-	7	100		83	242	5	240	51	
M0808A80.IM8	3A	-									Tent
M0808A80.P01	3A	-	9	100		82	217	5	240	31	
M0808A81.IM8	3A	-									Tent
M0808A81.P01	3A	-	9	100		90	222	5	240	31	
M0808A82.IM8	3A	17-Oct-91									Dust
M0808A82.P01	3A	17-Oct-91	2	100		100	215	20	250	52	More targets + tent
M0808A83.IM1	3A	17-Oct-91									Dust
M0808A83.P01	3A	17-Oct-91	13	100		2350	4095	20	230	52	More info.
M0808A84.IM1	3A	-									
M0808A84.P01	3A	-	12	100		2100	4095	15	240	62	
M0808A85.IM8	3A	02-Apr-92									Bunker + targets + tent
M0808A85.P01	3A	02-Apr-92	5	100		105	220	5	240	61	
M0908A00.IM8	4D	-									3 tanks
M0908A00.P01	4D	-	5	100		20	210	5	230	80	
M0908A01.IM8	4D	-									2 tanks
M0908A01.P01	4D	-	4	100		15	255	5	230	70	
M0908A02.IM8	4D	-									2 tanks
M0908A02.P01	4D	-	5	100		8	248	5	230	80	
M0908A03.IM8	4D	-									3 tanks
M0908A03.P01	4D	-	7	100		25	235	5	240	71	
M0908A04.IM8	4D	02-Apr-92									
M0908A04.P01	4D	02-Apr-92	7	100		20	255	5	240	70	
M0908A05.IM8	4D	-									
M0908A05.P01	4D	-	5	100		40	255	20	230	71	
M0908A06.IM8	4D	-									
M0908A06.P01	4D	-	7	100		30	205	5	240	70	
M0908A07.IM8	4D	-									
M0908A07.P01	4D	-	5	100		80	210	20	235	71	

Filename	Scen.	Pr	Date	Gc	Vn(%)	Vn	Xmin	Xmax	Ymin	Ymax	IQ	Comment
M0908A08.IM8	4D		02-Apr-92									
M0908A08.P01	4D		02-Apr-92	8	100		70	230	5	240	61	
M0908A09.IM8	4D		-									4 tanks
M0908A09.P01	4D		-	6	100		40	206	5	240	81	
M0908A15.IM8	4D		-									
M0908A15.P01	4D		-	2	100		70	210	20	230	71	
M3007A02.IM8	CH-FEL		-									
M3007A02.P01	CH-FEL		-	5	100		30	255	10	245	80	
M3007A10.IM8	CH-FEL		-									Track vehicles
M3007A10.P01	CH-FEL		-	6	100		38	235	10	235	80	
M3007A13.IM8	CH-FEL		19-Mar-92									Wreck + 3 vehicles
M3007A13.P01	CH-FEL		23-Mar-92	4	100		20	195	10	235	90	
M3007A15.IM1	CH-FEL		-									Condens + wreck
M3007A15.P01	CH-FEL		-	3	100		560	3030	15	235	20	Gc low because of condens
M3007A22.IM8	CH-FEL		-									2 vehicles
M3007A22.P01	CH-FEL		-	2	100		0	204	5	235	81	
M3007A25.IM8	CH-FEL		-									Few dust
M3007A25.P01	CH-FEL		-	6	100		25	235	5	240	70	Dust almost away
M3007A32.IM8	CH-FEL		19-Mar-92									Person at off the road vehicle
M3007A32.P01	CH-FEL		23-Mar-92	4	100		33	252	10	245	71	
M3007P03.IM8	4A		19-Mar-92									Few info.
M3007P03.P01	4A		23-Mar-92	5	100		30	160	10	240	80	
M3007P04.IM1	4A		-									Some condens
M3007P04.P01	4A		-	3	100		610	1700	10	235	21	Tank more clear
M3007P07.IM8	4A		-									5 vehicles
M3007P07.P01	4A		-	3	100		23	255	10	240	81	
M3007P09.IM8	4A		-									3 vehicles
M3007P09.P01	4A		-	2	100		28	235	10	240	80	
M3007P10.IM1	4A		19-Mar-92									4 vehicles
M3007P10.P01	4A		19-Mar-92	3	100		265	1270	10	245	62	
M3007P11.IM1	4A		19-Mar-92									4 vehicles
M3007P11.P01	4A		19-Mar-92	5	100		450	1870	10	235	81	4th tank behind woods visible
M3007P17.IM1	4A		19-Mar-92									3 tanks, condens not disturbing
M3007P17.P01	4A		19-Mar-92	8	100		550	2250	10	240	22	
M3007P18.IM8	4A		19-Mar-92									3 vehicles
M3007P18.P01	4A		23-Mar-92	5	100		15	180	5	240	71	
M3007P19.IM1	4A		-									Inconvenient much condens
M3007P19.P01	4A		-	8	100		520	2210	10	240	21	
M3007P21.IM8	4A		-									4 vehicles
M3007P21.P01	4A		-	3	100		12	165	10	240	81	
M3007P22.IM1	4A		19-Mar-92									3 (?) vehicles
M3007P22.P01	4A		23-Mar-92	3	100		350	2095	10	245	22	

Filename	Scen.	Pr Date	Gc	Vn(%)	Vn	Xmin	Xmax	Ymin	Ymax	IQ	Comment
M3007P26.IM1	4A	19-Mar-92									
M3007P26.P01	4A	19-Mar-92	7	100		1000	3870	10	245	72	
M3007P29.IM1	4A	-									
M3007P29.P01	4A	-	8	100		825	3550	15	245	71	
M3007P31.IM8	4A	19-Mar-92									
M3007P31.P01	4A	23-Mar-92	3	100		16	211	10	240	72	
M3007P35.IM1	4A	-									5 vehicles
M3007P35.P01	4A	-	12	100		830	3360	10	240	71	Gun of tank behind becomes visible
M3007P36.IM8	4A	-									3 vehicles
M3007P36.P01	4A	-	2	100		0	210	5	240	70	Low Gc because of movement of vehicle
M3007P39.IM1	4A	-									Air overexposed, few condens
M3007P39.P01	4A	-	14	100		950	3440	10	240	60	
M3007P40.IM8	4A	-									3 vehicles
M3007P40.P01	4A	-	2	100		0	190	5	240	61	
M3107A02.IM8	2C	-									2 tanks
M3107A02.P01	2C	-	5	100		20	190	5	245	71	
M3107A03.IM8	2C	-									
M3107A03.P01	2C	-	10	90	2.91E-03	75	220	20	230	61	
M3107A04.IM8	2C	-									Targets + bunker in foreground
M3107A04.P01	2C	-	10	100		15	200	5	245	81	
M3107A05.IM1	2C	09-Oct-91									Sand/dust
M3107A05.P03	2C	11-Oct-91	15	90	1.49E-03	800	2280	20	230	61	
M3107A06.IM8	2C	-									
M3107A06.P01	2C	-	9	100		20	160	5	245	71	
M3107A11.IM8	2C	09-Oct-91									Sand/dust
M3107A11.P02	2C	09-Oct-91	10	100		40	255	30	200	61	Targets better
M3107A11.P07	2C	-	25	95	5.97E-04	120	250	30	200		
M3107A12.IM1	2C	16-Oct-91									Sand
M3107A12.P02	2C	16-Oct-91	30	100		1150	4000	30	220	50	
M3107A13.IM8	2C	-									Large sky region
M3107A13.P01	2C	-	7	100		14	220	10	245	60	
M3107A14.IM8	2C	-									Large sky region
M3107A14.P01	2C	-	12	100	1.29E-02	3	230	10	245	61	
M3107A15.IM1	2C	08-Nov-91									
M3107A15.P02	2C	12-Nov-91	12	100		1600	3700	20	230	71	
M3107A16.IM8	2C	08-Nov-91									
M3107A16.P01	2C	12-Nov-91	12	100		80	220	20	230	51	
M3107A17.IM8	2C	12-Nov-91									
M3107A17.P01	2C	12-Nov-91	10	100		20	240	10	235	40	
M3107A18.IM1	2C	12-Nov-91									
M3107A18.P02	2C	12-Nov-91	10	100		1800	3630	20	230	51	
M3107A19.IM8	2C	08-Nov-91									

Filename	Scen.	Pr Date	Gc	Vn(%)	Vn	Xmin	Xmax	Ymin	Ymax	IQ	Comment
M3107A19.P01	2C	12-Nov-91	12	90	1.41E-03	80	215	20	230	62	
M3107A20.IM1	2C	-									
M3107A20.P01	2C	-	16	100		1000	3500	20	235	71	
M3107A21.IM8	2C	-									
M3107A21.P01	2C	-	5	100		12	215	5	240	71	No vehicles
M3107A22.IM1	2C	-									
M3107A22.P01	2C	-	8	100		1000	4095	20	240	61	
M3107A23.IM1	2C	-									
M3107A23.P01	2C	-	12	100		1150	4095	20	240	61	
M3107A24.IM1	2C	25-Feb-92									
M3107A24.P01	2C	26-Feb-92	12	100		1450	3500	20	235	62	
M3107A25.IM8	2C	-									
M3107A25.P01	2C	-	10	100		50	200	20	235	71	
M3107A26.IM1	2C	-									
M3107A26.P01	2C	-	14	100		750	3215	10	240	12	Vehicle becomes visible
M3107A27.IM1	2C	-									Dustcloud
M3107A27.P01	2C	-	13	100		800	4095	10	240	51	Dust clearly contoured
M3107A28.IM8	2C	-									
M3107A28.P01	2C	-	12	95	8.75E-02	0	200	5	240	40	
M3107A29.IM1	2C	25-Feb-92									
M3107A29.P02	2C	26-Feb-92	12	100		1200	3520	20	230	61	
M3107N02.IM8	2A	-									Complete black
M3107P00.IM1	2A	-									
M3107P00.P01	2A	-	5	100		455	2000	5	240	81	Tilted target discernible
M3107P01.IM8	2A	-									No battlefieldeffect of vehicle
M3107P01.P01	2A	-	5	100		25	160	10	245	61	
M3107P02.IM1	2A	-									
M3107P02.P01	2A	-	4	100		255	1960	5	240	81	Testtargets resolved
M3107P03.IM8	2A	-									No battlefieldeffect of vehicle
M3107P03.P01	2A	-	5	100		20	165	10	240	71	
M3107P04.IM1	2A	19-Mar-92									Target in foreground
M3107P04.P01	2A	19-Mar-92	3	100		360	1450	10	240	80	No improvment possible
M3107P05.IM8	2A	19-Mar-92									Slightly overexposed, scene as P04
M3107P05.P01	2A	23-Mar-92	4	100		15	150	10	240	80	Good image, no improvment
M3107P06.IM8	2A	-									Tank + tent
M3107P06.P01	2A	-	2	100		0	210	7	240	60	
M3107P07.IM1	2A	-									Some dust
M3107P07.P01	2A	-	3	100		300	1960	10	220	80	
M3107P08.IM8	2A	-									Overexposed
M3107P08.P01	2A	-	4	100		15	215	7	240	60	
M3107P09.IM1	2A	-									Some dust
M3107P09.P01	2A	-	2	100		380	1600	10	235	80	

Filename	Scen.	Pr	Date	Gc	Vn(%)	Vn	Xmin	Xmax	Ymin	Ymax	IQ	Comment
M3107P10.IM8	2A	-										Tank
M3107P10.P01	2A	-		5	100		18	220	10	240	71	Background slightly improved
M3107P11.IM8	2A	-										Tent + car in the tent
M3107P11.P01	2A	-		3	100		0	180	5	230	82	Car in tent clear
M3107P12.IM1	2A	-										
M3107P12.P01	2A	-		5	100		775	4095	5	240	72	Truck becomes visible
M3107P13.IM8	2A	-										
M3107P13.P01	2A	-		2	100		0	255	5	235	60	
M3107P14.IM1	2A	-										Tank in background
M3107P14.P01	2A	-		6	100		1150	3700	5	240	61	
M3107P15.IM1	2A	-										
M3107P15.P01	2A	-		5	100		600	2990	5	240	71	
M3107P16.IM8	2A	-										
M3107P16.P01	2A	-		6	100		55	255	5	235	71	
M3107P17.IM1	2A	-										Dust
M3107P17.P01	2A	-		4	100		735	3050	5	240	51	
M3107P18.IM1	2A	-										All targets, no vehicles
M3107P18.P01	2A	-		3	100		960	3990	5	240	61	Targets more clear
M3107P21.IM1	2A	-										Camouflaged truck
M3107P21.P01	2A	-		4	100		920	4000	10	240	61	Truck better visible
M3107P22.IM8	2A	-										Camouflaged truck
M3107P22.P01	2A	-		4	100		20	160	10	230	70	Verry light, no more details
M3107P23.IM1	2A	-										Like scene P22
M3107P23.P01	2A	-		6	100		950	4095	10	240	61	
M3107P24.IM1	2A	-										Like scene P22
M3107P24.P01	2A	-		8	100		800	4095	10	240	51	
M3107P25.IM1	2A	-										
M3107P25.P01	2A	-		7	100		1055	3880	5	240	62	
M3107P26.IM1	2A	-										Truck + tent
M3107P26.P01	2A	-		7	100		920	3890	10	240	61	No improvement
M3107P27.IM8	2A	-										
M3107P27.P01	2A	-		6	100		45	225	5	235	71	
M3107P28.IM1	2A	-										
M3107P28.P01	2A	-		9	100		640	4025	5	240	51	
M3107P29.IM1	2A	-										Truck + tent
M3107P29.P01	2A	-		5	100		1010	4095	10	235	50	
M3107P30.IM8	2A	-										Like scene P29
M3107P30.P01	2A	-		5	100		15	235	10	230	60	Truck in background
M3107P33.IM1	2A	-										
M3107P33.P01	2A	-		9	100		1360	4095	5	240	51	All testtargets resolved
M3107P34.IM1	2A	19-Mar-92										Targets + tent
M3107P34.P01	2A	19-Mar-92		6	100		1160	4095	10	235	61	Targets more clrear

Filename	Scen.	Pr Date	Gc	Vn(%)	Vn	Xmin	Xmax	Ymin	Ymax	IQ	Comment
M3107P35.IM8	2A	-									
M3107P35.P01	2A	-	6	100		35	255	5	235	70	
M3107P36.IM1	2A	-									
M3107P36.P01	2A	-	7	100		960	4095	5	240	51	
M3107P37.IM1	2A	-									Vehicle
M3107P37.P01	2A	-	9	100		1280	4095	10	240	51	
M3107P38.IM1	2A	-									
M3107P38.P01	2A	-	5	100		1300	4095	10	230	51	
M3107P40.IM1	2A	-									
M3107P40.P01	2A	-	7	100		1175	4095	10	235	61	
M3107P41.IM1	2A	19-Mar-92									Tank at center
M3107P41.P01	2A	19-Mar-92	8	100		1500	4095	5	235	61	Dust contoured
M3107P42.IM8	2A	19-Mar-92									Scene like P41
M3107P42.P01	2A	23-Mar-92	8	100		60	250	10	240	51	
M3107P43.IM1	2A	-									
M3107P43.P01	2A	-	8	100		1190	4095	5	240	51	Dustcloud contoured
M3107P44.IM8	2A	-									Tank + targets
M3107P44.P01	2A	-	7	100		45	255	5	235	71	Dustcloud contoured
M3107P45.IM1	2A	19-Mar-92									
M3107P45.P01	2A	19-Mar-92	7	100		1300	4095	20	235	61	Dustcloud contoured
M3107P46.IM1	2A	19-Mar-92									No dust + vehicles
M3107P46.P01	2A	19-Mar-92	6	100		1530	3900	15	235	71	All targets clearly visible
M3107P47.IM1	2A	-									Targets
M3107P47.P01	2A	-	6	100		1975	4095	5	240	61	
M3107P48.IM8	2A	-									Saturated
M3107P48.P01	2A	-	7	100		65	255	5	235	50	
M3107P49.IM1	2A	-									Saturated
M3107P49.P01	2A	-	6	100		2550	4095	5	230	51	

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THE CLASSIFICATION DESIGNATION ONGERUBRICEERD IS EQUIVALENT TO UNCLASSIFIED.

15. ABSTRACT (MAXIMUM 200 WORDS, 1044 POSITIONS)

A SURVEY IS PRESENTED OF THE 'STILL VIDEO' PICTURES THAT HAVE BEEN RECORDED WITH 3 CCD-CAMERAS DURING THE BEST-TWO TRIAL IN MOURMELON, FRANCE.
THE COMPOSITION OF, AND SELECTION FOR TWO DATABASES IS DESCRIBED AND THE RESULTS OF PROCESSING WITH THE FEL-IMAGE PROCESSING ALGORITHM ARE GIVEN. A STATISTICAL ANALYSIS OF THESE PROCESSING RESULTS IS CARRIED OUT AND DESCRIBED. FOR EACH SCENARIOS, ONE OR MORE EXAMPLES OF PROCESSED IMAGES ARE GIVEN.

16. DESCRIPTORS	***IDENTIFIERS***
ATMOSPHERIC PROPAGATION	VISUAL IMAGING
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CONTRAST	OBSCURANTS
SIGNAL PROCESSING	DUST
	IMAGE PROCESSING
	CCD CAMERA PERFORMANCE
	STATISTICAL RESULTS

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