



# image MOTION ANALYSIS CAMERA CONTROL

## The obvious solution to camera control

TEMA Camera Control is the perfect tool for controlling multiple high-speed cameras from a single user interface, regardless of the camera brands or models that are being used.

Since every camera vendor provides its own camera control software, testing organizations need to allocate time to learn, configure, operate and switch between several camera interfaces - increasing the total time needed to prepare one test. TEMA Camera Control offers a solution to this problem, allowing testing departments to simultaneously control all major high-speed camera brands and models currently on the market - through a single software client.

TEMA Camera Control can be fully integrated with TEMA & TrackEye. Tracking and analysis can then take place directly after having downloaded an image sequence from a camera, thus shortening the total analysis time down to a minimum.

### Key benefits

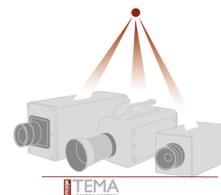
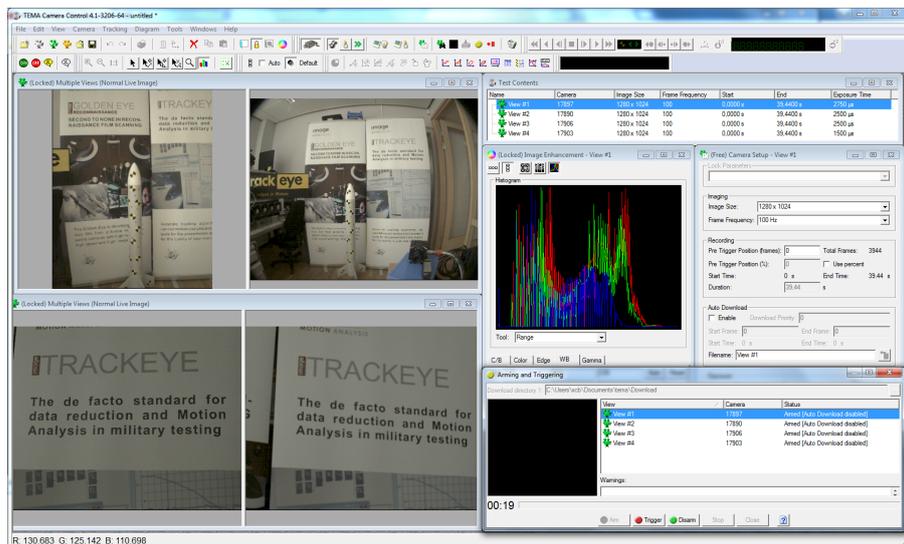
- Easy to use, intuitive, time saving
- Unlimited number of cameras (brands & models)
- Compatible with all major HS cameras
- Manual or Automatic download of images
- All recording parameters controllable (fps, resolution, exposure time, trigger, black & color references, ...)
- Possibility of creating templates
- Image enhancement tools available
- Distances & angles measurement tools on camera views
- Creation & Display of Metadata on camera views

## An interface tailored to your needs

TEMA Camera Control's user-friendly interface makes it easy for operators to record image sequency as well as view live image feeds from the cameras. It is also possible to perform parameter settings, enhancements and have the software download the captured image material automatically. Functions and settings can be performed on multiple camera simultaneously.

The main workspace allows the user to display several camera views at the same time as well as to compare previously recorded imae material loaded from disk. Camera paramter settings can be selected in parallel for several cameras.

The image sequence, camera setup and image enhancement windows can either be locked or free to move around the workspace. In the free state, the infoamtion and content is constantly updated to reflect changes when selecting different camera views, while if locked, they show the same information all the time.



**Step 1: Set camera parameters**

**Tool bar**

- Switch live/tracking mode
- Continuous or locked view mode
- Switch to low light mode
- Change update rate in views
- Take snapshots in normal/low light
- Change recording parameters
- Scan for new connected cameras
- Black reference
- Download images
- Arming dialog
- Discard images

LOW SNAP ARM

TEMA Camera Control is capable of setup any number of cameras. The operator can configure major parameters like: image size, frame frequency, trigger options, exposure time and more. The parameters configured and used in a certain test can be stored and then reloaded to the cameras later.

(Free) Camera Setup - Multiple Views

(Locked) Camera Setup - Pit Rear

(Locked) Camera Setup - Overhead Right

(Free) Camera Setup - T\_Driver\_Retract...

(Locked) Camera Setup - Pit Front

Vector Scope

RGB Waveform

Histogram

Intensity: [Slider] All High Low

Tool: White Balance High

Tool: Range

Tool: Range

C/B Color Edge WB Gamma Enable

Contrast: [Slider]

Brightness: [Slider]

Reset Auto Adjust Margin 1.9%

Crushed %: 0.5176 Clipped %: 0.0663 Reset All

**Step 2: Real time image acquisition**

TEMA Camera Control client contains a complete image enhancement functionality. Vector scope, RGB waveform diagram and histogram helps to improve properties like colour balance, contrast, brightness and gamma correction in the image. The enhanced image sequence can be saved or imported to other image formats after adjustments have been made. All calculations are made with high bit depth and headroom through the whole chain, which avoids the cutting of peaks and preserves the image quality.

**Step 3: Download images automatically/manually**

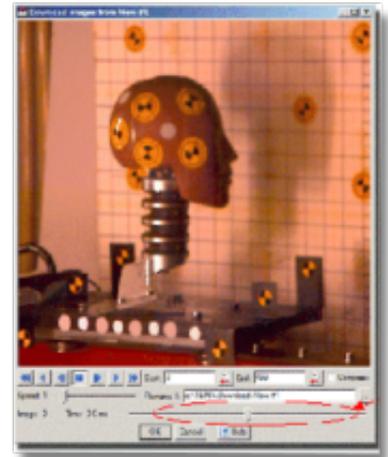
After the high-speed cameras have acquired image sequences, TEMA Camera Control downloads the material to the computer. Downloads can be performed manually by the user or automatically using a trigger signal.

**Manual Download**

The manual download command can always be executed by the operator, regardless if an automatic download has been performed or not. The manual download can be done for all available images on the camera.

**Auto Download**

The software can perform an automatic download of a pre-selected range of images from each camera to a pre-defined destination or files on the disk. Multiple file formats can be requested when downloading. The auto download can be set for any interval of time including pre-trigger frames.



View	Camera	Filename 1	Filename 2	Status	DL Start	DL End
Overhead Right	Sim_V5_11_1	C:\Public\DL1\S2\Overhead Right	C:\Public\DL2\S2\Overhead Right	Download Completed	-10	300
Pit Front	Sim_V5_13_3	C:\Public\DL1\S2\Pit Front	C:\Public\DL2\S2\Pit Front	Download Completed	-10	300
Pit Rear	Sim_V5_12_2	C:\Public\DL1\S2\Pit Rear	C:\Public\DL2\S2\Pit Rear	Download Completed	-10	300
T_Driver_Retractor_Lower	Sim_V5_10_0	C:\Public\DL1\S2\T_Driver_Retra...	C:\Public\DL2\S2\T_Driver_Retra...	Download Completed	-10	300
T_Dummy_Kinematics_Velocity_Left	Sim_V5_14_4	C:\Public\DL1\S2\T_Dummy_Kin...	C:\Public\DL2\S2\T_Dummy_Kin...	Downloading: 26	-10	300

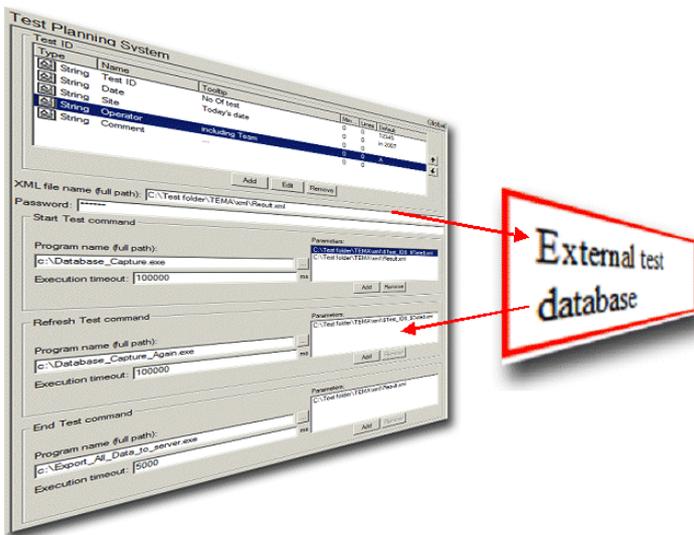
## CAMERA CONTROL: ENTERPRISE EDITION

The enterprise Edition of TEMA Camera Control adds a set of new features to TEMA Camera Control which are useful for larger test facilities who often have the following characteristics.

- Pre-defined processes for carrying out operations
- Test planning systems to administrate tests, data and resources
- Subdivision of tasks between departments of a corporations
- Data storage models conform to certain regulations
- High throughput of tests (several tests are run in one day)
- Repetitive tests on a recurring basis

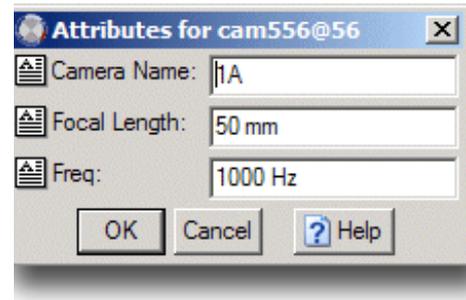
### Test metadata

TEMA Enterprise Edition allows an administrator to define any number of metadata fields on the test and camera view levels. Operators can then enter values for these fields, which are then stored in the test file and can be overlaid on exported images.



### TEMA CC Configurations

- TEMA Single Camera Control
- TEMA Multiple Cameras - Single Make
- TEMA Multiple Cameras - Multiple Makes
- Enterprise Edition Multiple Cameras - Single Make
- Enterprise Edition Multiple Cameras - Multiple Makes



### Test Planning System interface

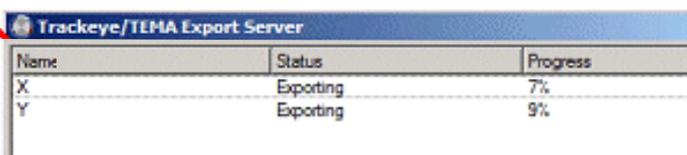
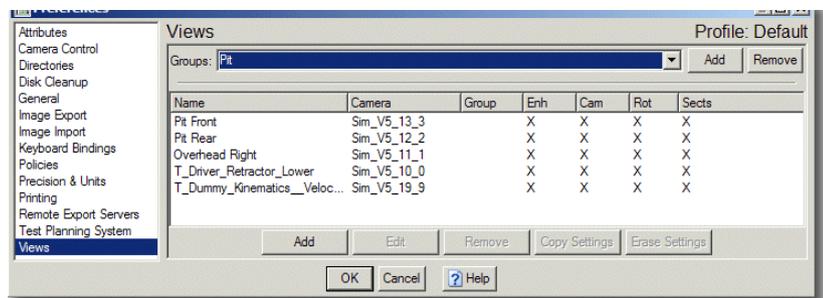
For enterprises where the overall planning of crash tests is performed in a computerized system - a fully configurable interface function is included. This allows TEMA tests to be automatically set up for a specific test category.

After the operator has entered the test identification/ID, TEMA inquires the test planning system for all relevant information for the test. This includes the list of camera views which are then setup automatically. Test metadata are also read from the test planning system if available.

Upon finishing the test, the resulting state can be pushed back into the Test Planning System so that the requester can immediately view the various metadata after operator entry.

### Camera view list

TEMA Camera Control can hold its own list of camera view names. These names are distinct from the physical cameras and their names. Each camera view can have setups associated to it in order to preset as much as possible all settings before a test.



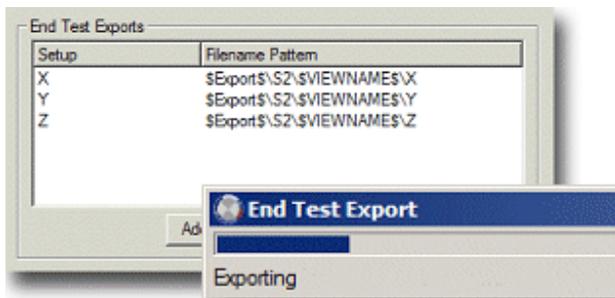
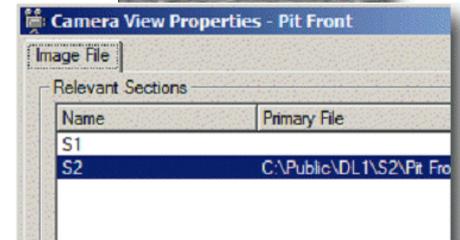
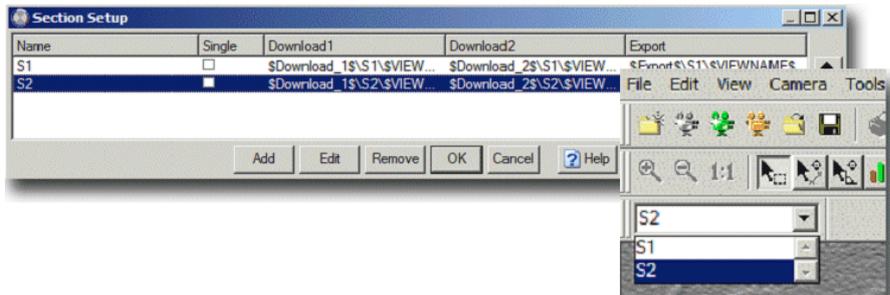
### Image export server

To remove the processing burden of converting the image sequences to the destination format, such as AVI or MPEG, it is possible to define that a separate server computer should perform this task. The server works like a printer queue so the client computer is immediately available for other tasks while the server runs the export job one after the other. Power loss of the server will not cause its job queue to be lost.

## Test sections

TEMA Camera Control Enterprise Edition allows a test to be subdivided into several sections. A section is one timed event, as seen by all or a subset of the cameras. This feature is very useful for instance to capture reference images for 3D calibration or pre-crash reference images.

Each test section has separated filename patterns so that the downloaded imagery for each section can be stored in separate files. The exports to be performed by the End Test command can also be specified on a per section basis.



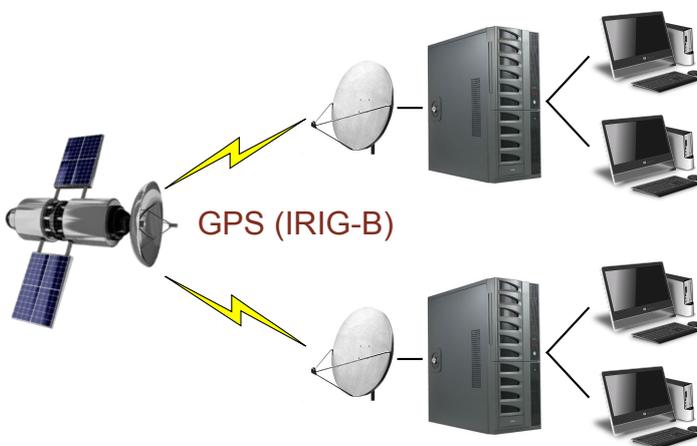
## End Test Command

Once a test is completed an End Test Command can be run. This will automatically perform any number of pre-defined Image Export operations for each camera view. Each of these exports has a separate filename pattern and a separate Export Setup which contains information about the output file format, overlay data and title slate data.

## SYSTEM INTEGRATION

Together with the software capability described in the previous sections, Image Systems can engineer the complete system of cabling, junction boxes, individual computers and the inter-computer communications.

TEMA Camera Control Enterprise Edition can be customized at both ends of the process. The project metadata can be imported from a test control database, as can the camera views and individual camera setup requirements. This gives the test engineer full control of the imaging parameters and reduces the possibility of setup errors. The image and data file output can be automated to feed directly into the network system.



## More Enterprise Edition features

- Dual download destinations for each camera
- Automatic disk cleanup after X days
- Digital signature on image contents
- Create automatic image export routines
- Color balance calibrations
- Unlimited number of Preference profiles
- Create test templates
- Policies to limit human/operator error
- ...

## Learn more

 [www.imagesystems.se](http://www.imagesystems.se)

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