BLUEPRINT MODELER

LENS DISTORTION CORRECTION MODULE

SIMPLIFIED EXTERNAL VERSION

APPLICATION'S MANUAL

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INTRODUCTION

Every camera consist of the special lens system, thanks to that the image could be obtained. Unfortunately, this system is loaded with some unperfections – result image might be sometimes strongly distorted. Especially when photographing objects with small focal lengths the geometric distortions are significant.

Usage of the cameras for purposes others than cataloging (family albums...etc) force user to correct acquired photographs, especially it is necessary to remove lens distortion. The lens distortion are often visible in the central part of the image – where the image is radially emphasized.

1. FEATURES

The application allows to remove or put spherical distortion on the digital images. The main destination of the program is to remove distortions. Thanks to the JPEG format this process is fully automated and user doesn't have to interference with the application additionally. The application can use suitable lens profile what significant accelerate the image processing.

Simplified version features:

- full automation of correction process,
- allows only automatic correction (without option of manual correction),
- JPG images support (without JPEG save options),
- max. resolution of processed images limited to 1600 x 1200,
- batch processing for correction process (max. 5 images),
- Calibration Profiles Database viewer,
- supports two language versions (polish/english),
- keyboard shortcuts.

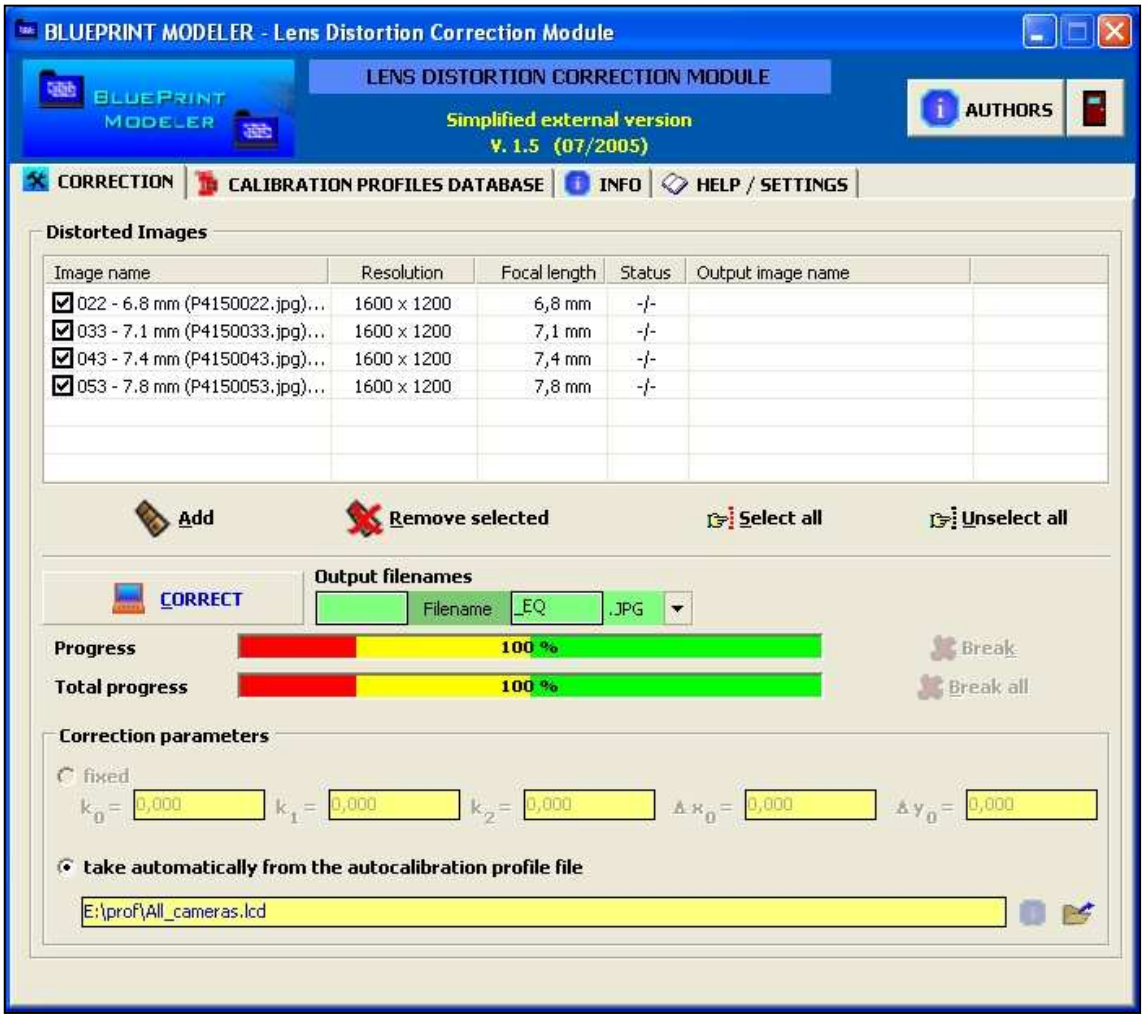
Additional features are available in the Basic version (manual correction, BMP, TGA /with transparency/ and AVI support, without limits on the resolution or count of the processed files).

2. SETUP

Application doesn't require other files than main executable; the setup process rely only on copy the executable to the selected folder.

3. INTERFACE

The main screen from the application is shown on the figure below:



The program is divided into few tabs that are designed to make the correction process easy.

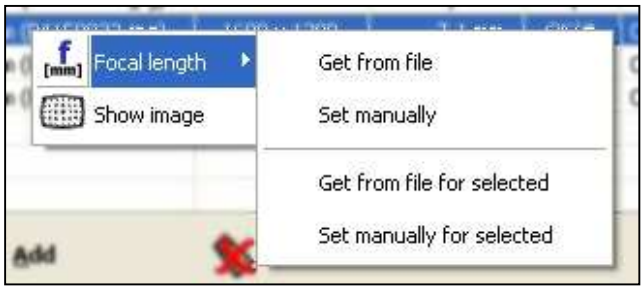
Description of the particular tabs:

CORRECTION	Allows to start the correction procedure for selected images (correction might be manual or automatic)
CALIBRATION PROFILES DATABASE	Allows to (load for) view the given lens calibration profiles database,
INFO	Describes legend (description of the symbols used in the correction and calibration process) and features of given version,
HELP / SETTINGS	It make available to get the help in the form of PDF documents. One can also change language version in this tab.

Buttons/fields meaning in the **CORRECTION** tab:

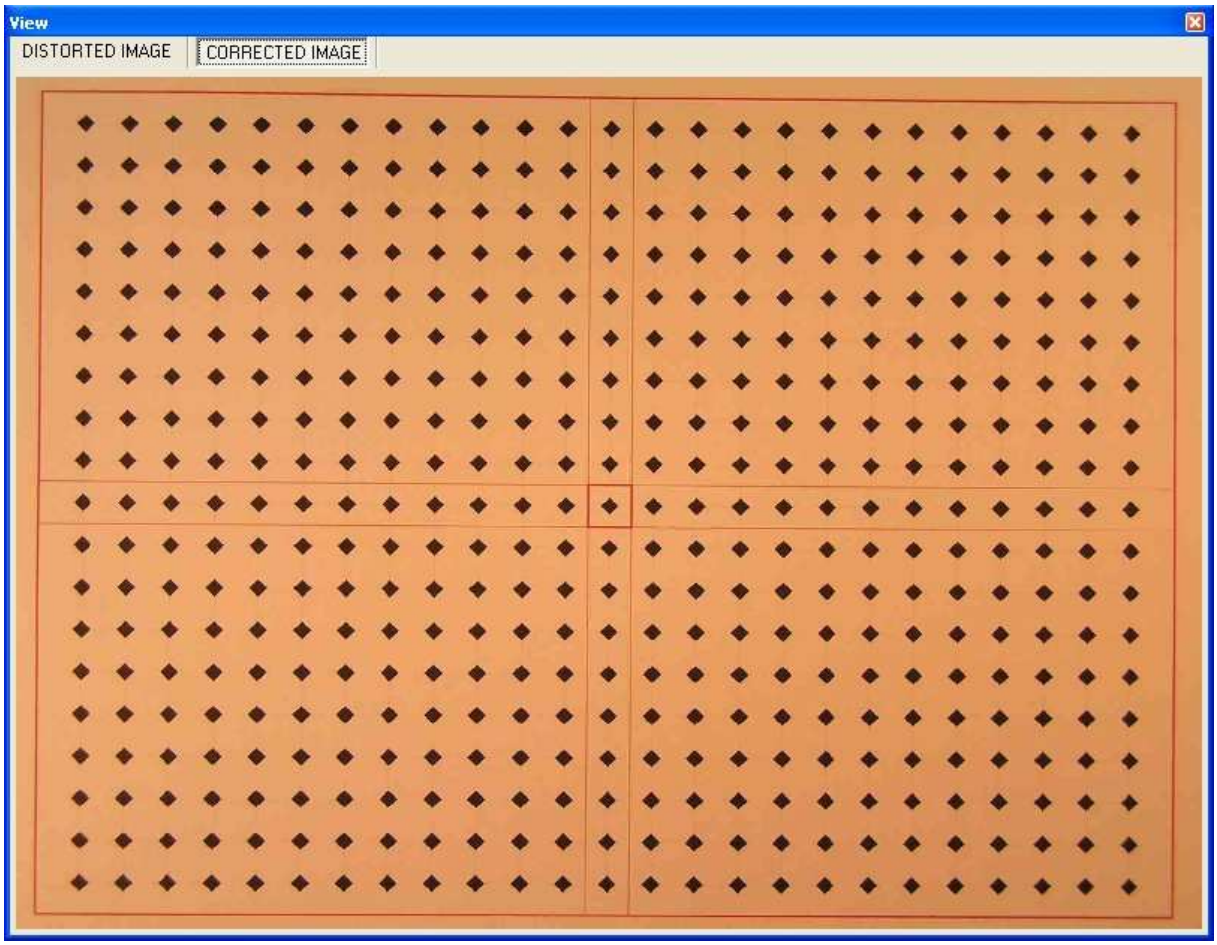
Add	Add images to the list of processed images
Remove selected	Removes selected images from the list
Select all	Select all images
Unselect all	Unselect all images
	Start the correction procedure
Output filenames	Defines how the result files will be named.
Correction parameters	Defines correction parameters: ▪ fixed (not available in this version), ▪ automatically obtained from selected file (file with profile or with profiles database). Files with profile can have following extensions: **LCP** – a single profile (for one camera) **LCD** – profiles database (with profiles for more than one camera)
	Allows to open information about loaded profile (LCP). To obtain details about loaded database one have to use the „CALIBRATION PROFILES DATABASE" tab.
	Allows to load selected profile or profiles database, which will be used in the correction process.

Press right mouse button to open the context menu (visible below):



where one can set focal lengths for given image or for array of selected images. Value of the focal length might be obtained from the given file (whenever it is possible).

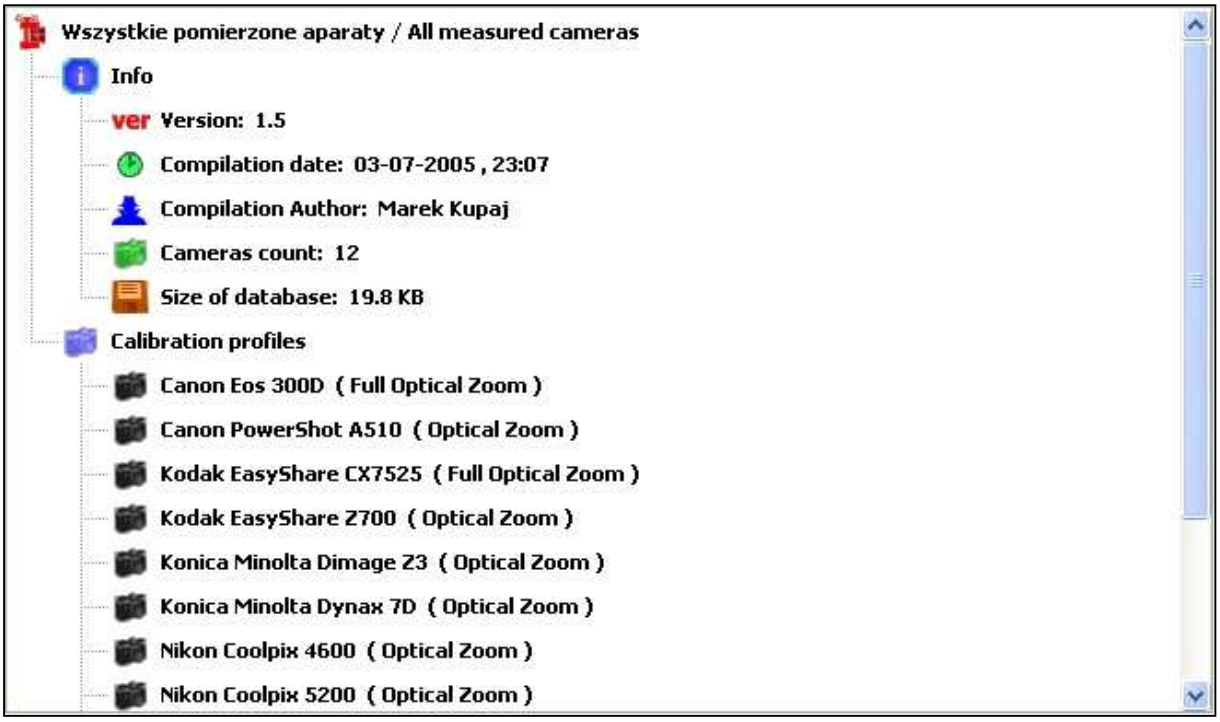
The given image might be also viewed – as the image before and after correction (if image has been corrected). Sample view window is visible on the image below:

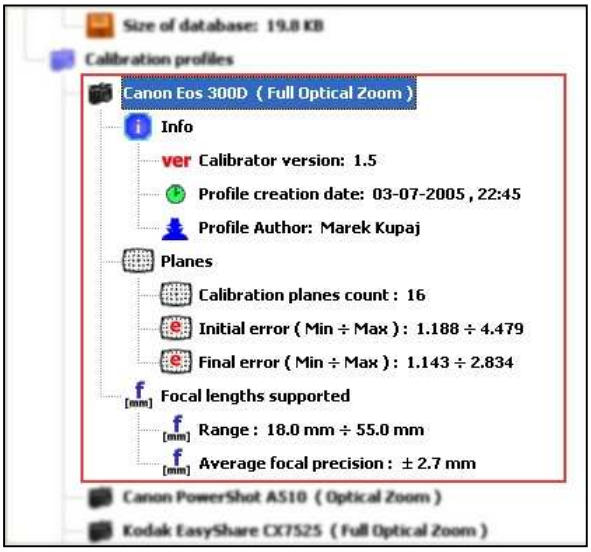


Buttons/fields meaning in the **CALIBRATION PROFILES DATABASE** tab:

CLEAR	Clear database viewer
OPEN	Load given database to viewer
	Collapses the profiles tree
	Expands the profiles tree

Sample calibration profiles database is shown below:





Double-click on the black symbol of the camera expands detailed information about selected profile.

The image at right shows sample profile details (with info about distortion level and supported focal range).

Buttons/fields meaning in the **HELP/SETTINGS** tab:

Calibration patterns	Opens document with calibration patterns
Application's manual	Opens document with application's manual
Survey method for the autocalibration process	Opens document with description of the survey (used in the autocalibration procedure for determine lens calibration profiles)
Contact with Authors	Opens default mail application with filled mail to the author
 **Polska wersja językowa**	Switch to the polish language version
 **English language version**	Switch to the english language version

4. REMARKS

During work with the images the following error might occurs; some images might be loaded with bad resolution (eg. as 0 x 0). In that case user should restart application (eventually one should restart computer – this error occurs when the memory space is not enough in the given moment[1])

During correction process, application take closest focal length (to the focal length of the given image) and next run the distortion correction. It means that, the more the profile is complete (photos taken within the total focal range), the reduction is better.

If user don't select given base or the profile, or if the given base doesn't have matching profile for the used camera, the application will pass the correction process without image deformation (with parameters set to zero).

Use of corrupted profile (or incompatible with present version) will be detected and the correction process won't be executed.

If user have photos earlier processed in the other graphic processing application, usually the photos aren't equipped with information about focal length and camera model. In order to that, the following steps should be taken:

- all files that have to be processed should have proper names; the filename should have particular description about used focal length, e.g. for file **Out98002.jpg** (if its focal length is equal to 10,3mm), one should change filename to the **Out98002 - 10.3mm.jpg**. Instead change name of the file, user might set focal length in the Module (b y the context menu).
- instead use of the profiles database the particular lens profile should be used (*.LCP profile),
- perform the correction.

[1] memory should increase if one close other running applications

5. CONTACT

Every remarks, reservations or questions concerning the application please direct on the mail address of the Author: *m_kupaj@poczta.fm.*

The latest versions of the application and calibration profiles are available on the www page: *http://www.mkupaj.vip.interia.p/lens/start_eng.html.*

If You are interested in the Basic version I invite to the page, too.