Technical note TN-01

Problem	How to focus spectral camera? How to align spectral camera to a predefined line ?	**Date**	2nd July 2015
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Introduction

Push-broom type spectral camera is basically a "line scan camera" system, i.e., the spectral measurement is done across one line at the target surface at a time. Focusing on the target is done using objective. The purpose of the spectral camera focusing and alignment is to ensure that :

- objective focus is exactly on the sample surface

- the measurement line is across the desired position on the target surface

- light source illuminates exactly the right place and is evenly distributed

These goals can be achieved by using a test target and the adjustment procedure described here. The target can placed on the measurement surface for alignment and removed after that.

NOTE: Spectral camera scanner systems have focusing target and

Problem solution

The spectral camera produces spectral image where line pixels are in one dimension and spectral pixels in the other dimension. Thus, when colored objects are observed, it may be difficult to interpret the location of the line on the target due to both spatial and spectral variation in the image. Hence the best result is achieved by using a black and white test target, black being "black" throughout the whole spectral region and white giving signal at all wavelengths. The test pattern can be easily produced, enlarged, reduced etc. using a copy machine.
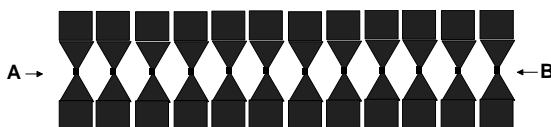

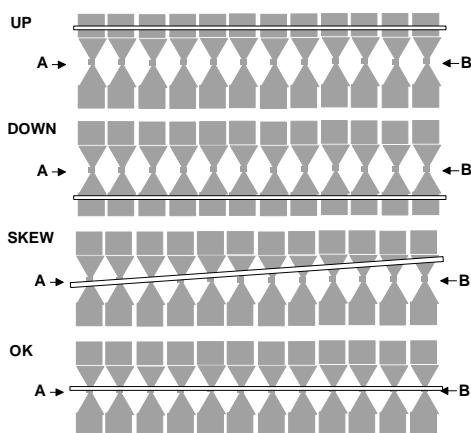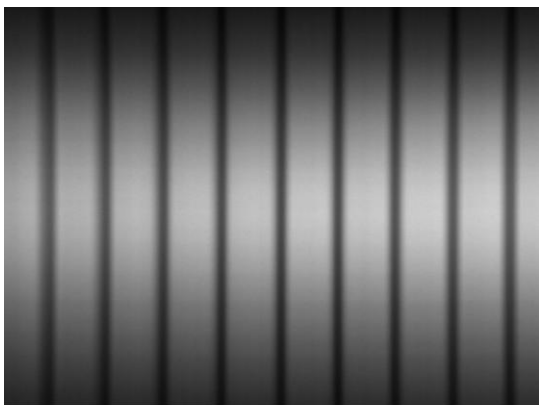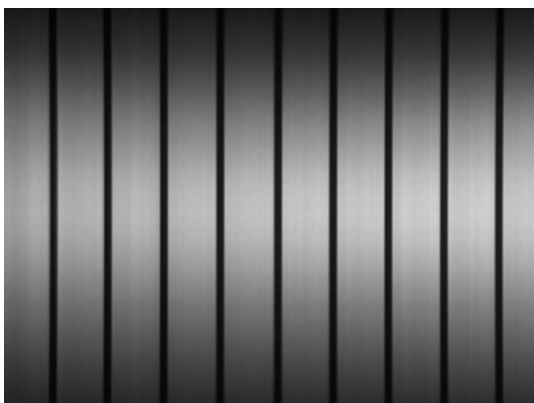Figure 1. Basic test target for alignment. The line A-B is the desired measurement line.

Figure 2. Possible errors and proper alignment.
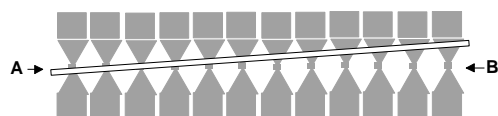
Focusing and alignment procedure

The test target is placed on the object surface so that the line A-B corresponds to the desired measurement line. First the light source should be visually aligned to give maximum intensity across the line A-B. The alignment is particularly important if a narrow fiber optic line light source is used. Alignment of the position of the spectrograph/camera unit is easiest when live image from the camera is available.
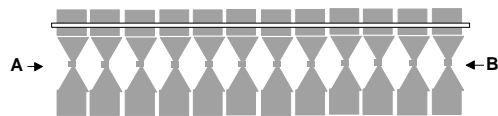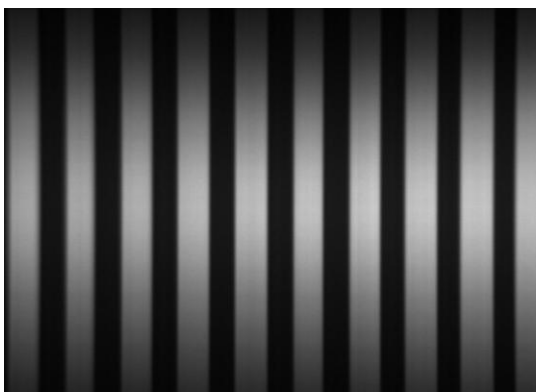

Out of focus

Focus is ok

The spectrograph looks above or under the line A-B $\Rightarrow$ move the spectrograph/camera unit up or down so that the width of the black columns in the image becomes to its minimum.

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