

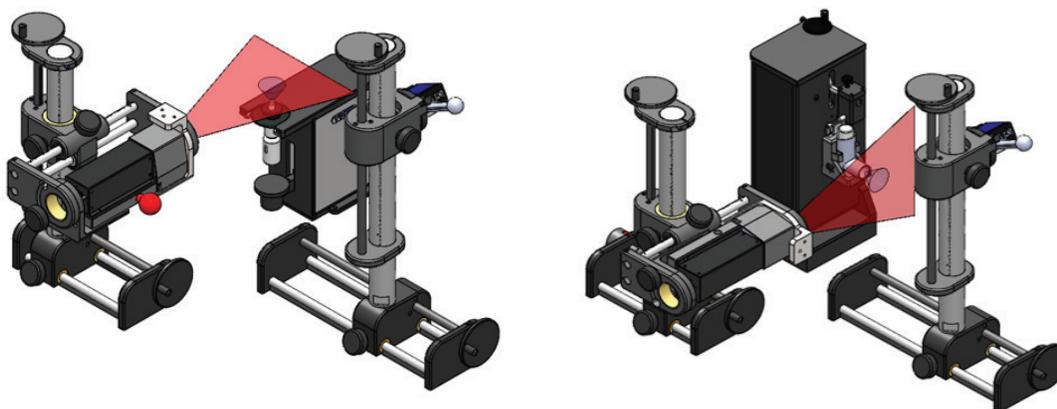
# Technical Note – TN0107

## Pattern Touching Border



The Proveris Scientific SprayVIEW® Measurement System helped to establish the industry standard for automated Spray Pattern (SP) and Plume Geometry (PG) measurements for orally inhaled and nasal drug products (OINDP). We have since worked to expand the platform’s capabilities to include Plume Front Velocity (PFV) measurement as well as Evaporation Fraction measurement. At its core, the SprayVIEW consists of a Vereo® Automated Actuator used to fire the device in testing, a laser light source used to illuminate the spray from the device, and high speed camera use to capture a series of images from the spray event. Those images are then analyzed using proprietary algorithms to produce the data for the measurement in question. Just like with any form of photography, it is important to consider your field of view (FOV) when planning the perfect shot! This tech note is designed to help users who encounter a “Pattern Touching Border” error resulting from a Spray Pattern measurement.

Robust method development is critical prior to performing product testing with the SprayVIEW. During method development, the parameters for such things as laser and camera positions as well as timing are customized based on the product’s characteristics. This customization ultimately leads to optimizing the FOV captured by the camera and displayed in SP images. A composite image of the full spray event is represented as an intensity of pixels in the image. If the FOV is too large, the details of the SP are less defined, whereas if the FOV is too small, edges of the SP are not captured in the image because they extend beyond the viewable area. This will result in a “Pattern Touching Border” error.



*Figure 1. General setup for Spray Pattern measurements for both nasal spray and pMDI devices. Note the position of the camera, both in height and lateral distance from the device, is what determines the FOV.*

The goal in method optimization, therefore, is to capture the spray such that the spray encompasses the FOV with clearly defined edges that have enough separation from the edges of the frame. Proveris recommends that the percentage of spray area vs. FOV area be in the 5-10% range and not to exceed approximately 15%. Values higher than this risk data being lost beyond the edges (border) of the FOV.

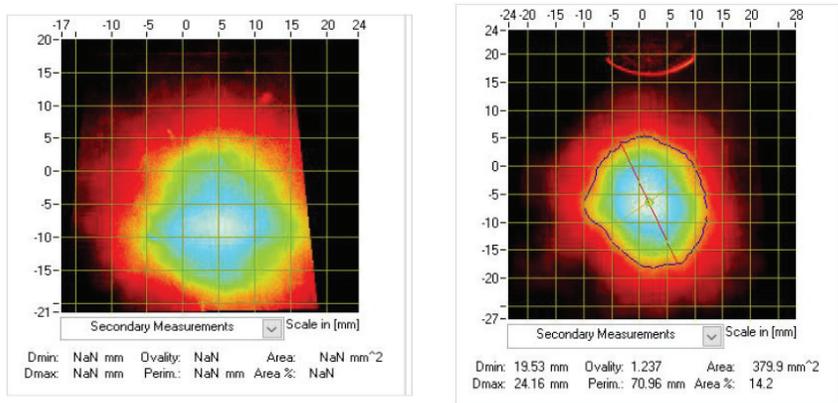


Figure 2. The image on the left is an example of a Spray Pattern touching the border. After adjusting the camera, the image on the right shows the result. Note the area % is less than 15.

The algorithm within Viota calculates pixel intensity. If that intensity encompasses pixels on the border of the FOV, the data for that SP is considered to be insufficient and Viota will not calculate and record the primary and secondary parameters for that SP. The image will still be captured, but depending on the version of Viota, generally those parameters will display on the image as NaN – not a number. Therefore, if a border touching does occur, it is recommended that either the FOV be increased (thereby decreasing the SP area/FOV area percentage) or the cursor be repositioned during target calibration such that the spray is moved further away from the offending border. The FOV is increased by adjusting the camera position settings (see Figure 3) to move the camera away from the device tip. Also, the cursor adjustment can be achieved during the camera calibration with the provided calibrated target (see Figure 4).

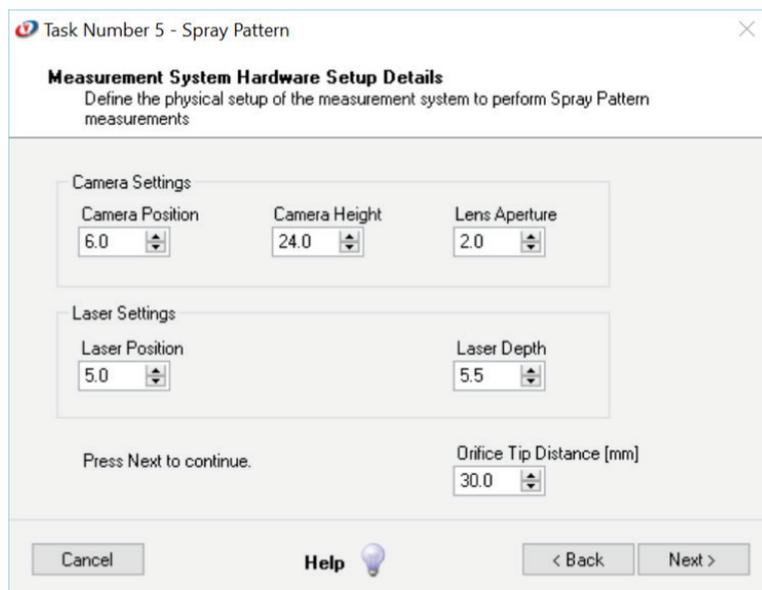
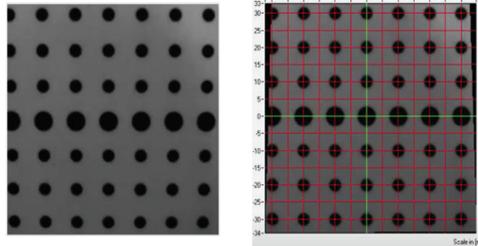
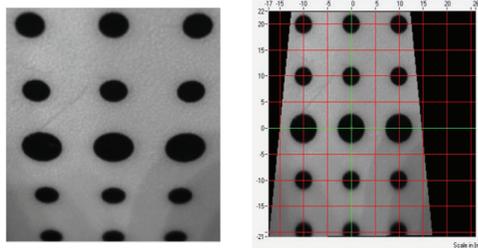


Figure 3. Changing the camera setting in the method can ensure that the FOV is better optimized for the device.

Camera further away  
from the sample



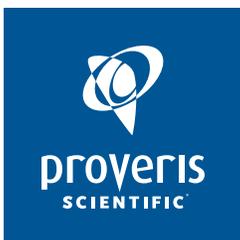
Camera closer to the  
sample



*Figure 4. If the spray pattern constantly offends a particular border, the cursor can be adjusted accordingly during the camera calibration using the provided target to move the pattern closer to the middle of the FOV.*

It should be noted that in some cases there could be outliers. The customer will need to make the determination if there is a need to retest with better method optimization or classify the shot as Out-Of-Specification (OOS) if the border is touched.

If you have questions regarding the pattern touching border error or need any additional information, please don't hesitate to contact a Proveris engineer at [support@proveris.com](mailto:support@proveris.com).



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