



APPLICATION NOTE

ECLIPSE Ji Digital Inverted Microscope Imaging software NIS-Elements AR JOBS / Sample Navigation

AI-powered “Sample Navigation” simplifies image acquisition! Improved reproducibility and streamlined information sharing

Automated image acquisition of multi-well plate samples requires specialized knowledge and experience to obtain optimal images, including development of autofocus and autoexposure routines. The advantage of ECLIPSE Ji is that its artificial intelligence (AI)-based automatic setting support reduces the training time required to learn how to operate the instrument. The built-in “Sample Navigation” function has the ability to automatically scan multi-well plates, dishes, or slides to identify the location of samples. AI automatically detects the well plate and optimizes the focus and exposure settings. This allows even first-time users to quickly learn how to operate the system and capture high-quality data. This application note introduces a workflow for automated image acquisition using "Sample Navigation" and a method for streamlining information sharing via automatic acquisition setup based on image metadata.

Keywords: Artificial intelligence (AI), automation of image acquisition, automatic settings, optimization of image acquisition conditions

Sample Navigation Features and Workflow

Ability to **find samples, acquire, and view images**

1. Streamlines multi-well plate imaging workflows
2. Intuitive operation that is easy to understand, even for first-time users
3. Simple and versatile features assist with wide variety of samples
4. Autofocus options are Brightfield AI-AF and fluorescent AF.
5. The “Built-in Job” is a pre-built, multi-well acquisition routine ready for immediate use.
6. “Custom Job” allows you to select highly customizable automatic imaging sequences (assembled within NIS-Elements Job Definition)

AI-Auto focus

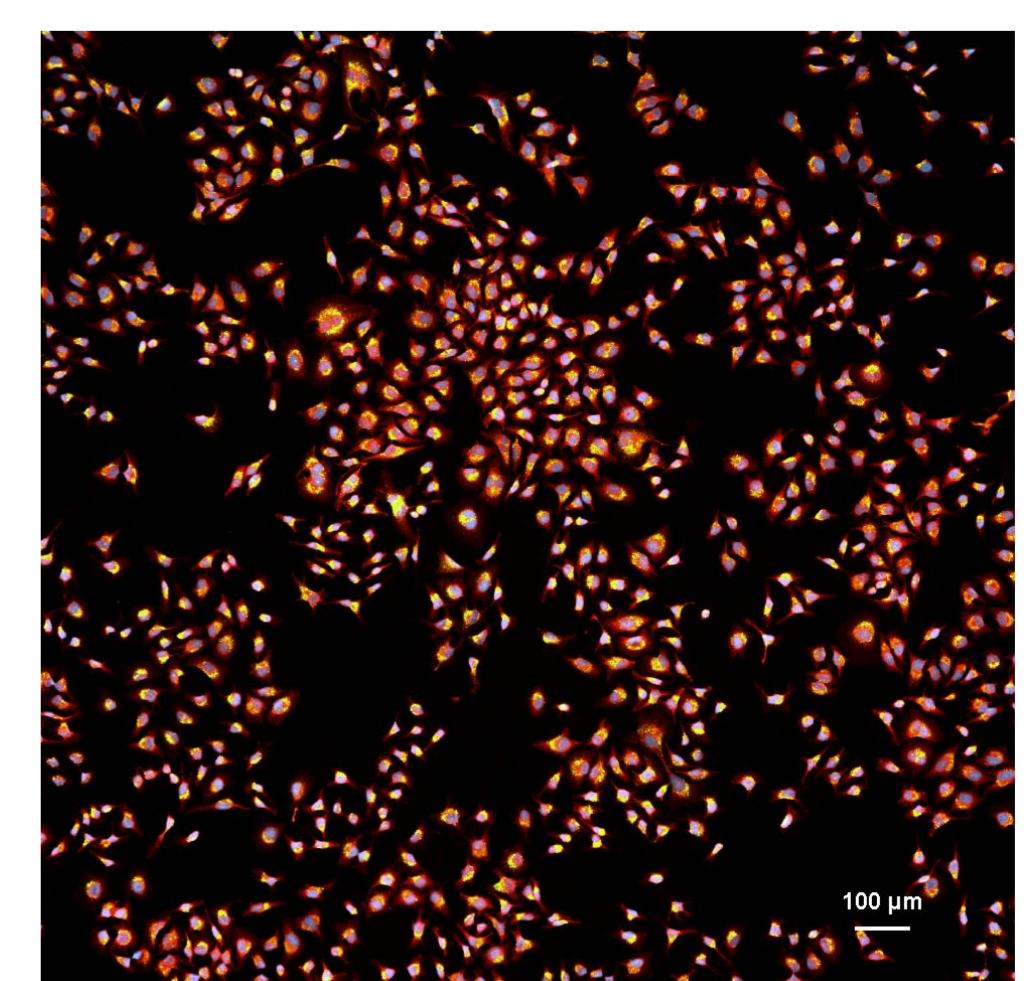
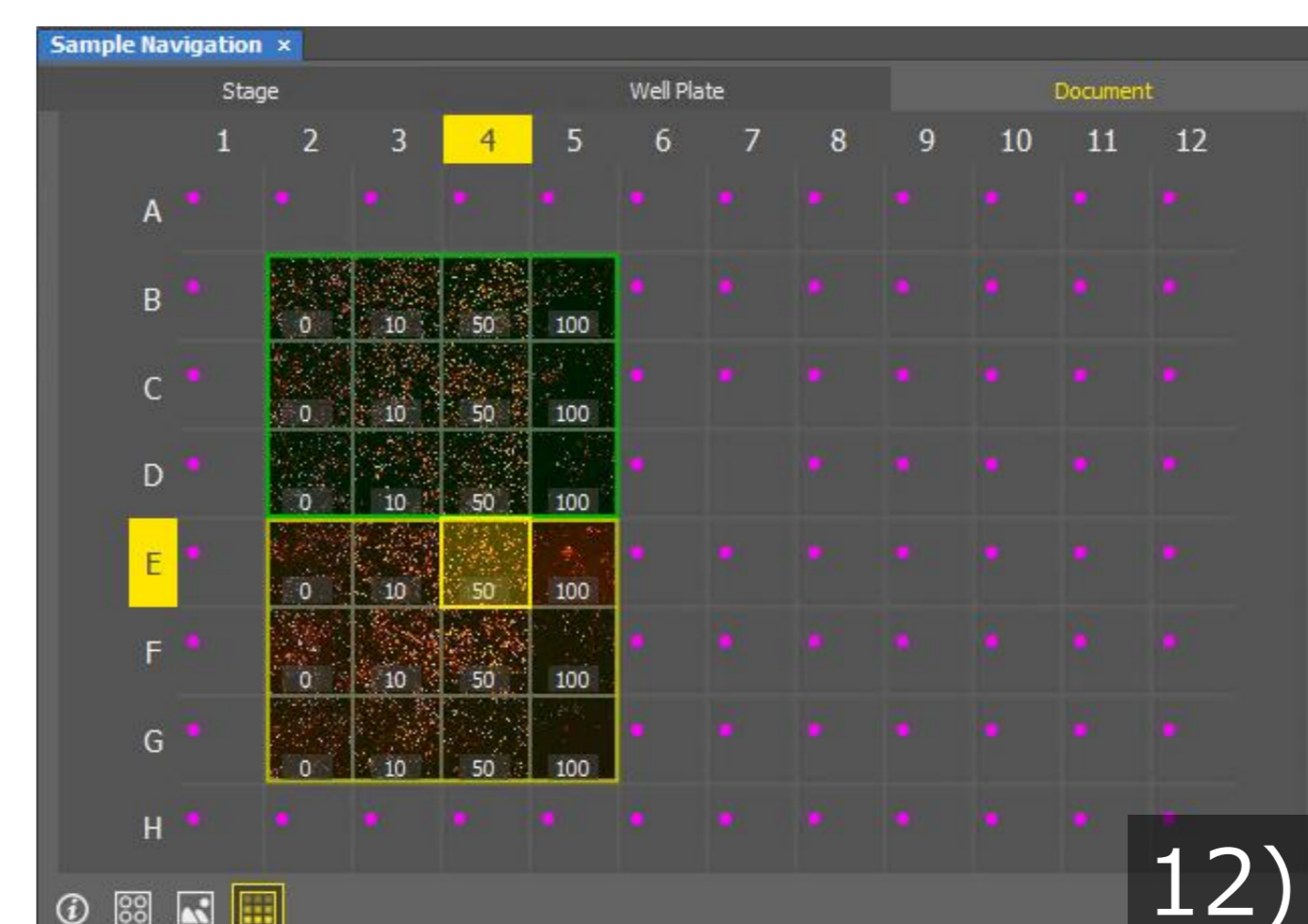
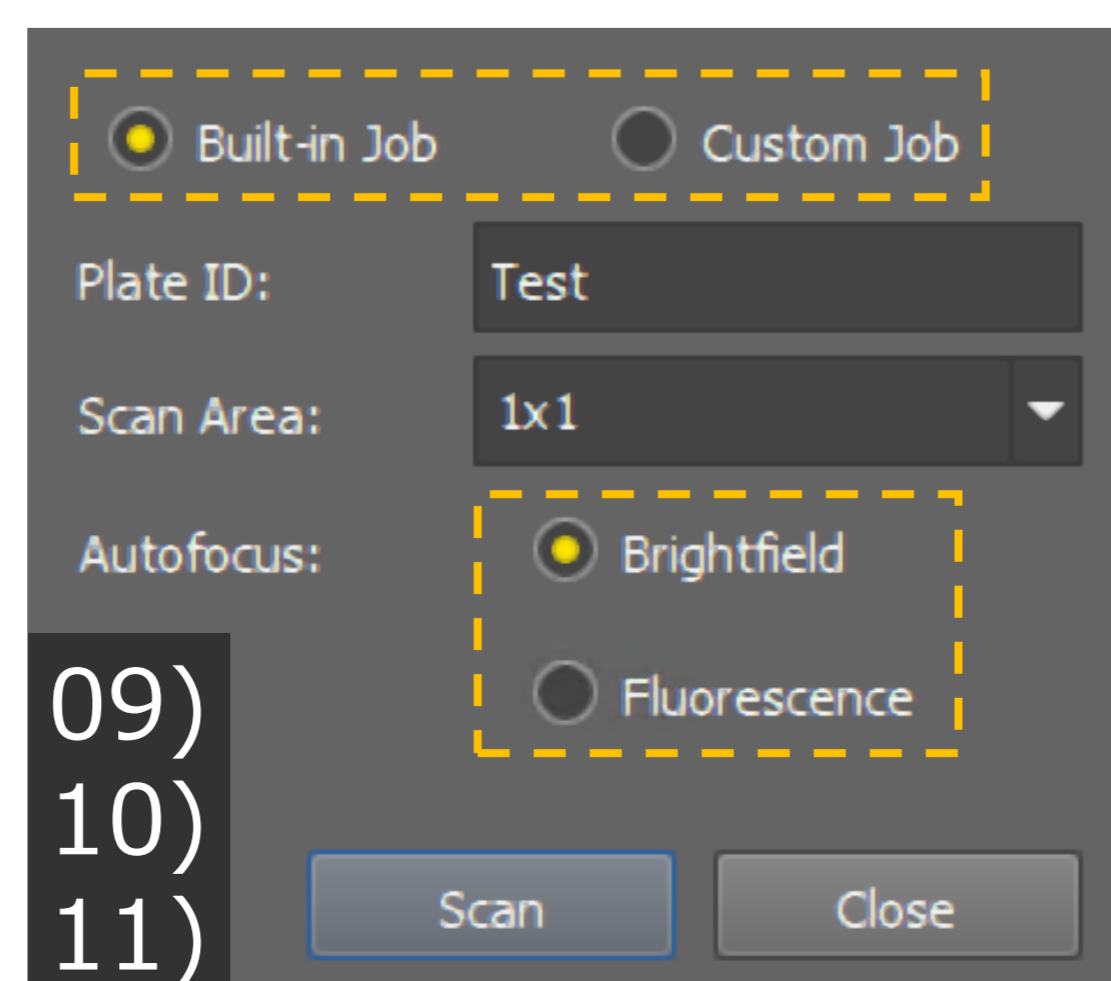
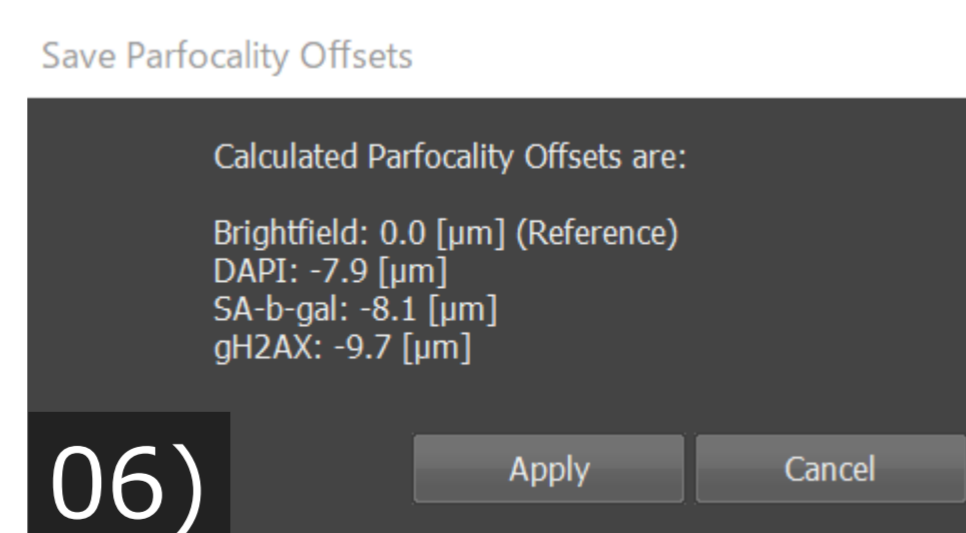
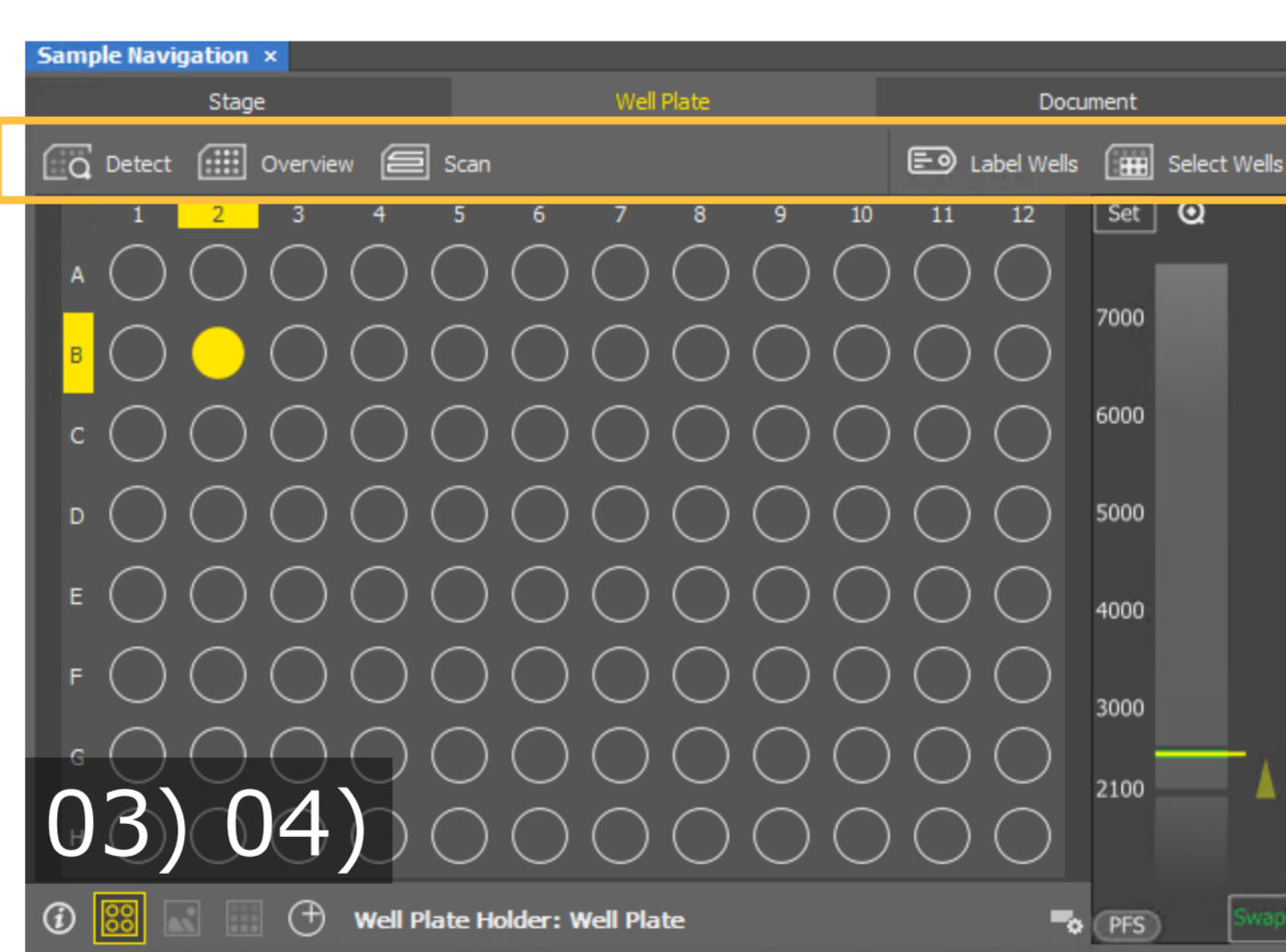
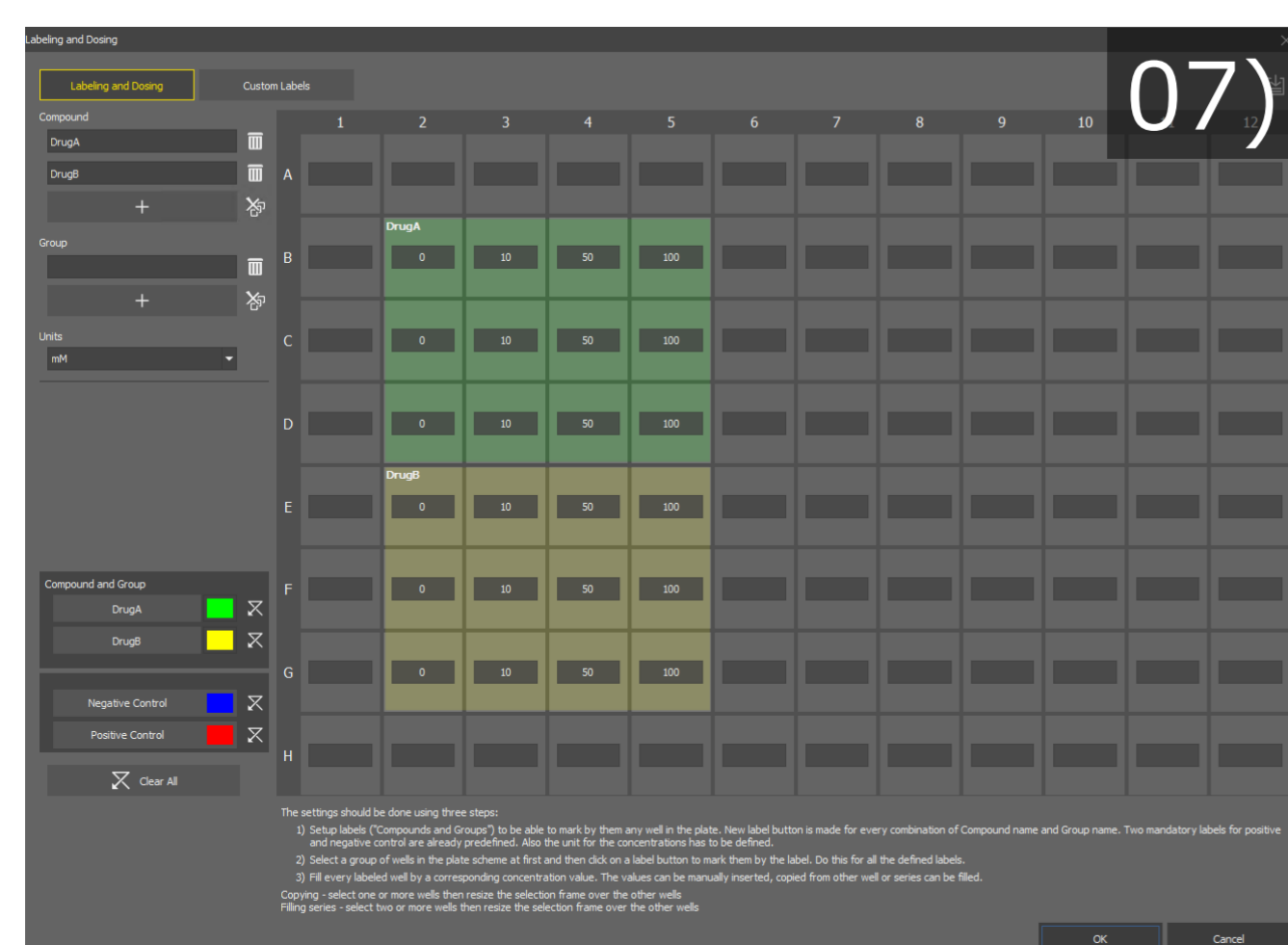
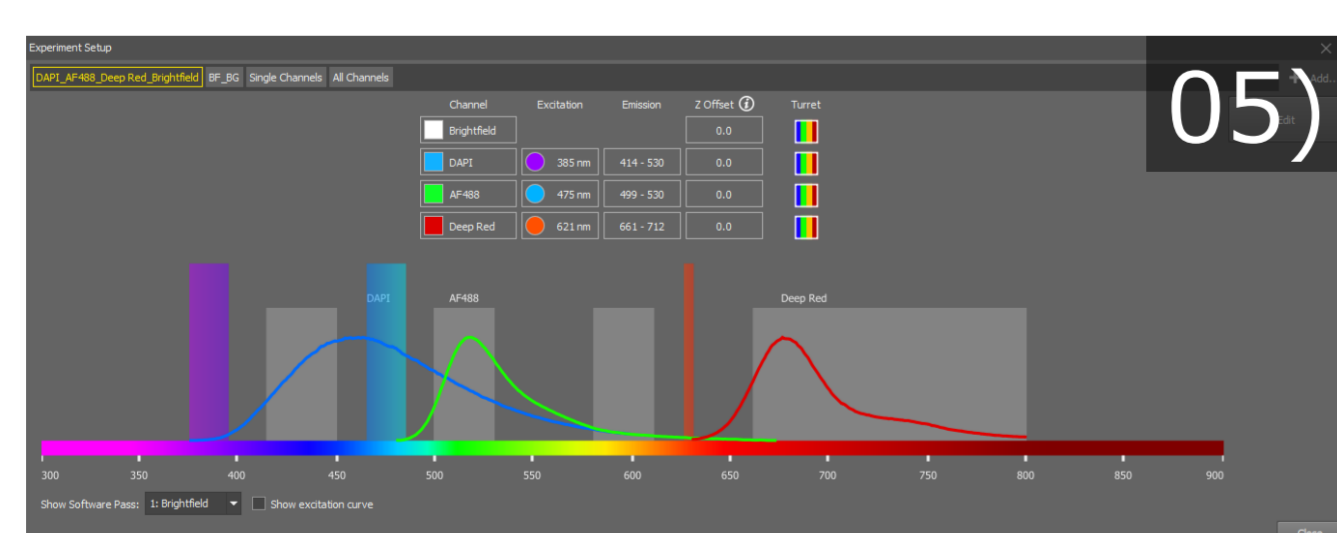
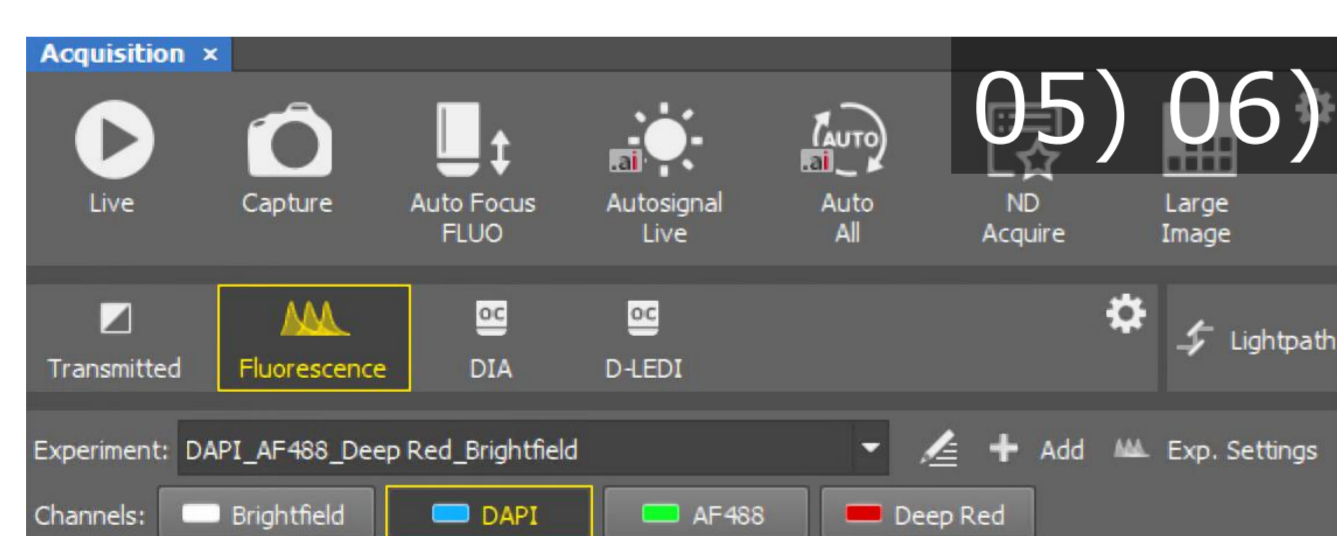
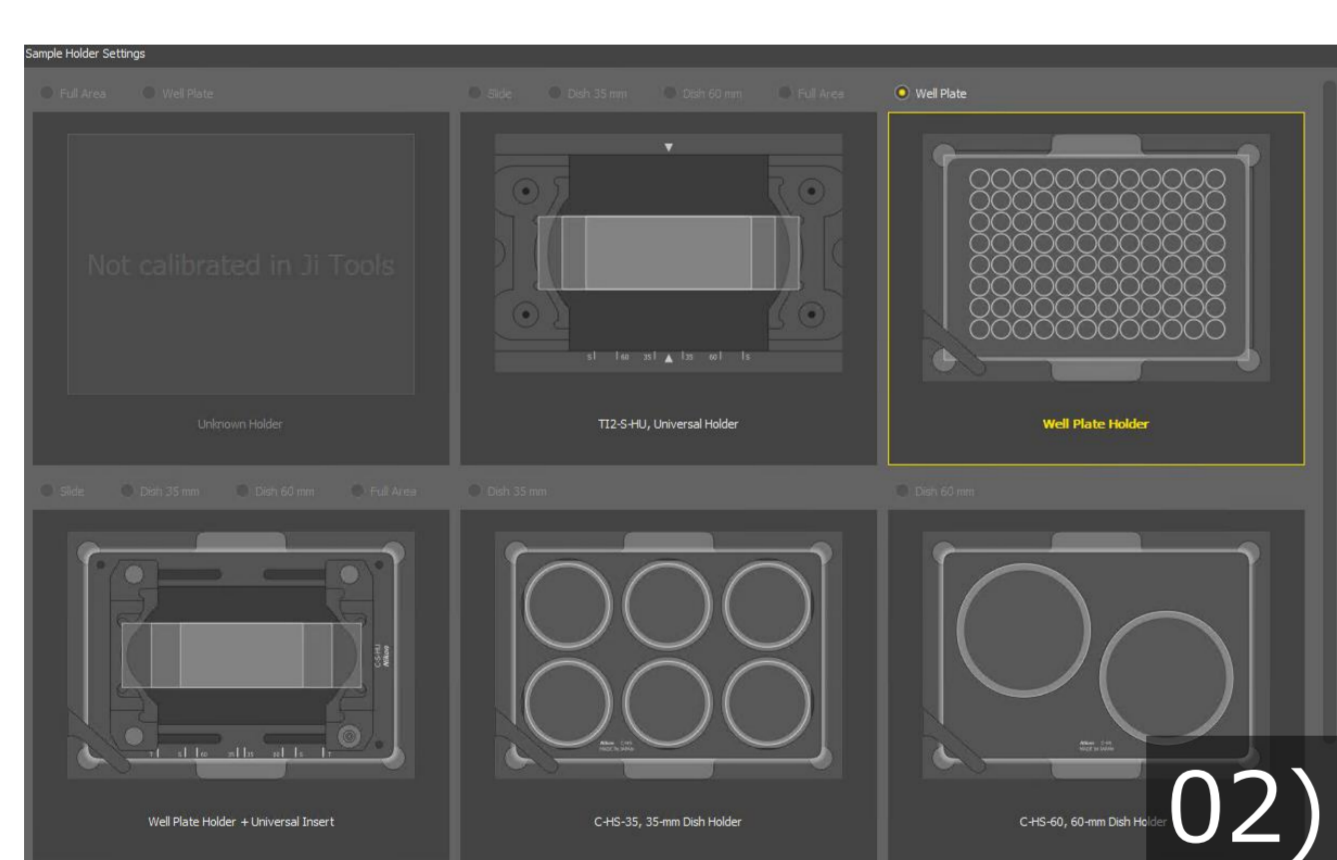
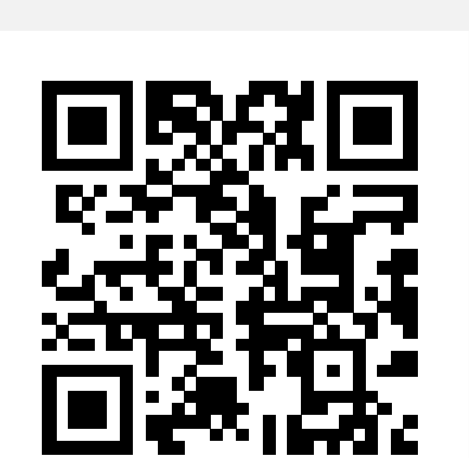
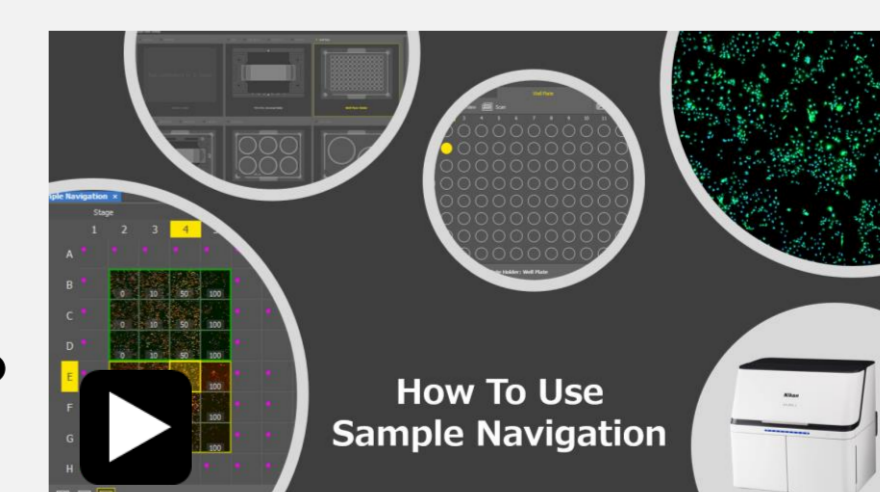


Fig.1: Sample Navigation Workflow

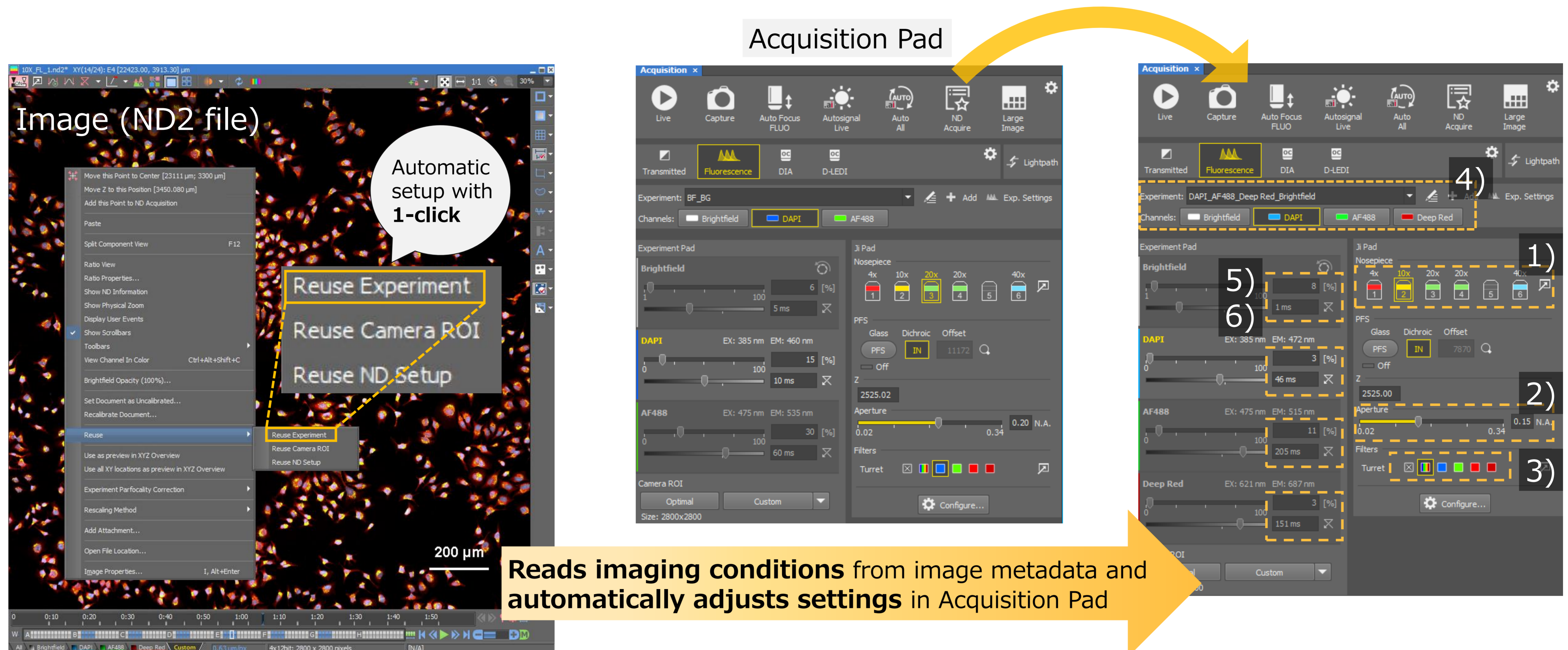
- 01) View Sample Navigation
- 02) Holder Selection
- 03) Detect (Well Plate tab)
- 04) Overview
- 05) Experiment Setup (Wavelength Selection)
- 06) AutoAll (Channel-specific Z-Offsets & Autosignal.ai)
- 07) Label Wells
- 08) Select Wells
- 09) Scan (Well Plate tab)
- 10) Scan (Built-in Job)
- 11) Autofocus Brightfield / Fluorescence
- 12) Document tab (Image Viewing)

Click here for operation video



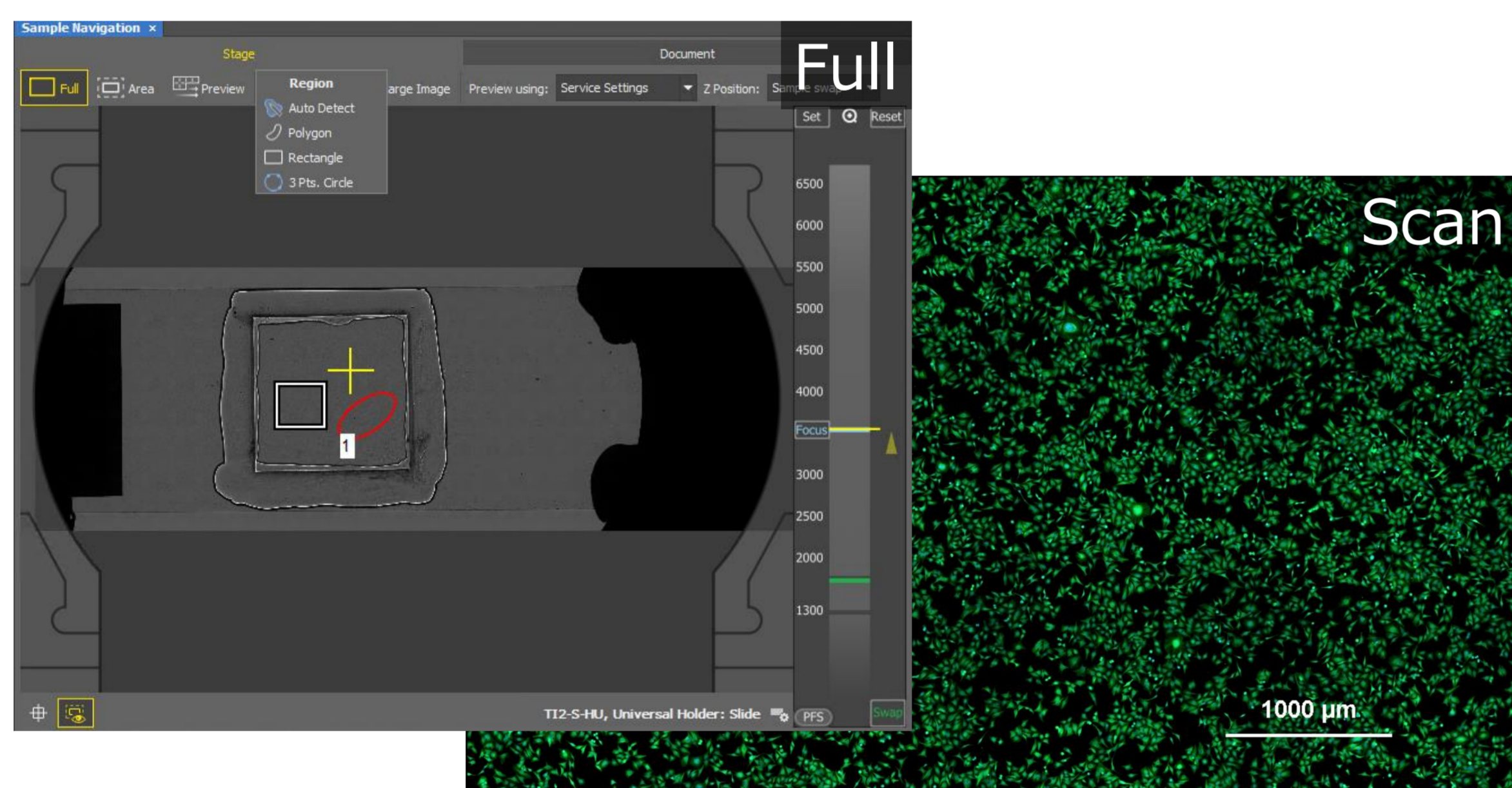
"Reuse Experiment" feature improves reproducibility of experiments and streamlines information sharing across multiple facilities

By selecting "Reuse Experiment" on the image (ND2 file), you can reuse the imaging conditions used to acquire the image, such as 1) objective, 2) aperture, 3) filter, 4) wavelength, 5) LED power, and 6) exposure time. With one click, imaging conditions can be retrieved from previously acquired images and the same conditions can be automatically set, improving the reproducibility of experiments. In addition, sharing images enables scanning under the same conditions across multiple facilities, contributing to the streamlining of information sharing between collaborators. This maintains the consistency of experiments and improves the reliability of research.



Reads imaging conditions from image metadata and automatically adjusts settings in Acquisition Pad

Sample Navigation is compatible with a variety of containers such as slides and dishes



- **Full :** Scanning of the entire area of a slide sample.
- **Scan :** Scan areas specified by "Auto Detect" or manually drawn boundaries. Performs high resolution "large image" (tiled) acquisitions across "Region of Interest (ROI)".

Summary

- **"Sample Navigation" function**
 - ✓ Automatic configuration support using artificial intelligence (AI) reduces the training time required to learn how to operate the device.
 - ✓ Automatically scan and locate samples in multi-well plates, dishes, and slides.
 - ✓ AI automatically detects the well plate and optimizes autofocus and exposure settings.
 - ✓ Streamlined, multi-FOV scans (tiled images) of "Auto Detect" or manually-drawn features, even for samples of complex shapes mounted on slides.
- **Image (ND2) file reuse function**
 - ✓ "Reuse Experiment" feature streamlines replication of experimental conditions.
 - ✓ The "Reuse Experiment" feature allows you to readout of previous imaging conditions with one click, improving the reproducibility of experiments.
 - ✓ Sharing images (ND2 files) among multiple facilities enables scanning (image acquisition) under the same conditions.

Product Information

ECLIPSE Ji Digital Inverted Microscope

ECLIPSE Ji is an AI-Driven automated imaging system. Artificial intelligence (AI) automatically adjusts focus and sets exposure conditions. This significantly reduces the number of settings and optimization steps, making it easy for anyone to obtain images.



Imaging software NIS-Elements AR JOBS / Sample Navigation

NIS-Elements AR's sample navigation has a Built-in Job function that allows you to acquire images with simple operation. In addition, for users who want more flexibility in their experiments, the Custom Job feature allows you to automate more flexible experiment flows. This allows you to realize imaging flows that combine simple operability with high flexibility to meet all your needs.