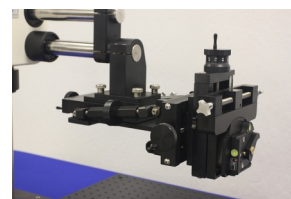
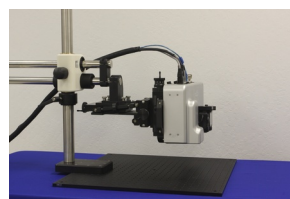


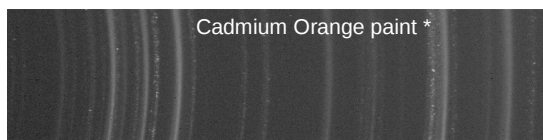
Duetto 2

Ultra-portable XRD/XRF for Cultural Heritage

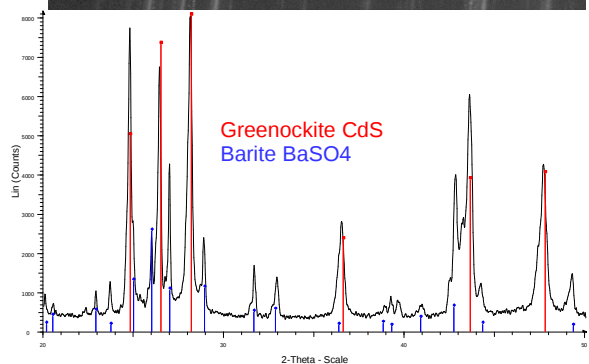
Duetto, first launched in 2010, was the first commercial X-ray diffraction (XRD) and X-ray fluorescence (XRF) instrument specifically designed for Cultural Heritage. **Duetto** enables non-invasive in-situ analysis of a small region of an object. XRD and XRF data are obtained from 2D images collected by a photon-counting CCD. **Duetto** can be used in the laboratory or deployed in the field (museum, archaeological site, restoration site, etc) using a variety of mounting options.



Duetto 2 keeps the same successful design and upgrades all components to maintain the Duetto line at the state-of-the-art. **Duetto 2** is faster, more compact, easier to transport and install, and simpler to use. These improvements are enabled by the use of new miniature rugged components originally developed by our staff and vendors for NASA space flight instruments.



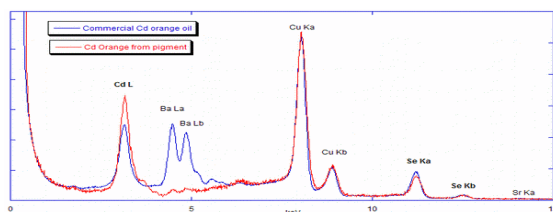
2D XRD data collection allows fast analysis and reveals particle size effects.



The XRD diffraction pattern is computed in real time during the acquisition.

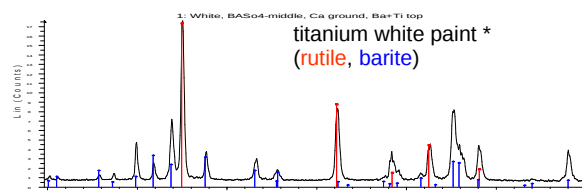
Preliminary analyses can be done during the acquisition.

Data is exported to 3rd party XRD analysis software (Xp Powder provided).

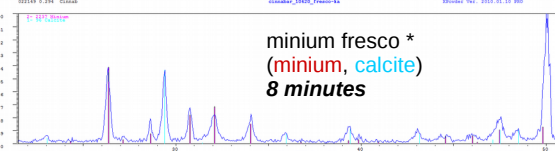
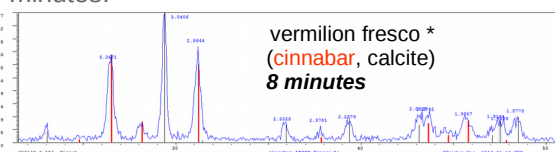


The XRF spectrum is collected at the same time. XRF helps constrain the phase identification in XRD data and reveals signatures of non crystalline materials.

* Duetto 1 data shown.



Pigments can usually be identified in a few minutes:



Duetto 2 specifications

X-ray sensor	photon-counting deep-depleted CCD, 1024 x 256, 26 μm pixel, -50° C (Peltier), forced air cooling
X-ray tube	ceramic-metal construction, grounded cathode, 28kV max, 10W, Co or Cu target, forced air cooling
Sample viewing and positioning	laser, embedded color camera and LED lighting ⁽¹⁾
XRD range and resolution	20 to 55 °2 θ , 0.2 to 0.3 FWHM ⁽²⁾
XRF range and resolution	3 to 25 keV, <200 eV FWHM at Mn K α
Typical analysis time	10 to 60 min ⁽³⁾
Power input	45 W, 12-24 Vdc ⁽⁴⁾
Size and mass	38 (l) x 30 (w) x 14 (h) cm, 5.9 kg
Control PC	USB 2.0 connection to laptop, Linux and Windows available.
Control software	new proprietary software with GUI for control, data viewing and automated preliminary interpretation.
Data interpretation software	for XRD: Xpowder default (requires Windows). Compatible with most other software. ⁽⁵⁾ for XRF: Open Source PyMCA recommended.
File format export	txt, xy, plv, mdi, ...and any ASCII format requested.
Mounting	photographic quick release to customer supplied support, optional precision alignment head, tripod, benchtop mount, scaffolding mount, ...
Transportation	ground and air shipping in rugged transport case provided, checked airline luggage compatible.

(1) Duetto 2 is auto-focus and focus-tracking ready.

(2) varies with 2 θ . Practical FWHM varies depending on sample nature, grain size, surface roughness, etc.

(3) most simple compositions can be identified in a few minutes. Data is shown in real time, acquisition can be stopped when sufficient S/N is observed.

(4) laptop style AC adapter default, optional auxiliary smart Li-ion system available.

(5) eXaminArt's cloud computing XRD app QAnalyze.com available in current Beta version.

Designed and manufactured in California.

Contact: info@examinart.com

<http://examinart.com>