



# **Eurostars E10207 - PhaseMapper3D**

**Jan Sohar**



## ① Company introduction



### ADVACAM Group

- ADVACAM Oy, Espoo: semiconductor sensors & modules (since 2012)  
Spin-off from VTT Technical Research Centre of Finland  
- 10 employees
- ADVACAM s.r.o., Prague: imaging cameras and solutions (since 2013)  
Spin-off from Institute of Experimental and Applied Physics, Prague  
- 22 employees
- USA ADVACAM, representative office Grant Forks, North Dakota  
- 2 employees



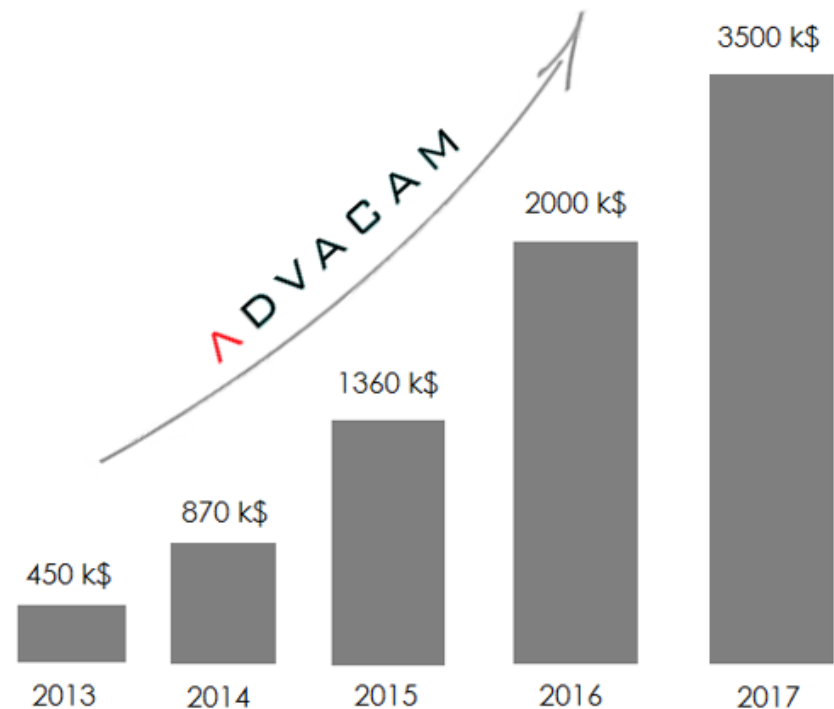
## ① Company introduction



### ADVACAM: the expertise

The whole production and R&D is covered:

- Sensor manufacturing
- Bump-bonding
- Readout electronics
- Detector production
- Software development
- Method development
- Further detector development





# ① Company introduction

ADVACAM



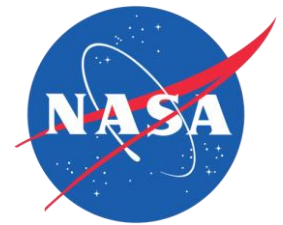
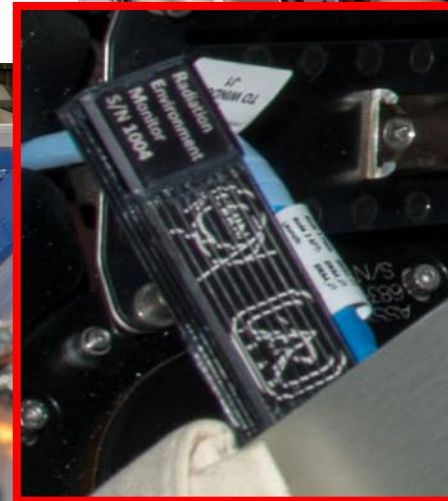
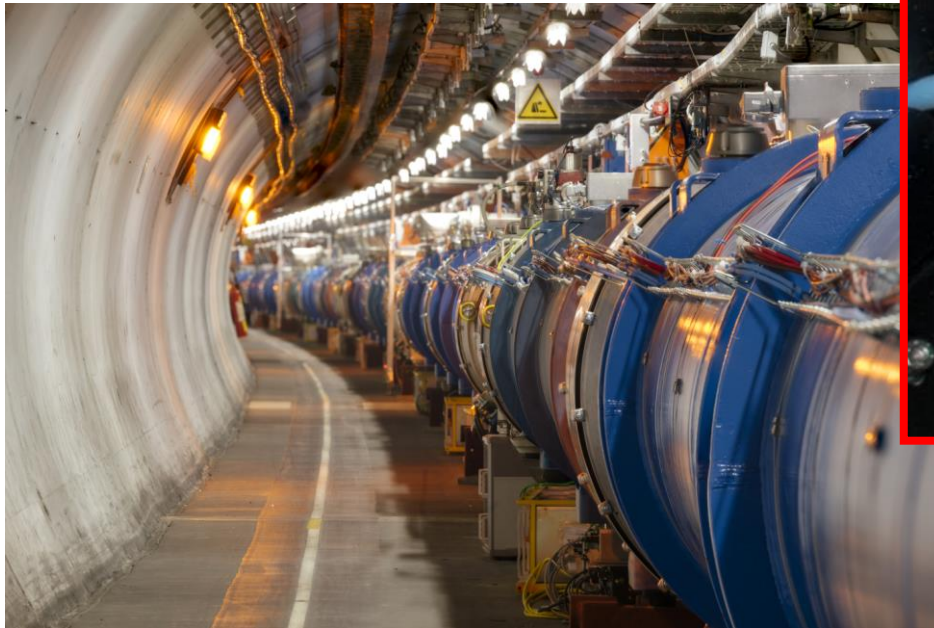
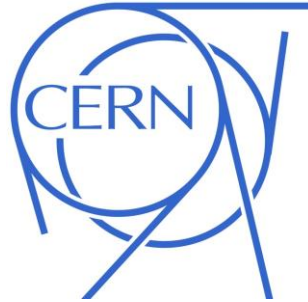
## Selected clients



Map of customers



# The new technology comes from CERN and space



esa



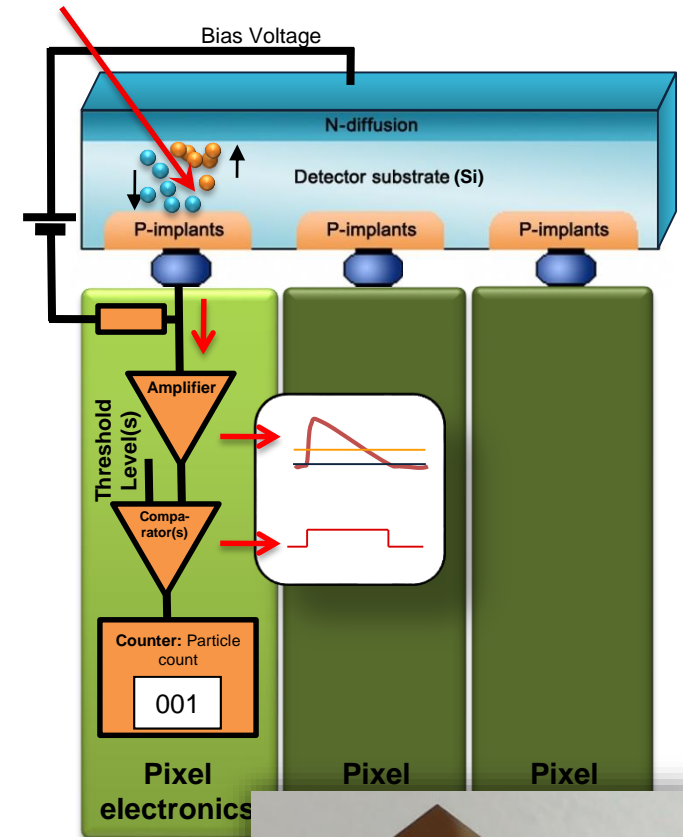


# Background technology: Detector principle

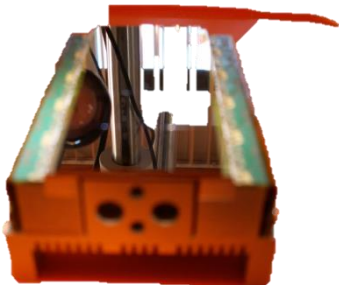
- Technology based on CERN chips

## Advantages:

- High resolution of 55 microns.**
- Can perform energy (spectral) sensitive imaging**
- Particle tracking and particle type recognition.
- High speed.
- Patented technology for large area devices: edgeless sensors + tiling



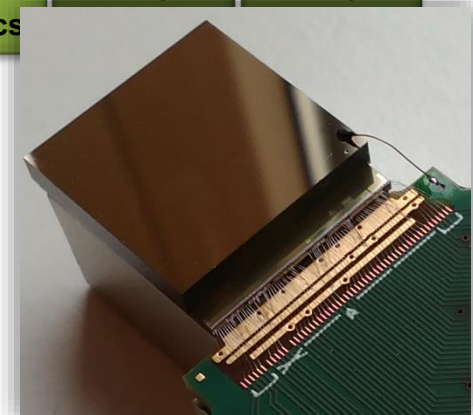
Compact CdTe:



Large area (6.5 Mpixel):

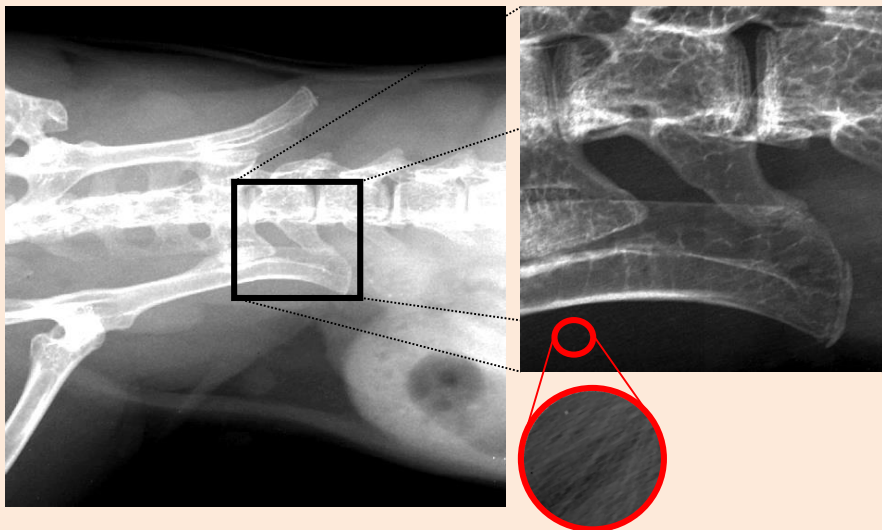


2 mm CZT



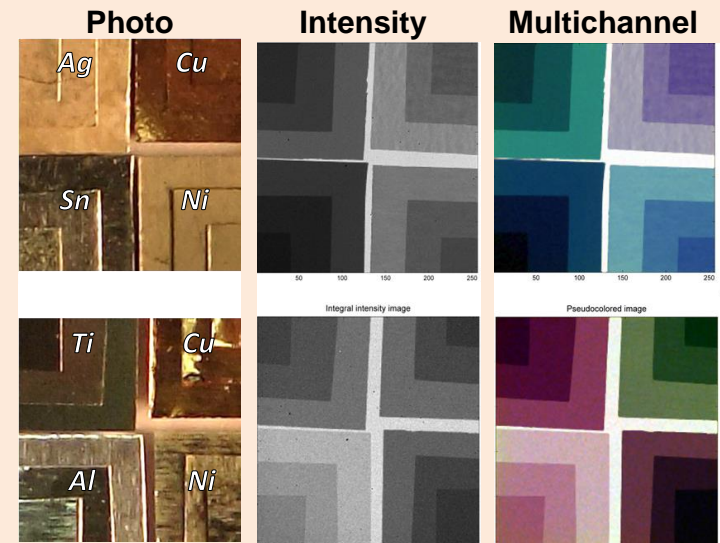
ADVACAM imaging detectors register each individual photon of radiation (eg X-ray) at each pixel.

## Photon counting: Ultra-high contrast



Mouse: hair fibers are resolved through its body !

## Multichannel: Material sensitivity



Metals: Material differences are identified !

Signal to noise ratio can reach **2400** (noise of 0.04%) – measured with 2 mm thick CZT sensor

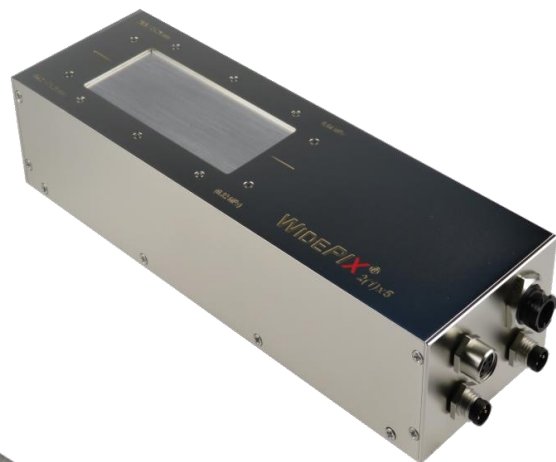


# Examples of ADVACAM products

**WidePIX L 2(1)x5**  
1280x512 pixels  
70x30 mm



**WidePIX 2(1)x5**  
1280x512 pixels  
70x30 mm



**WidePIX L 2(1)x15**  
3840x512 pixels  
210x30 mm



**WidePIX L 2(1)x10**  
2560x512 pixels  
140x30 mm

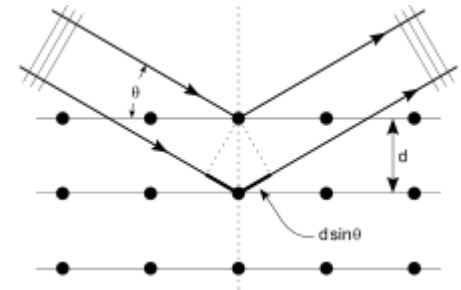






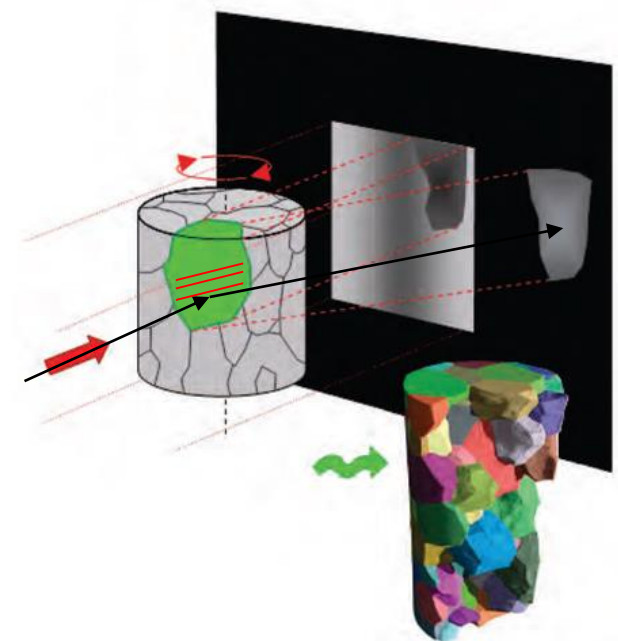
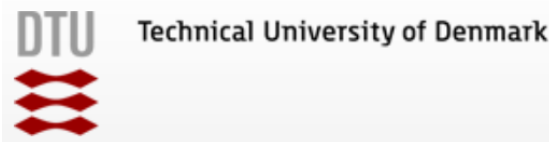
## Abstract

The project aims to develop an X-ray module for structural 3D imaging of multi-phase materials. The module will integrate a **novel x-ray detector - able to replace grey value with color images** - with innovative diffraction-based reconstruction algorithms designed to perform 3D characterization. As the first widely accessible **non-destructive setup being able to map multiphase 3D crystalline information**, PhaseMapper3D will tap into a large and unserved market within the materials science X-ray imaging sector .



$$2d \sin \theta = n\lambda$$

Partners:



The R&D work of ADVACAM within PhaseMapper3D project resulted in

- **AdvAPIX TPX3**: The First Truly Spectral Imaging X-ray Camera



The R&D of AdvAPIX TPX3 was finished in 2017 and the new product was introduced to market in October.



# AdvaPIX TPX3 on the market

AdvaPIX introduced during world conference IEEE NSS-MIC 2017 in October 2017 in Atlanta:



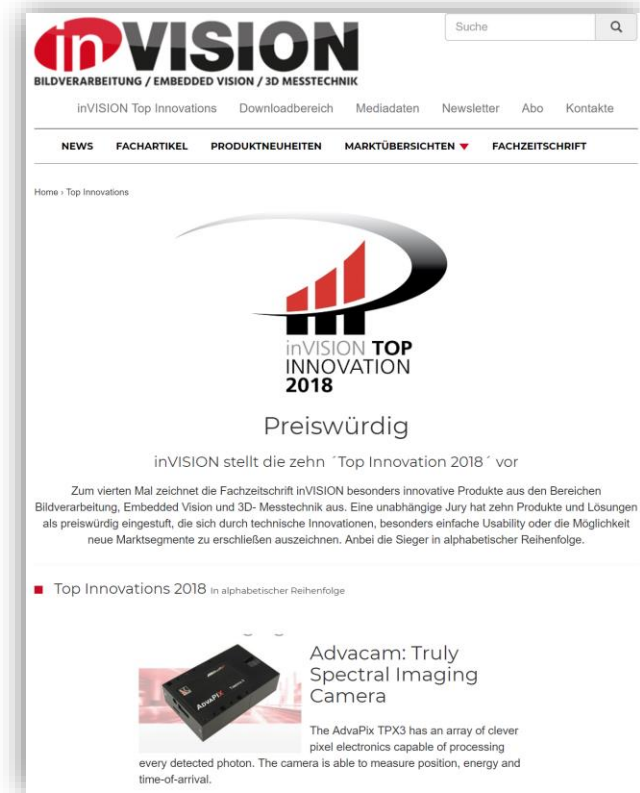
Sales: 2017 - 8 pieces sold (133 k EUR = 3.4 M Kc),  
2018 – 16 pieces sold (302 k EUR = 7,8 M Kc)  
- incl. 2x6 large area TPX3 detector

Very high-added value product

Award - most innovative product by inVision magazine.

**The ADVACAM company became the first company in the world bringing this technology to the market.**

**The AdvaPIX TPX3 device is the first commercially available detector with truly spectral imaging capability**



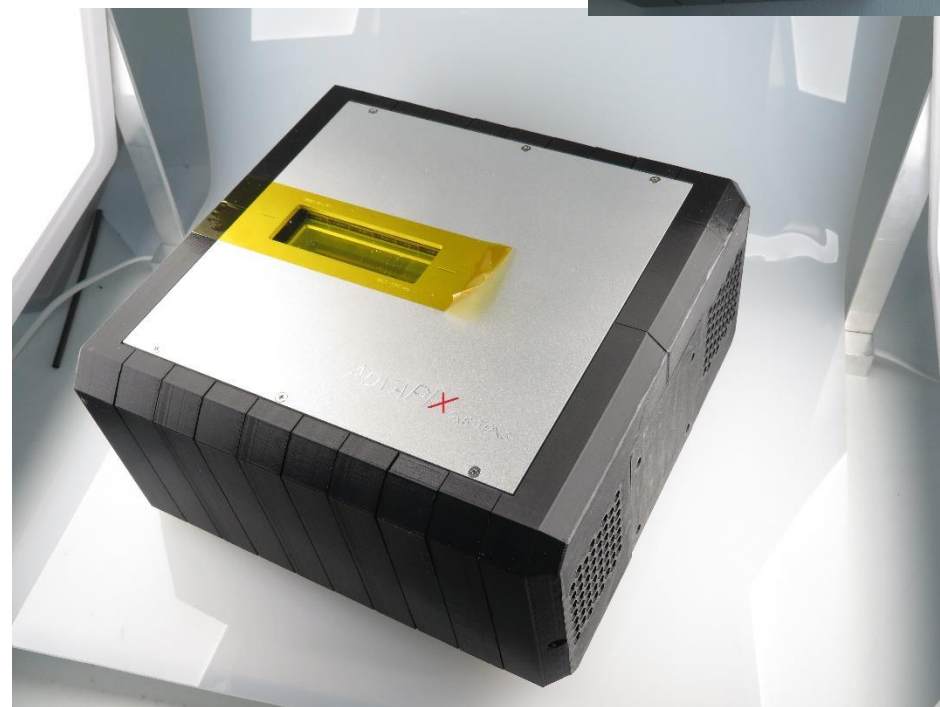
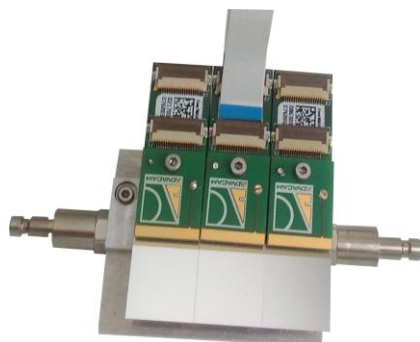
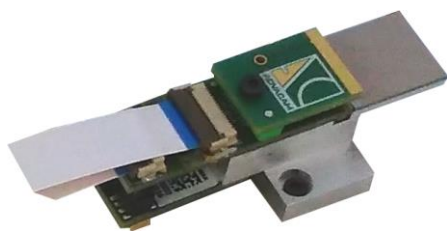
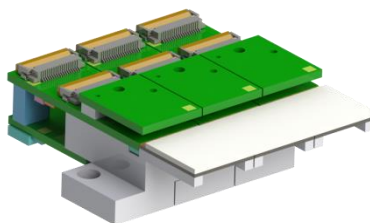
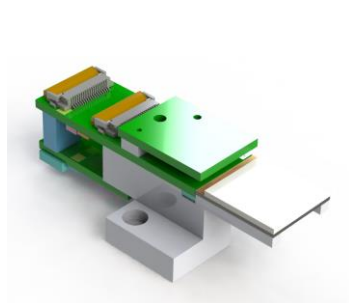
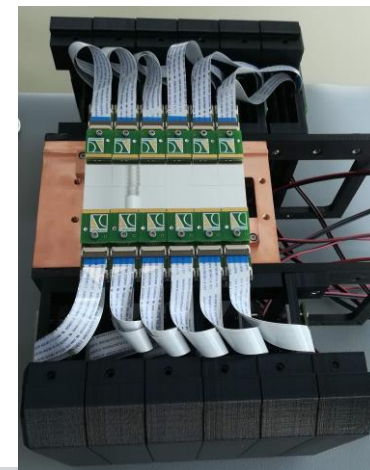


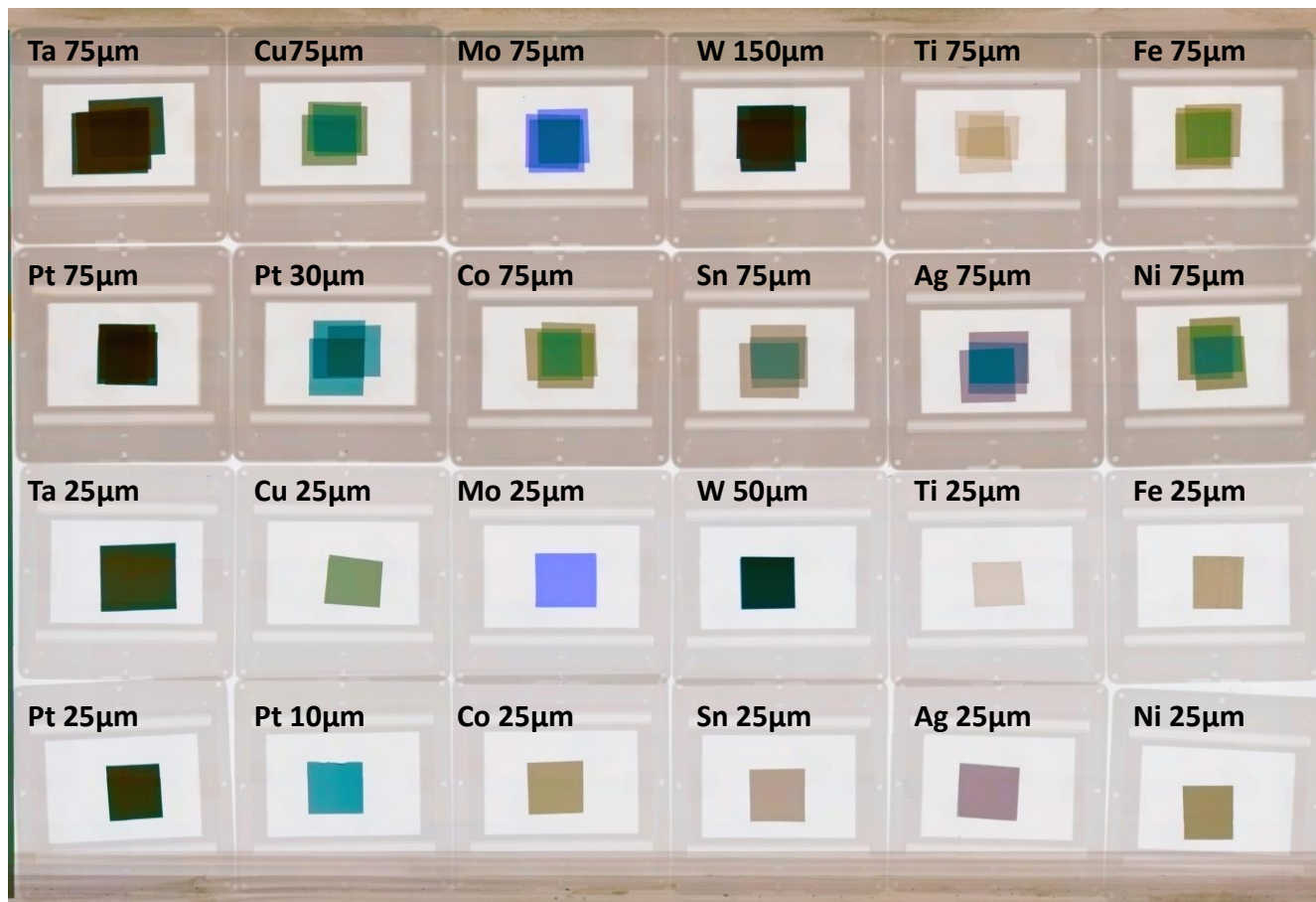
R&D in ADVACAM continues ...

... Larger detectors, custom devices ...



**AdvaPIX TPX3 2x6** consist of 12 TPX3 units  
World's unique large area TPX3 detector





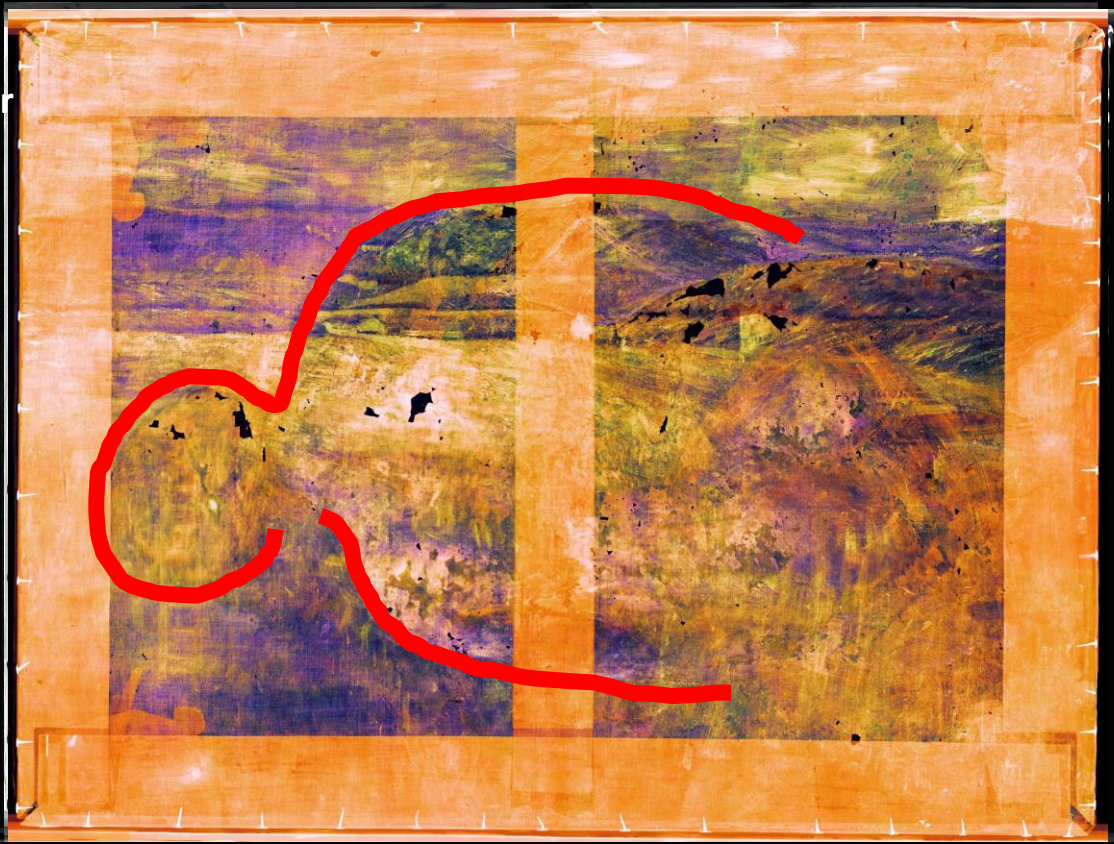


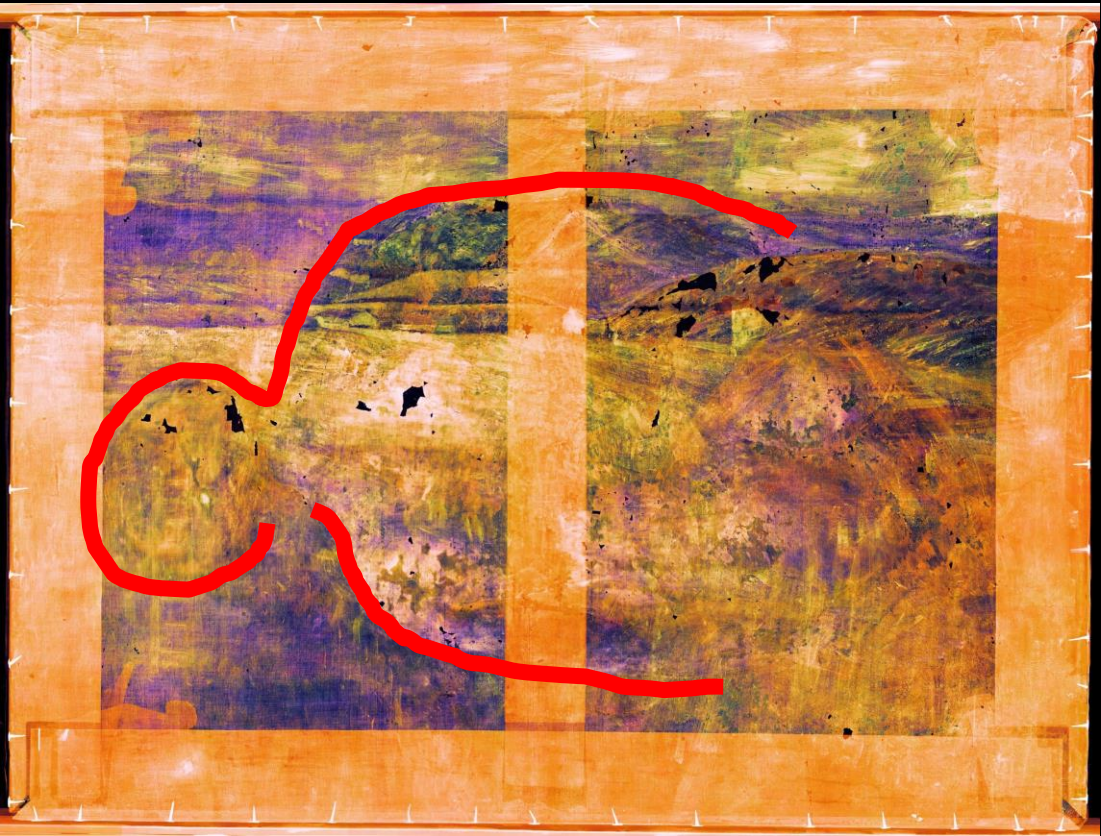


Signed  
**Vincent van Gogh**

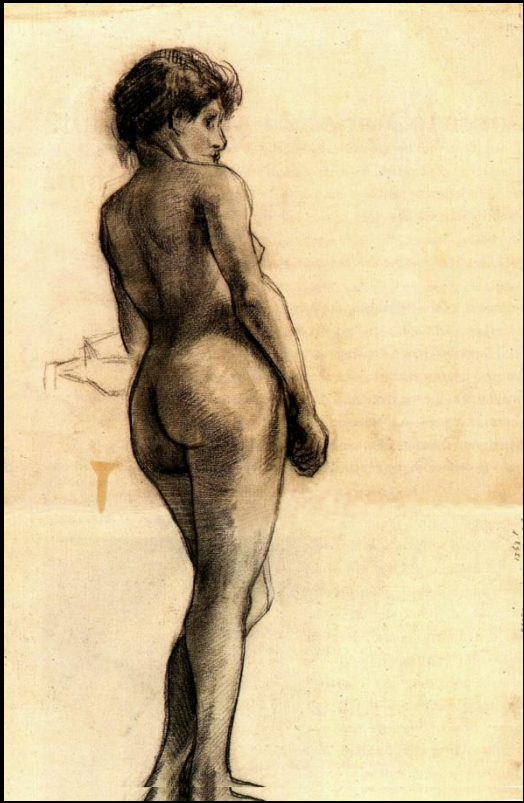
La Crau with Montmajour  
in the background

~1888











**THANK YOU**