

CERN@school's use of the CernVM and CVMFS

Will Furnell

The Institute for Research in Schools

The University of Kent

mail@willfurnell.com

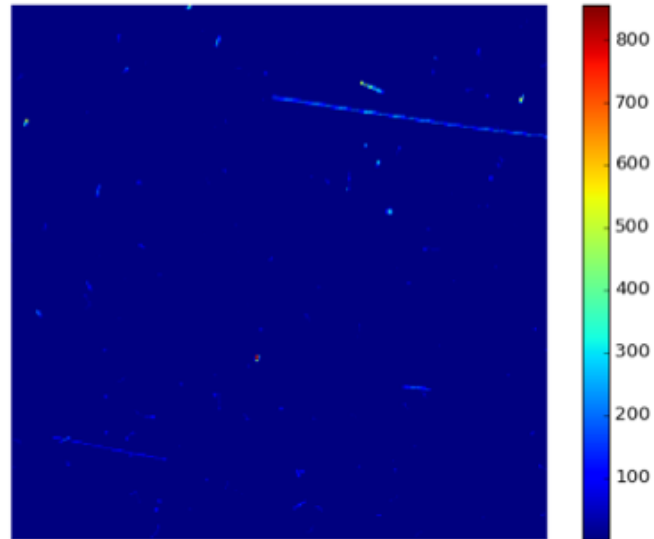
CERN@school

- Programme designed to inspire the next generation of scientists and engineers
- Secondary school students (ages 11-18) carry out their own research projects using Timepix detectors, provided by IRIS
- <http://researchinschools.org/CERN>

Timepix Detector

- 256 x 256 pixel hybrid silicon pixel detector
- Used to detect individual particles of ionising radiation
- Created by the Medipix Collaboration at CERN

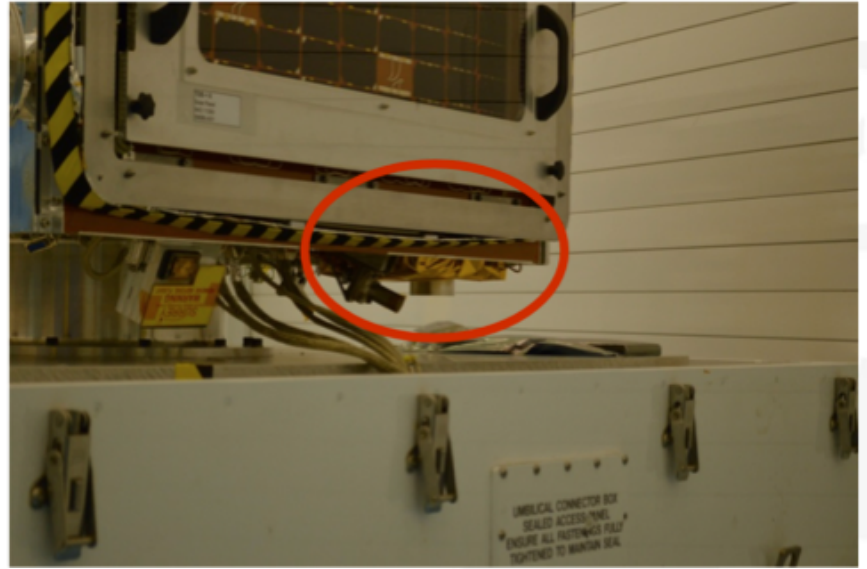
(<https://medipix.web.cern.ch/>)



Langton Ultimate Cosmic ray Intensity Detector (LUCID)

- Payload on TechDemoSat-1 (Surrey Satellite Technology) - launched in late 2014, LUCID ended operations in mid 2017.
- 5 Timepix detectors on board
- Used to study the radiation environment in Low Earth Orbit
 - Cosmic rays, South Atlantic Anomaly, Coronal Mass Ejections

LUCID



The Virtual Organisation

- Very small
 - Only a handful of users
- Also (relatively) small requirements for storage & compute on GridPP...

The Virtual Organisation

- Very small
 - Only a handful of users
- Also (relatively) small requirements for storage & compute on GridPP...
- ... but we still need to deploy our own software and submit jobs!
- Limited or no access to SL6 systems

CernVM

- Primarily used to interact with GridPP
 - Job management, data transfer, testing software, uploading to CVMFS
- Standardised environment - easier to introduce new users
- Only a small amount of setup and resources needed

CVMFS

- researchinschools.egi.eu
- We use CVMFS for Python and dependencies
 - Python 3 is provided by Conda (<https://conda.io>)
- Mix between software such as NumPy, SciPy, Tensorflow and our own
 - <https://github.com/InstituteForResearchInSchools>
 - https://github.com/amshenoy/lucid_neural_analysis
 - <https://github.com/willfurnell/lucid-grid>
 - <https://github.com/willfurnell/grid-analysis>

CVMFS

- Has made it very easy for us to deploy software
- Lets us use exactly the same software on the CernVM and GridPP worker nodes
- Also means users don't need to install software themselves
- ... however long delay (for us) – not as suited for software in active development

CernVM – future use?

- Linux based platform for students to work on
- Easy to set up Python programming environment for CERN@school (and other IRIS projects)
- Customisable image for education
- CVMFS could be useful for software deployment

Summary

- We use the CernVM to interact with GridPP
- We use CVMFS to deploy our custom Python software and its dependencies
- Thank you for the excellent software!