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Panorapix - The TERAPIX Visualization Tool

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Abstract. Panorapix is a new X11 client for visualizing FITS images on UNIX platforms, developed in the context of the TERAPIX project. The code is in C++ and uses the Qt library which provides an ergonomic look-and-feel to the interface. Huge images (32k×32k pixels and even bigger) can be comfortably visualized even on a modest machine. Up to twelve files can be dealt with simultaneously and all kinds of X display are supported (8, 16, 24 and 32 bits-per-pixel).
In the very first version, the most important tools have been implemented (zooming, panning, coordinates, intensity, ...), but new functionalities will easily be added.

1. Introduction

The MEGACAM instrument, mounted on the CFHT, will produce 18k×18k images. The TERAPIX center, in charge of processing the MEGACAM data, will routinely deal with even larger composite images. As existing astronomical software was not able to display those huge images in an efficient way, a new visualization tool has been developed.

Panorapix, in its very first version, provides the most important tools (zooming, panning, coordinates, intensity, ...). To these basic tools, we have added the possibility to move the image smoothly with a "hand", to calibrate the monitor and to manipulate the color maps by using cubic-splines.

Panorapix's salient features are:

- Portability,
- Object oriented (C++), modular code,
- Ergonomic feel (Qt library),
- Runs on all UNIX platforms,
- Accepts images of any size,
- Fast access to any part of huge images,
- Free access to the full dynamic range of data,
- Optimized for true color displays,
- Optimized for slow client/server connections,
- "Intelligent" blink (with up to 12 images).

2. Memory Management

Many programs are limited by the physical memory of the machine they use. To solve this problem, we decided to use memory mapping.
With this mechanism, the image file becomes a part of the process data segment and the OS handles all page swapping. The main advantage of this method is that no input/output functions (read, write, seek) are used so one can rapidly access any part of any image.

Tests have been done on two different machines and the results are presented in Figure 1 and Figure 2:

- XP1000 - 500MHz - 2GB RAM - RAID 5
- PII - 450MHz - 512MB RAM - SCSI 3

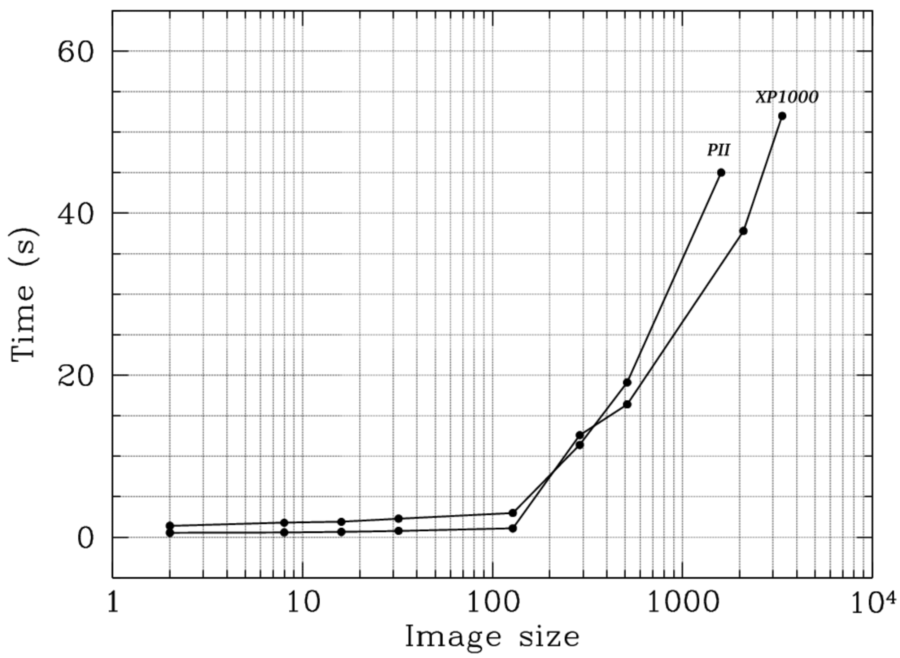

Figure 1. Maximum loading time.

3. Full Dynamic Range

Panorapix has permanent access to the full data dynamic range. In contrast to other program, it does not use a temporary buffer prior to image display: the exact data value of each pixel is converted to its screen value in real time.

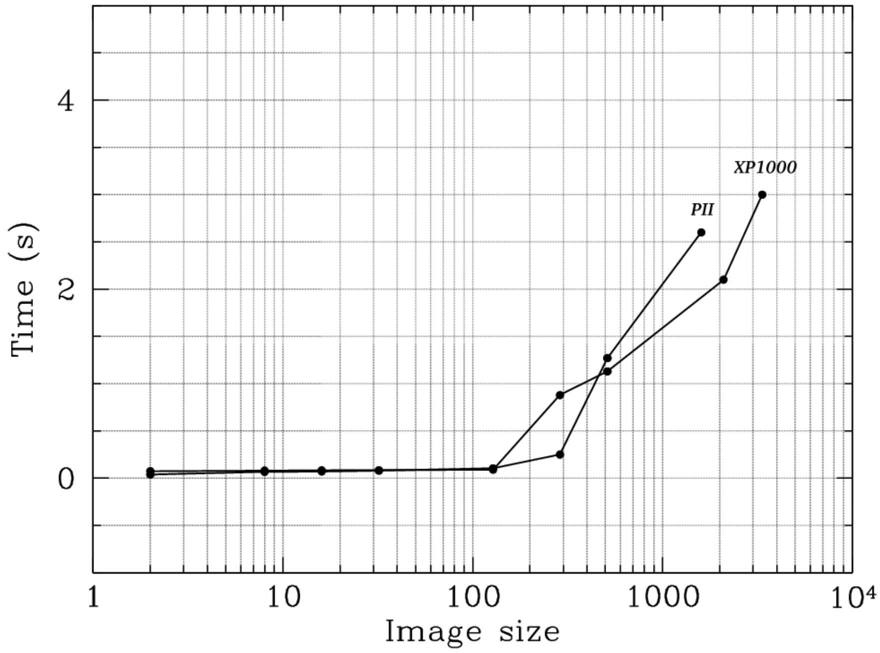

Figure 2. Maximum time to move from end to end.

4. Where to Get it ?

More informations and demonstration are available on TERAPIX web site: http://terapix.iap.fr/panorapix.