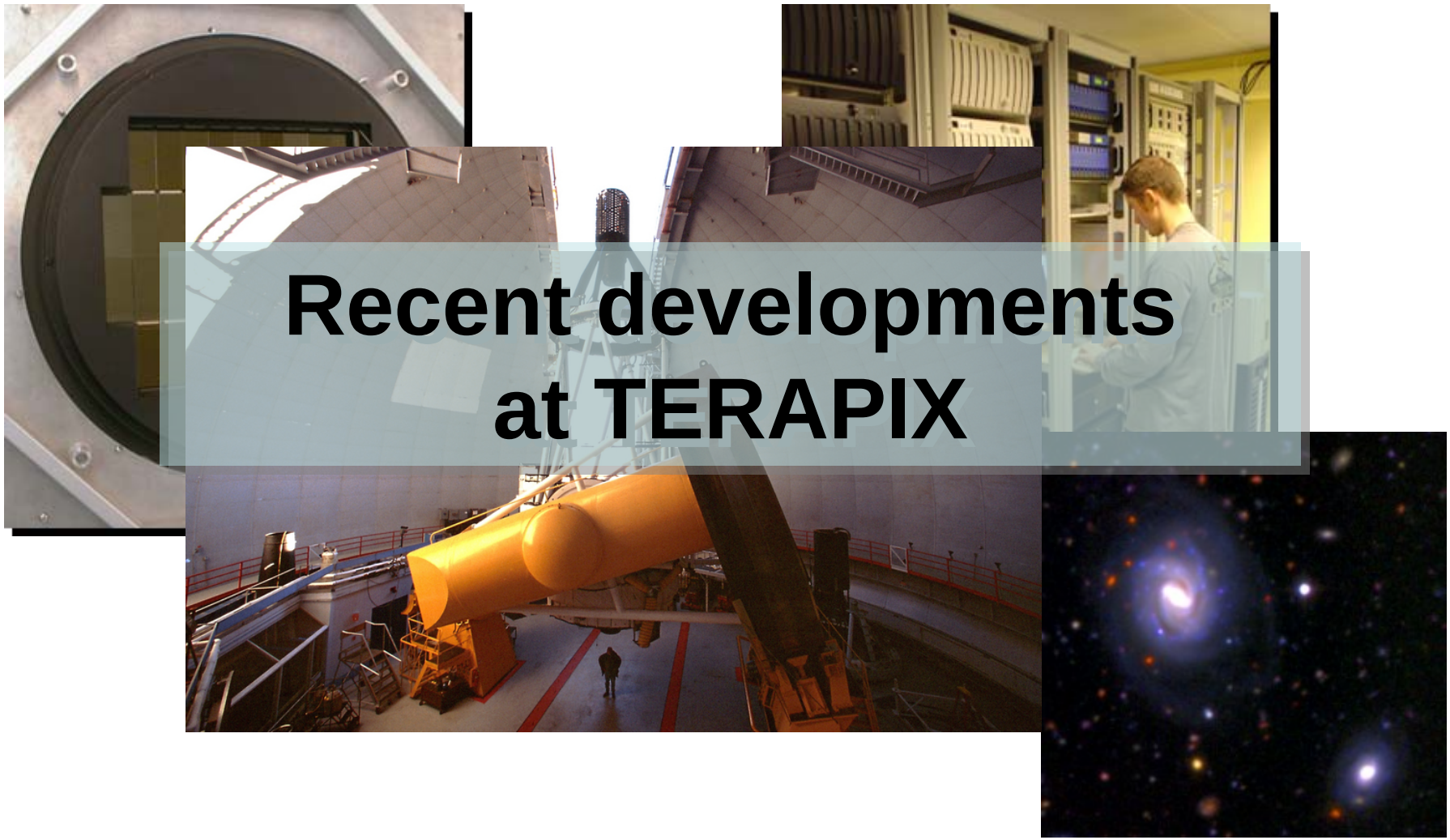


Recent developments at TERAPIX

E.Bertin (IAP), A.Baillard, M.Dantel-Fort, L.Domisse, F.Magnard, C.Marmo,H.J.McCracken, Y.Mellier, M. Schultheis, G. Sémah

Outline

- TERAPIX and the CHTLS
- Access to software and support
- Development plan
- New developments for T04
- Ongoing software developments (for T05)

The team at IAP

- 4 astronomers:
  - **Y.Mellier** (PI/PM), **E.Bertin (**PS/PM**)**, **H.J.McCracken** **M.Schultheis** (Besançon)
- 4 engineers:
  - **M.Dantel-Fort**, **F.Magnard, C.Marmo, G.Semah**
  - (Laurent Domisse left in April)
- 1 Ph.D student:
  - **A.Baillard** (EFIGI)

The tasks of TERAPIX

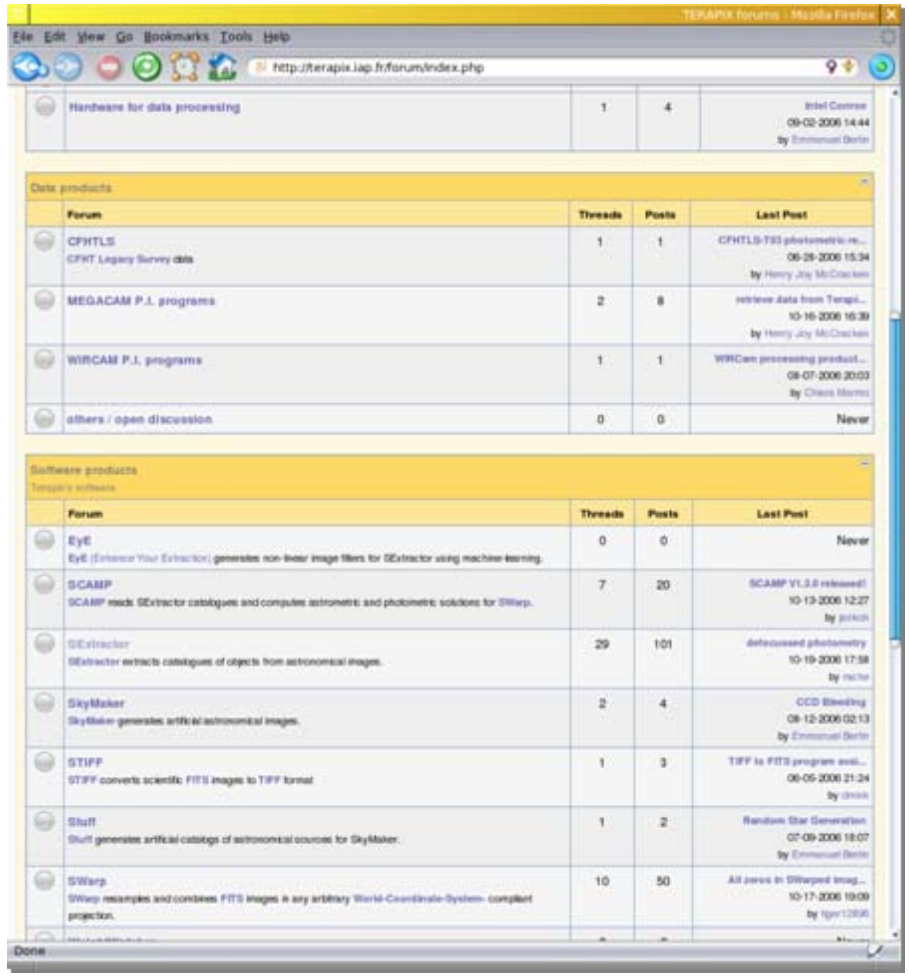
- Develop and distribute software tools required for the processing of MEGACAM and WIRCAM data
  - Pre-processing done at CFHT (**Elixir**)
  - TERAPIX software is developed in-house and can be used on various kinds of data
  - Released as Open Source to the community
- Produce and release calibrated, resampled, co-added images, weight maps and catalogs on a regular basis.
  - The 4th release is currently being processed
  - The achieved re-processing cycle time is about 12 months
  - Each release benefits from
    - Extended coverage
    - Complete re-calibration with increasing overlaps
    - Software upgrades and new features
- Provide support to members of the Canadian and French communities
  - Process P.I programs on request
- Manage data and hardware
  - Compute/storage farm of 26 bi-, quad-, and octo-procs for processing
    - 250 Gflops peak
    - Direct access to the data with 120TB of redundant storage
  - Cluster of 8 bi-pros available on request for data-intensive CFHTLS science

Access to software

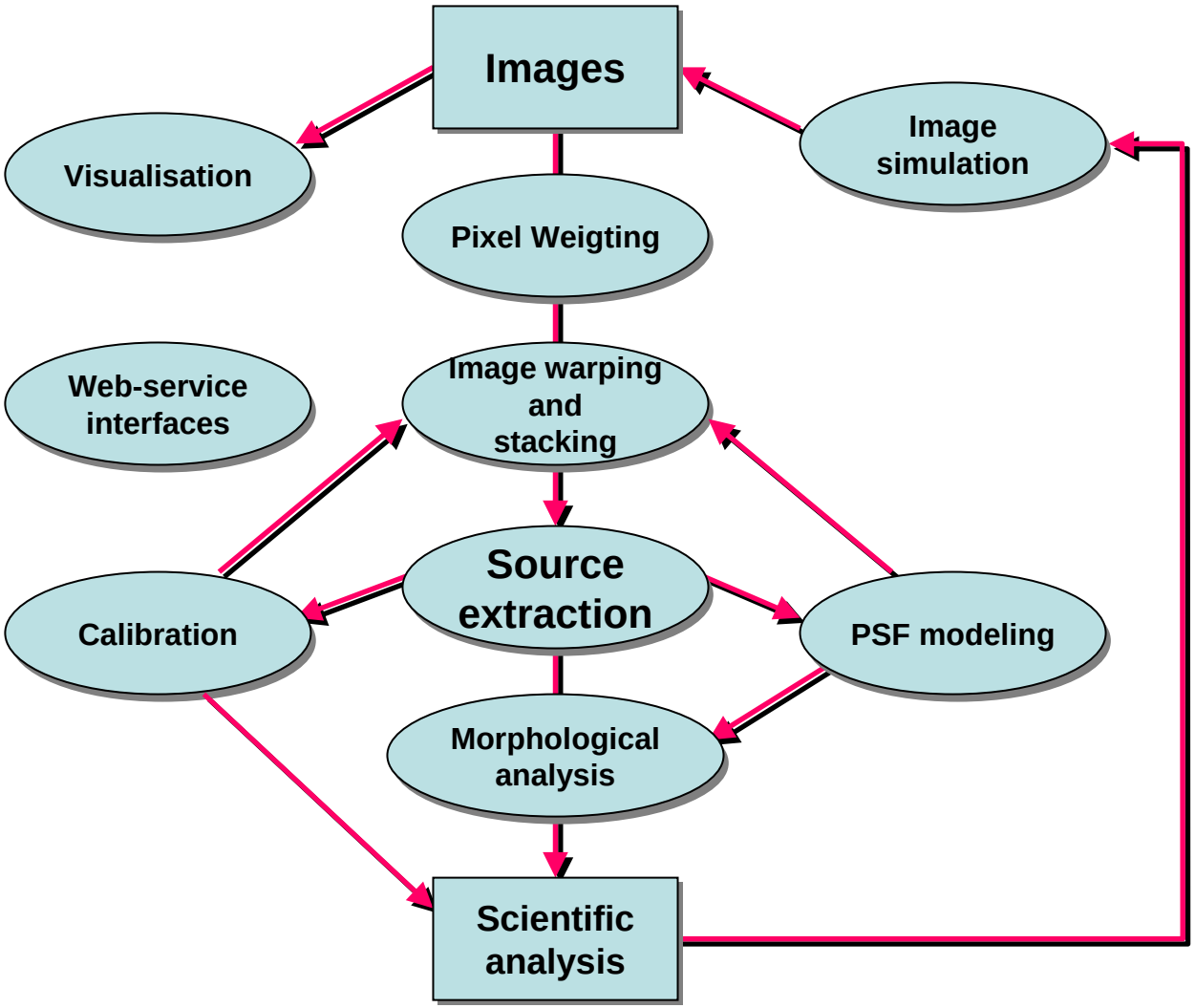
- What is distributed:
  - source packages
  - Binary, static Linux RPMs (both x86 32 et 64 bits, single and multi-threaded)
  - PDF documentation
- Public unstable versions:
  - accessible through our SubVersioN repository
  - http://terapix.iap.fr/wsvn
  - “on demand” re-packaging of intermediary versions

Getting help

- Discussion forums
  - http://terapix.iap.fr/forum
  - MEGACAM
    - CFHTLS
    - P.I.
  - WIRCAM
  - TERAPIX software
  - software for astronomy
  - hardware for astronomy
  - private forums
    - We can host your forum!

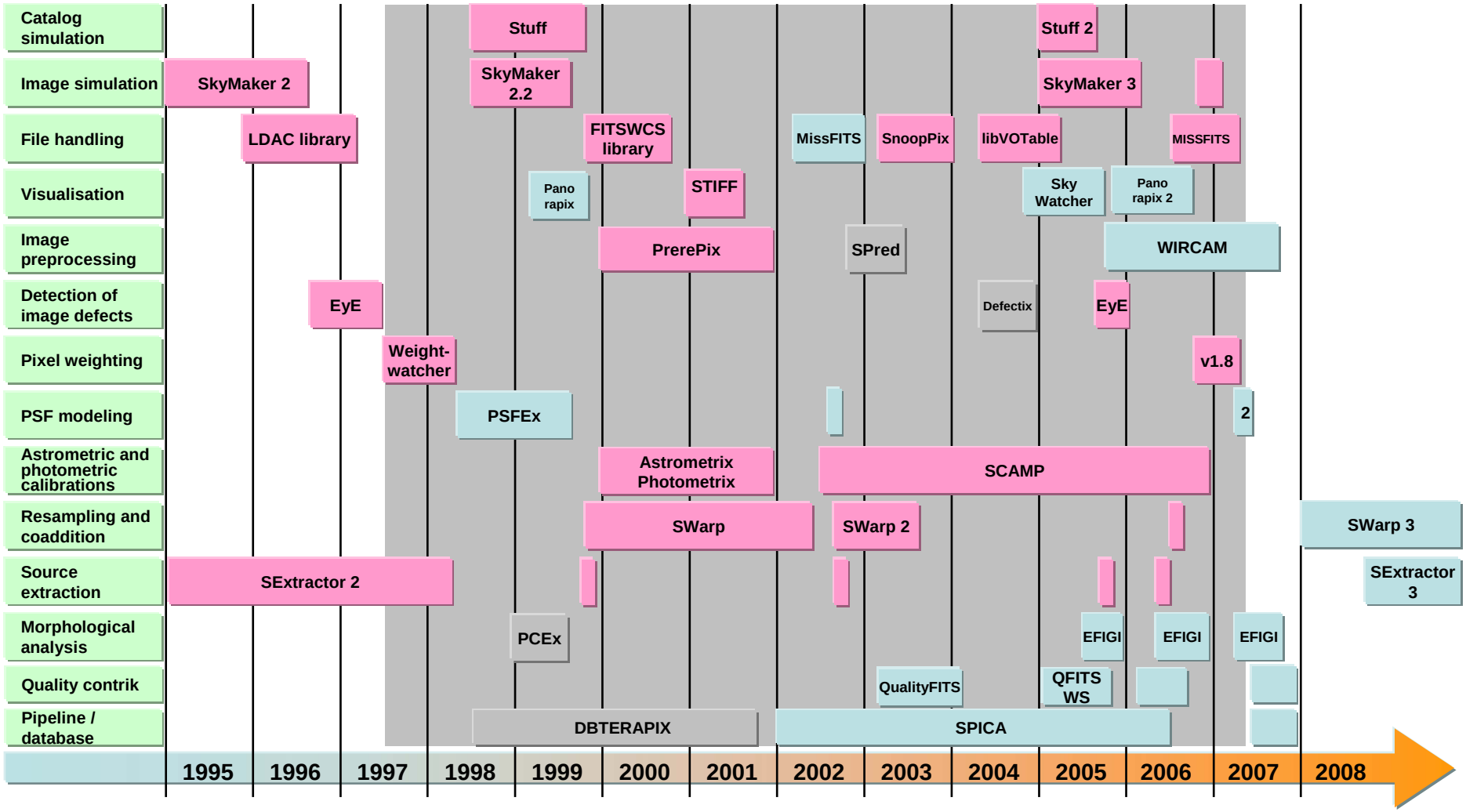


TERAPIX: An automated image analysis system



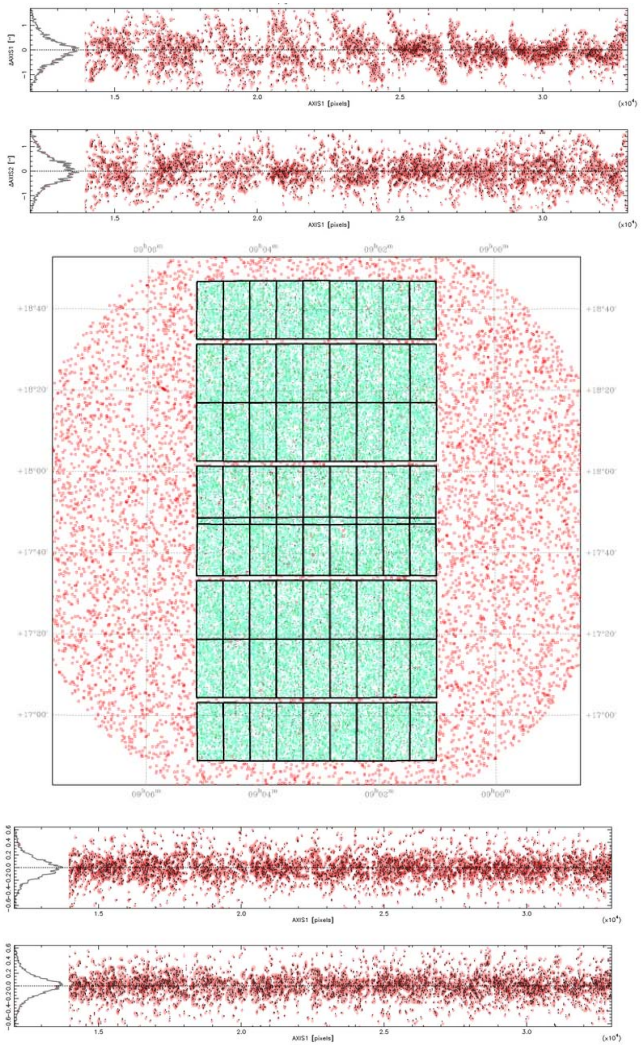
TERAPIX

Development plan



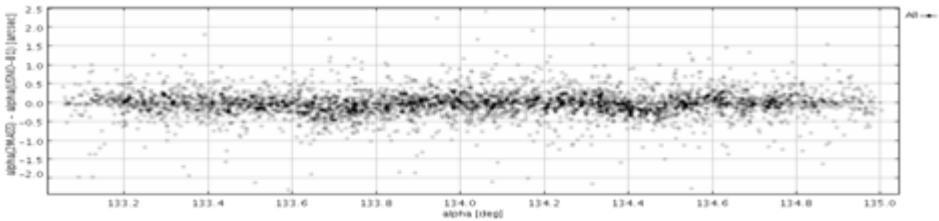
New developments for T04

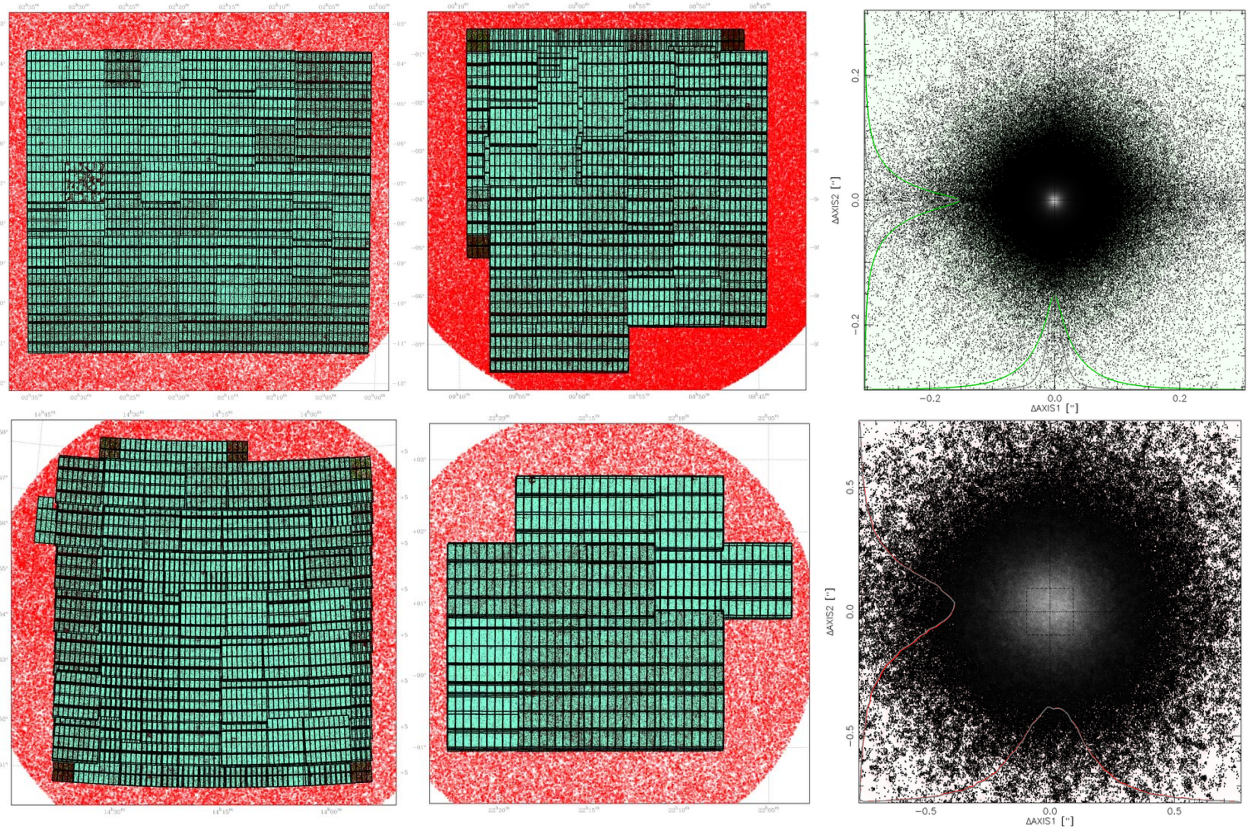
- SCAMP (astrometric and photometric calibration software): improve robustness of the existing approach
  - public release in 2006: testing by other users helped find bugs and improve algorithms
    - V1.2.1->1.3.8: recipes tuned to offer more robust behaviour in crowded fields and observing programs with poor dithering patterns.
    - WIRCAM processing (C.Marmo): very large number of exposures
    - used in various data challenges around the world
    - balancing between internal and external positional constraints
    - move to ICRS (at last)
    - Redistribute free parameters as the number of exposures increases



New developments for T04 (cont.)

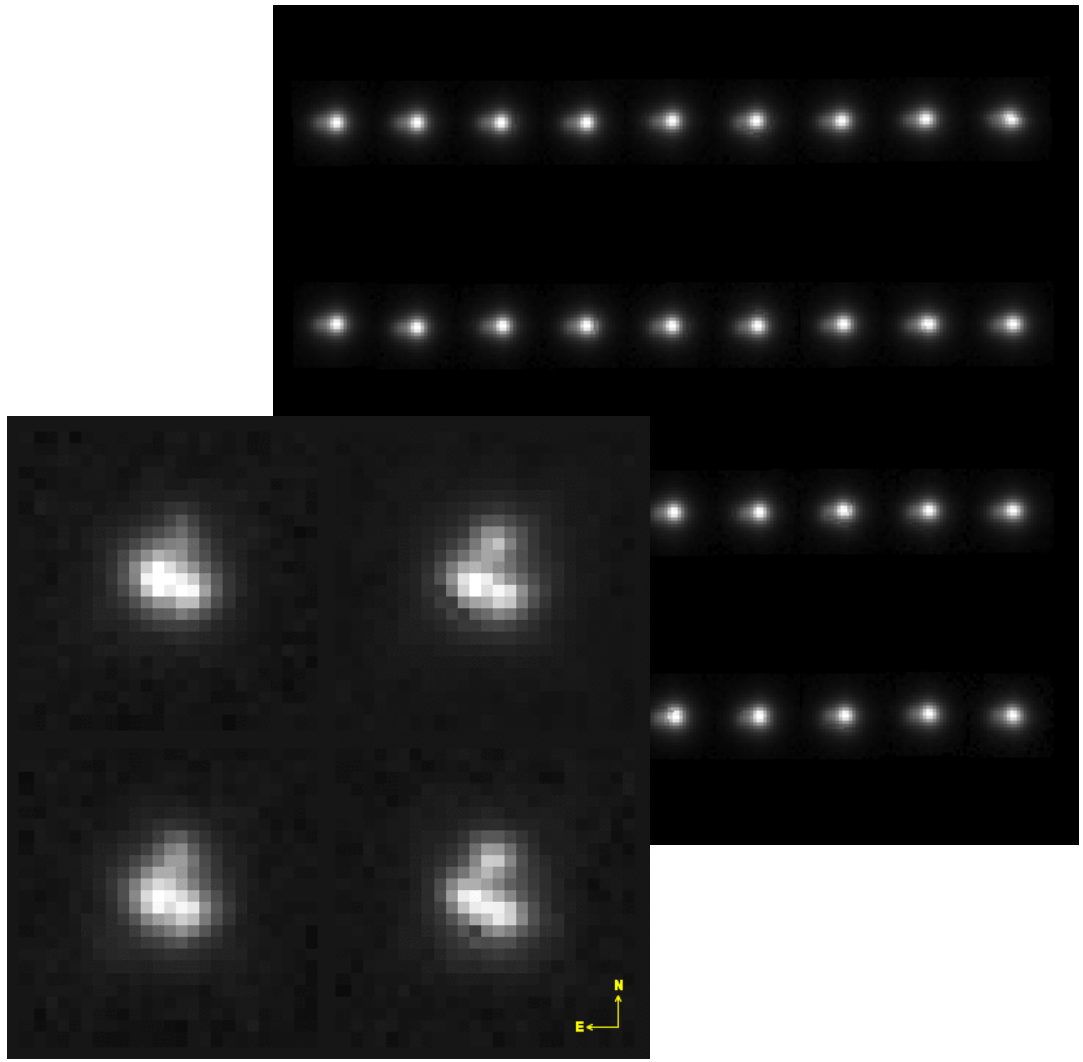
- Astrometric reference changed from USNO-B1 to 2MASS
- Astrometric stats in T04 - Wide:
  - Up to 34.10^6 sources used for solution and 48 instrumental “contexts”
  - Dispersion: (pairwise,3σ-clipped)
    - 27mas RMS internal for sources with S/N > 100
    - 0.23’’ RMS with respect to 2MASS
  - Systematics with respect to 2MASS ≤0.13’’





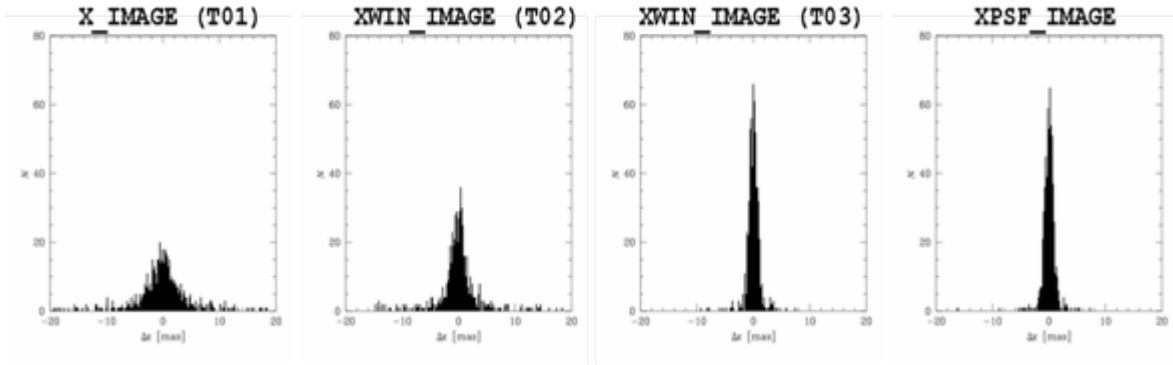
Ongoing software developments for T05

- Automated quality control
  - New PSFEx version
    - Will be released later this year
    - New metrics to track down bad PSFs (defocused, trailed, multimodal)
    - Works with undersampled data

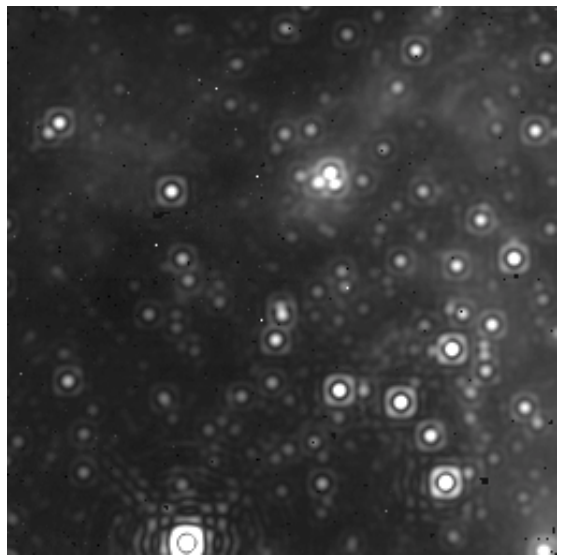


Ongoing software developments for T05 (cont.)

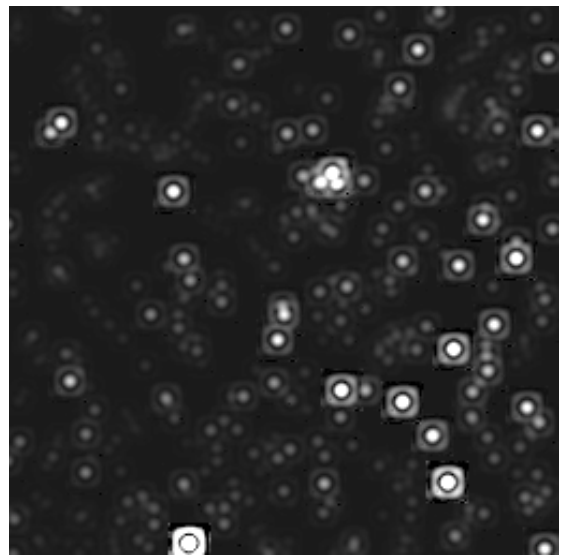
- PSF-fitting photometry
  - Mostly improve photometry
  - Improvements and testing contributed by Ph. Delorme (Grenoble)
  - Deblending issue: Extragalactic science vs galactic science



original

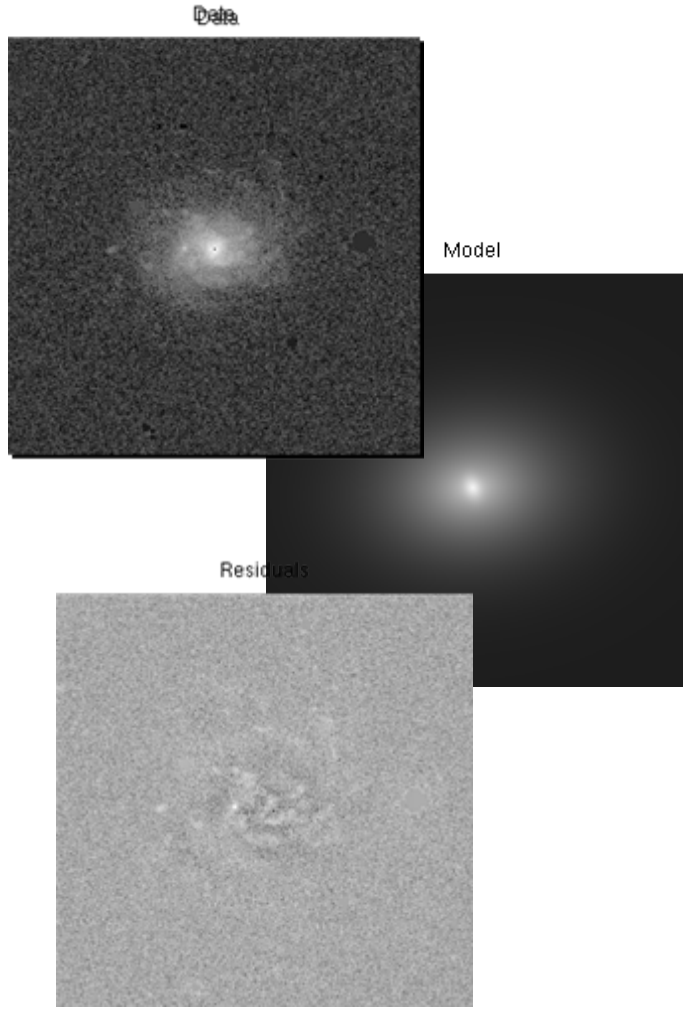


reconstructed



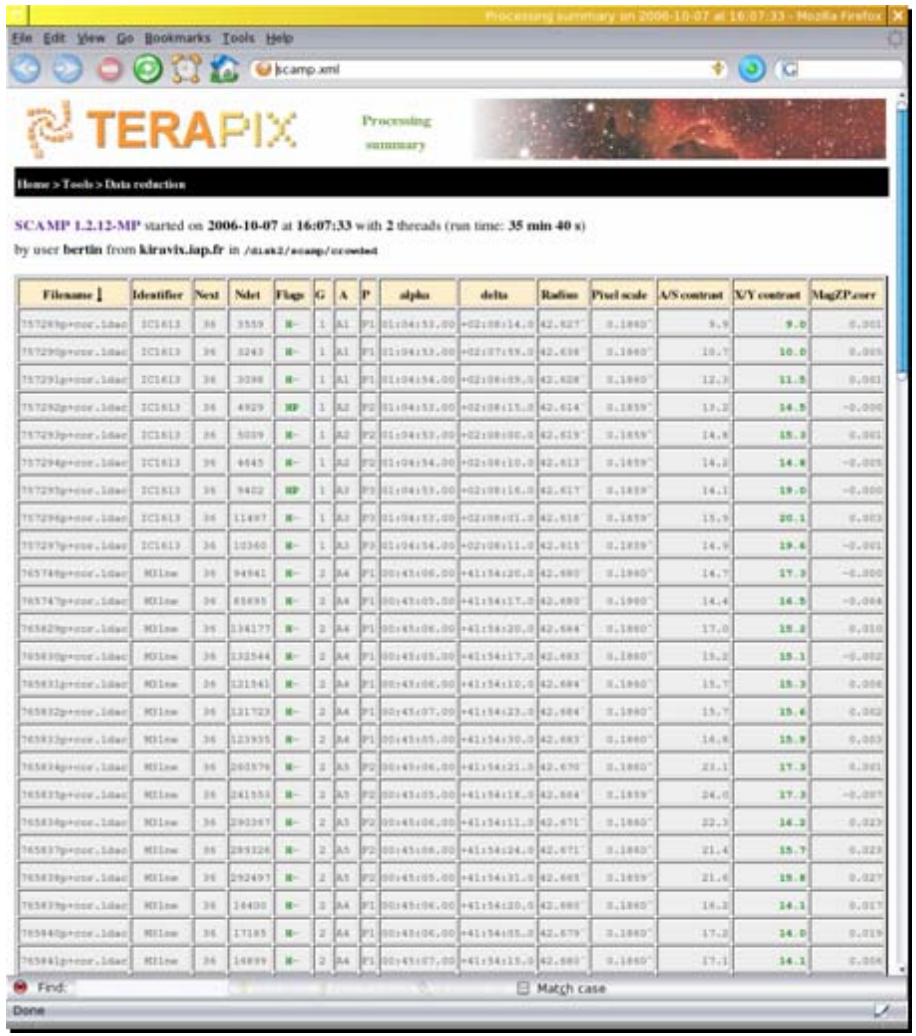
Ongoing software developments for T05 (cont.)

- Galaxy profile-fitting
  - PSF model available
    - varies smoothly over Deep and Wide stacks
  - Development done in the framework of the EFIGI project
  - Analytical profiles
    - Single Sersic
    - Sersic + exponential (12 free parameters)
  - About 10 (faint) galaxies per second per 2GHz core
  - Suitability for lensing studies needs to be assessed
  - Use for star-galaxy separation



Ongoing software developments for T05 (cont.)

- QualityFITS pipeline (automated pixel weighting / image diagnostic) moved to CFH
- New pipeline
  - Improved job balancing and data handling
  - Allow images from various imagers to be processed transparently
  - “shopping cart” model with full control on what is processed and what is not
  - Rely heavily on XML outputs from pipeline modules and the associated XSLT filters for visual checks and tracking of software configurations
  - More consistent use of flag maps



TERAPIX

terapix.iap.fr