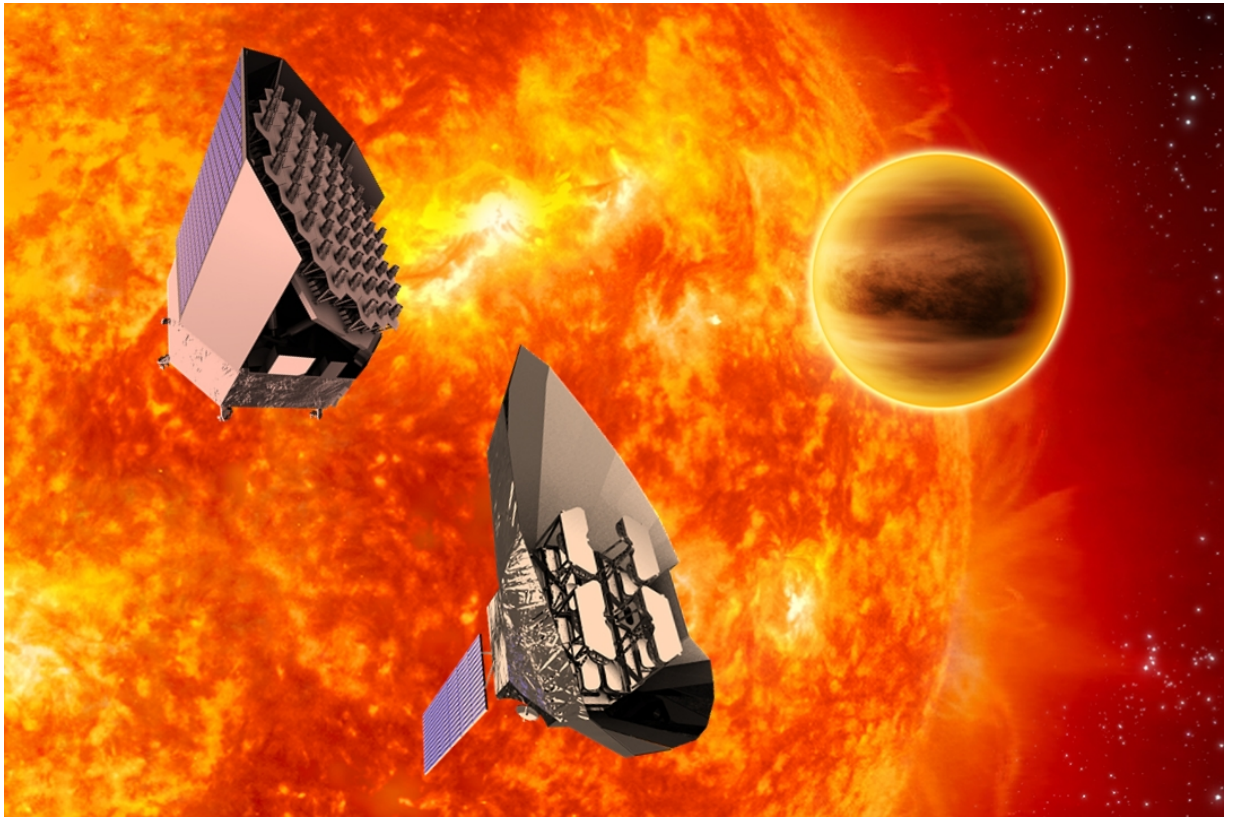
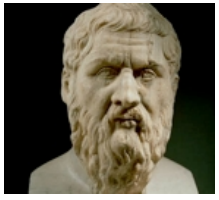
PDAAS: Exoplanet Analysis
Feedback from the parallel session



Nicholas Walton

(PLATO PDAAS Assessment Study Team)

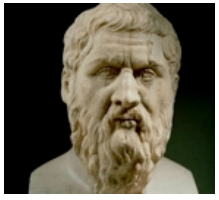
Institute of Astronomy
University of Cambridge



Exoplanet Analysis System (L2)
feedback from the parallel session

L2 exoplanet analysis work breakdown structure

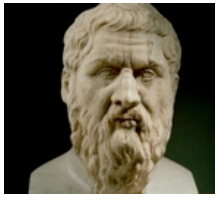
- Starting point: Wp12/Wp16 tasks in previous report
  - Considered Corot and Kepler experience
- Refined analysis of next level of tasks
  - Focussed on processing steps and points of interface to GB followup
  - Use of models and fitting in transit detection
- Developed an outline of the development and processing strategies: with dumps to MDB at each
- Concept of iterative processing and self calibration of data (thus minimising need for external data)



Exoplanet Analysis System (L2)
feedback from the parallel session

Key challenges in meeting science goals

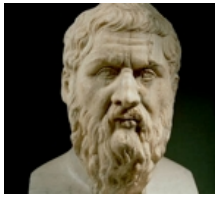
- Identified some major sources of noise
  - PSF, confusion, pixellation, centroiding, background, crowding
  - Need for ancillary data both internal (PLATO) and external (input catalogue and to be obtained)
- Many unknowns in processing chain to be handled in L1



Exoplanet Analysis System (L2)
feedback from the parallel session

Algorithms

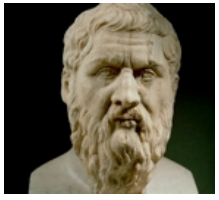
- Data flow rates and processing implications
  - Sample sizes considered
  - Possible requirement for independent processing chains on the NT and FT
  - Assessment required as to special needs for the faint and bright samples
- Assessment and definition of key transit detection s/w required (how many, development of new techniques).
  - Science group should recommend options
  - PDC to develop operational s/w
- In general – most L2 s/w techniques known



Exoplanet Analysis System (L2)
feedback from the parallel session

Requirements on input data from L0/ L1

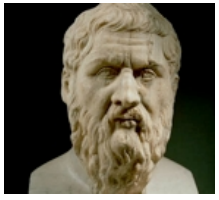
- Assessment of requirements on simulation data
  - Seen as required at an early stage in the development process
- Need for use of test data from other missions (e.g. Corot/Kepler) in the validation of algorithms
- Recommendation to maximise processing on the ground
  - Tradeoffs in images vs cadence
- Complexity in L1 – especially de-trending, accounting for red/ white noise



Exoplanet Analysis System (L2)
feedback from the parallel session

Integration of Ground Based data/ Gaia data

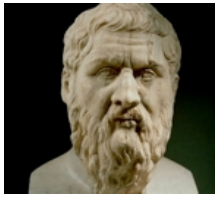
- Interface to followup identified at an early stage
- Use of GB data to provide priors in the initial transit search/fitting stage
- Output to GB with list of high value candidates
- Integration of GB data into analysis chain
  - Identification of planet systems
- Iterations with increasing data volumes
  - Over mission lifetime



Exoplanet Analysis System (L2)
feedback from the parallel session

Outputs to Archive

- Limited time for discussion, but …
- Iterative nature of the analysis requires main data base updating
- Issue of release schedules for the MDB to the archive



Exoplanet Analysis System (L2)
feedback from the parallel session

Actions

See slides from Laurent