CU6 - gwp650 : Single transit analysis - List of Work Packages

	Name of WP	Coordinator	Total FTE for the WP
• WP 01000	Manag., config manag. & interfaces	Viala, Obs. Paris (France)	0.1 MY/Y
• WP 02000	Definition of tests campaigns & Comp. alg. Perform.	Viala, Obs. Paris (France)	0.3 MY/Y
• WP 03000	Detailed functional analysis of single transit	Viala, Obs. Paris (France)	0.1 MY/Y
• WP 05000	Manufacturing of cross correlation masks	Royer, Obs. Paris (France)	0.2 MY/Y
• WP 06000	Coarse characterization of sources	Martayan, Obs. Paris (France)	1 (?) MY/Y
• WP 07000	Rad. and rot. vel. by CC with template/masks	Delle Luche, Obs. Paris (France)	0.6 MY/Y
• WP 08000	Rad. vel. by CC with template/masks in Fourier space	Frémat, Obs. Bruxelles (Belgium)	0.25 MY/Y
• WP 09000	Rot. vel. by Fourier transform	Frémat, Obs. Bruxelles (Belgium)	0.25 MY/Y
• WP 10000	Rad. and rot. vel. by minimum distance method	Blomme, Obs. Bruxelles (Belgium)	0.4 MY/Y
• WP 12000	Rad. and rot. vel. For multi-l by TODCOR-like method	Gosset, Inst. Ast. Liège (Belgium)	0.4 MY/Y
• WP 14000	Single transit : Detailed first look & validation	Désert, Inst. Ast. Paris (France)	0.5 MY/Y
• WP 15000	Science alerts	Désert, Inst. Ast. Paris (France)	0.5 MY/Y

Total number of people involved = 19

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Work packages not provided

- WP 04000 Overview of existing techniques for spectra analysis
- WP 11000 Rotational velocities by neural network
- WP 13000 Radial and rotational velocities for multi-l by spectrum substraction method

CU6 - gwp650 : Single transit analysis
Radial and rotational velocities determinations
(1) List of work packages delivering algorithms & software products

- WP 07000 Radial and rotational velocities by CC with template/masks in data space 0.6 MY/Y
  DelleLuche, Viala
- WP 08000 Radial velocities by CC with template/masks in Fourier space 0.25 MY/Y
  Frémat, Lobel
- WP 09000 Rotational velocities by Fourier transform 0.25 MY/Y
  Frémat, Lobel, Jankov (TBC)
- WP 10000 Radial and rotational velocities by minimum distance method 0.4 MY/Y
  Blomme, Post-doc (TBC)
- WP 12000 Radial and rotational velocities for multi-line spectra by TODCOR-like method 0.4 MY/Y
  Gosset, Rauw, Post-doc (TBC)

CU6 - gwp650 : Single transit analysis
Radial and rotational velocities determinations
(2) Cycle 2 : mid-oct-2006 - mid-may-2007
Deliveries

- Software Requirements Document. Deadline : 10 November 2006
  - What the software product does, determines, with which accuracy, etc.
- Software Design Document. Deadline : 8 December 2006
  - Description of mathematical methods (references)
  - Methodology (algorithms ?)
  - Structure of software products
- Software products. Deadline : 30 March 2007
  - Functional analysis (?)
  - Data model diagram (e.g. UML Diagrams) (?)
  - Software product itself : **Packages of java classes**. To be delivered to the CU6 data operating centre : CNES.
  - Implementation and integration at CNES
  - **Tests** of the software products : Performances Report Document (PRD) Deadline : mid-may-2007
  - Software product User Manual (USM) Deadline : mid-may-2007

CU6 - gwp650 : Single transit analysis
WP 02000 : Tests campaigns and algorithms performances
(1) General objectives

Participants : Viala, David, Bouchy, Gomboc, Prsa Total FTE = 0.3 MY/Y

- Principles
  - Software products dedicated to Vrad and Vrot determinations will be tested using the same set of data
    - Object spectra
      - at RVS resolution and and sampling
      - provided by CU2
    - Template spectra
      - provided by CU8
      - converted by CU2 1) to RVS resolution and 2) to the same format as the one adopted for the object
  - Performances, merits and drawbacks of the different software products (algorithms) will be assessed using this common data set

CU6 - gwp650 : Single transit analysis
WP 02000 : Tests campaigns and algorithms performances
(2) Operating modes

- Operating mode : cycles of 6 months
  - Define and list (and ask CU2 for providing) a complete set of objects covering all (?) possible(?) star characteristics :
    - Atmospheric parameters : Teff, log g, [Fe/H] (All spectral types and luminosity classes)
    - Radial and rotational velocities
    - Magnitudes
    - Reddening
    - "Exotic" spectral characteristics
  - Define the corresponding set of templates (requirements to CU8), also necessary for building correlation masks
  - Collect results (Vrad, Vrot, errors on them, correlation functions…) from the 5 dedicated software products developped in gwp650
  - Compare their performances, merits and drawbacks. Produce the Performances Report Document (PRD)

CU6 - gwp650 : Single transit analysis
WP 02000 : Tests campaigns and algorithms performances
(3) Operating modes

- Operating mode (continued) : Starting a new cycle of 6 months
  - Complete and upgrade the set of objects and templates
    - Extend range of object parameters
    - More and more realistic instrument modelling (psf, noises, instrumental response …)
    - More and more realistic description of the stars (also improves templates)
    - More and more realistic description of the sky
  - Iteration of the process
    - Collect the new results from software products
    - Compare, for each software, its performances with respect to the previous cycle (algorithm improvement suggestions ?)
    - Compare, for the current cycle, performances between the different algorithms leading to Vrad, Vrot. Merits and drawbacks versus object type and/or parameters.
    - Produce a performance report document (Assessment of gain (loss ?) from one cycle to the other)

CU6 - gwp650 : Single transit analysis
WP 02000 : Tests campaigns and algorithms performances
(4) Cycle 2 : mid-oct-2006 - mid-may-2007

- Set of object spectra provided bu CU2 (cf Paola Sartoretti's presentation)
  - 5 Spectral types : K0V, F0V, G0V, A0V and B0V
  - For each spectral type : 3 to 5 different magnitudes (no reddening)
  - Simple RVS modelling (Paola's talk), e.g. :
    - gaussian psf
    - constant dispersion (independent of wavelength and focal plane position)
    - Object spectrum =
      - Kurucz synthetic spectrum degraded to RVS resolution
      - + noises (background, Poisson, dark an total detection)
      - Random small wavelength shift of the whole spectrum
- Set of template spectra for the same spectral types at RVS resolution (Kurucz synthetic spectra) also provided by CU2

CU6 - gwp650 : Single transit analysis
WP 02000 : Tests campaigns and algorithms performances
(5) Cycle 2 : mid-oct-2006 - mid-may-2007

- For each spectral type/magnitude
  - Realisation of 1000 to 2000 object spectra all with Vrad = 0 km/s and Vrot = 0 km/s .
  - Each individual object spectrum consists in a 2 columns ascii file
    - 1st column : wavelength of the middle of the pixel
    - 2nd column : flux (photons/sample)
  - File name (and location) gives the object parameters (atmospheric parameters, magnitude)
  - All files are already put on the CU6 website : **http://wwwhip.pbspm.fr/gaia/cu6_cycle_2.html**
  - Each of the 5 dedicated algorithms (WP) computes the radial velocity of the object spectrum
  - Histogram of the 1000 (2000) Vrad determinations ==> error on radial velocity determination versus spectral type/magnitude for each dedicated algorithm
  - Comparison of algorithm performances, merits and drawbacks by mid May 2007

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Cycle 2 : mid-oct-2006 - mid-may-2007

•	WP 06000	Coarse characterization of sources Martayan	1 (?) MY/Y
•	WP 14000	Single transit : Detailed first look & validation Désert, Hebrard, Lecavelier	0.5 MY/Y
•	WP 15000	Science alerts Désert, Bouchy, Hebrard, Lecavelier	0.5 MY/Y

- Specification (prototyping) of the requirements of the software products
- Specification (prototyping) of the design of the software products
- Cycle 3 (mid-may-2007 - mid-nov-2007) deliveries :
  - Software Requirement document
  - Software Design Document
  - Software products (packages of java classes)
  - Implementation, integration of software products
  - Tests of software products (Performance Report Document)

Point to be clarified

- Software products dedicated to Vrad an Vrot determinations require (to be confirmed !) object (template) spectra which are :
  - Calibrated in wavelength
  - Normalized to the continuum
- Set of templates provided by CU2 are neither calibrated nor normalized
- This tasks are devoted to CU6
  - Wavelength calibration : gwp 630
  - Normalization to the continuum : gwp 620
- How do we proceed ?
  - Set of data provided by CU2 "processed" by CU6 gwps 620 and 630 before arriving to gwp 650

  Or, in the meantime :
  - Wavelength calibration and normalization to the continuum done by CU2, thus providing data immediately usable by gwp 650

Thank you
for
your attention !