

Interfaces: the WP12's point of view

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The WP 12 Data Products

Stellar Science Data Products (DPs): Submitted to requirements (SciRD)

<i>Product</i>	<i>Designation</i>	<i>Level</i>
Calibrated lightcurves and centroid curves	DP1	L1
Planet candidate transits and parameters	DP2	L2
Asteroseismic mode parameters	DP3	L2
Stellar rotation and activity	DP4	L2
Stellar masses and ages	DP5	L2
Confirmed planet systems and their characteristics	DP6	L2

Preparatory Data Products (PDPs): Input needed by the stellar pipeline.

- ✓ Generated before operations by WP 12.
- ✓ Stored in the PDC-DB.
- ✓ Not modified by the pipeline.
- ✓ Submitted to WP 12 internal requirements.

Intermediate Data Products (IDPs): Internal to the stellar pipeline.

- ✓ Appear as output and input of the pipeline modules.
- ✓ Submitted to internal requirements to WP 12.
- ✓ To be stored in the PDC-DB in order to ensure the reproducibility of the delivered results.

Additional Data Products (ADPs): Output of the stellar pipeline that are not data products

- ✓ Not submitted to any requirement.
- ✓ Stored in the PDC-DB for their scientific interest.

Before operations :

WP 12 will deliver the preparatory data products (PDPs) to the PDC-DB (or to the PIC) through the modules:

- **Module SteSci 1:** Classical parameters determination from preparatory data
→ Responsibility of WP 122 led by Thierry Morel
- **Module SteSci 2:** Stellar properties determination from preparatory data
→ Responsibility of WP 125 led by Jørgen Christensen-Dalsgaard

WP 12 defines, specifies and develops these modules, but it is unlikely to operate them.

→ These modules are not subject to requirements because they operate before operations

Before operations :

- **Module SteSci 1:** Classical parameters determination from preparatory data
→ Responsibility of WP 122 led by Thierry Morel

Determines stellar parameters, as accurately as possible, using non-seismic methods:

- spectroscopy, – spectral energy distribution (SED) fitting,
- infra-red flux method (IRFM), – interferometry,
- surface-brightness colour relations (SBCRs)

Why do we need to determine classical parameters within WP 122?

The stellar pipeline needs a homogeneous and precise determination.

inputs:

- interferometric, spectroscopic, (spectro-)photometric, and astrometric data from ground or space (e.g. Gaia)
- pre-computed grids of 1D/3D model atmospheres and synthetic spectra corrected, wherever possible, for non-LTE and/or 3D effects

output

- bolometric luminosity, radius, effective temperature, chemical composition, ...
- limb- and gravity-darkening coefficients

Before operations :

- **Module SteSci 1:** Classical parameters determination from preparatory data
→ Responsibility of WP 122 led by Thierry Morel

Determines stellar parameters, as accurately as possible, using non-seismic methods:

- spectroscopy, – spectral energy distribution (SED) fitting,
- infra-red flux method (IRFM), – interferometry,
- surface-brightness colour relations (SBCRs)

Interface issues:

With WP 11 (exoplanet science):

- What are the requirements for the planet-host candidates in, e.g., terms of precision for T_{eff} , chemical abundances, ...?
- Limb- and gravity-darkening coefficients: computed as part of pipeline on a star-to-star basis or provided as pre-calculated grids?

With WP 13/WP 34 (PIC) and/or WP 35 (Preparatory and Follow-Up Data Base):

- Update of stellar parameters in the PIC.
- Joint effort WP 122-WP 13 for collaboration with spectroscopic surveys.
- Feeding of PDC-DB with preparatory data: WP 34 or WP 35?
- Computations made by WP 122 to be transmitted to the PDC-DB/PIC or WP 122 provides the pipeline module to WP 35, which operates it?

Before operations :

- **Module SteSci 2:** Stellar properties determination from preparatory data
→ Responsibility of WP 125 led by Jørgen Christensen-Dalsgaard

Determination of stellar properties such as mass, radius and age from non-seismic constraints available prior to launch.

This implies classical methods for the determination of the stellar parameters: isochrone fitting for clusters, lithium, etc...

Why do we need to determine stellar properties before launch within WP 125?
The stellar pipeline needs good priors for further determinations in the stellar pipeline.

inputs:

- grids of pre-computed stellar models
- classical stellar parameters (e.g. T_{eff} , luminosity, $[M/H]$)

Outputs

PDPs: stellar properties (radius, mass and age) with full pdfs

Before operations :

- **Module SteSci 2:** Stellar properties determination from preparatory data
→ Responsibility of WP 125 led by Jørgen Christensen-Dalsgaard

Determination of stellar properties such as mass, radius and age from non-seismic constraints available prior to launch.

This implies classical methods for the determination of the stellar parameters: isochrone fitting for clusters, lithium, etc...

Interface issues :

With WP 13/WP 34 (PIC) and/or WP 35 (Preparatory and Follow-Up Data Base):

- Update of stellar parameters in the PIC.
- Benchmarks to be defined by WP 125500 to be included in PIC catalogue.
- Computations made by WP 125 to be transmitted to the PDC-DB/PIC or WP 125 provides the pipeline module to WP 35, which operates it?

With WP 14 (FU):

- Useful to regularly update PIC results for the FU ranking?