Centro de Estudios de Física del Cosmos de Aragón

CALL FOR LETTERS OF INTENT FOR SURVEYS WITH JST250 AT OAJ

1200 h	5 years	2027A

Deadline: **30 April 2026, 14:00 CET**

Letters of Intent should be submitted in PDF format to the following email:
JST250Surveys@cefca.es

1. SUMMARY

The *Centro de Estudios de Física del Cosmos de Aragón* (CEFCA, *https://www.cefca.es*) is a research center located at the city of Teruel (Spain). Its main goal is to operate the ICTS *Observatorio Astrofísico de Javalambre* (OAJ, *https://oaj.cefca.es*) and its scientific exploitation. All images acquired by OAJ telescopes are reduced, calibrated, and released to the astronomical community by the "Unidad de Procesado y Archivo de Datos" (UPAD), an essential infrastructure of the ICTS.

The OAJ, located at the Sierra de Javalambre, in Teruel (Spain), is aimed to lead large-sky multi-filter surveys of the Northern hemisphere over the next years. The OAJ consists of two main telescopes of large field of view (FoV): the 2.5m Javalambre Survey Telescope (JST250) and the 80cm Javalambre Auxiliary Survey Telescope (JAST80), with polychromatic, seeing-limited images in their unobscured FoV diameters of 3 deg and 2 deg, respectively. Both telescopes are equipped with panoramic instrumentation: the Javalambre Panoramic Camera (JPCam), with ~1.2 Gpix distributed in a mosaic of 14 large-format CCDs covering 3.4 deg² at the JST250 focal plane and T80Cam, at the JAST80 telescope, providing a 2 deg² FoV at the focal plane. The UPAD, a specific data center for the reduction, archiving and distribution of the large volume of data acquired at the OAJ (up to 1.5 TB per night when the two telescopes are in operation), completes the main OAJ infrastructures. It deploys a storage capacity of more than 5 PBs and a computing power of more than 500 cores with 3.8 TB RAM memory.

JST250 is devoted to conduct the Javalambre Physics of the Accelerating Universe Astrophysical Survey (J-PAS, https://www.j-pas.org), mapping thousands of deg² of the sky with a set of 54 narrow-band contiguous optical filters plus 3 broader ones. J-PAS is conducted with JPCam since spring 2023. The J-PAS Early Data Release (J-PAS EDR) with 12 deg² observed with all the J-PAS filters selected from the first year of observations were made publicly available in November 2024[1]. JAST80 is currently mostly devoted to conduct the Javalambre Photometric Local Universe Survey (J-PLUS, https://www.j-plus.es), with 12 narrow, intermediate and broad-band filters. J-PLUS survey started in November 2015 and recently released its forth data release[2] (DR4), covering nearly 5000 deg². Both J-PAS and J-PLUS will provide powerful 3D views of the Universe and unprecedented multicolor information for

[1] https://archive.cefca.es/catalogues/jpas-edr
[2] https://archive.cefca.es/catalogues/jplus-dr4

many fields of the Astrophysics that are being made publicly available to the community as legacy projects.

The OAJ belongs to the Spanish map of *Infraestructuras Científico-Técnicas Singulares* (ICTS). As such, the OAJ offers a fraction of its observing time as Open Time to the astronomical community through the modalities of Legacy Surveys, Regular Programs (RP), and Director Discretionary Time (DDT).

Following the survey spirit of the ICTS OAJ, and with the aim of maintaining the competitiveness of the facility in the next years, a specific open call for proposals (https://oaj.cefca.es/observingtime/cfp_legacy_surveys_jast80) was made public early 2022 for the definition of the second-generation Surveys to be executed with the JAST80. The selected proposals (https://oaj.cefca.es/observingtime/oaj_ls) started on 2023. In addition, a call for proposals for Shared-Risk Programs with JPCam at the JST250 telescope was issued in February 2025. Six projects were approved for observation[3]. The following competitive, open time call for proposals will be made public mid 2026 to define the second-generation, large Legacy Surveys with the JST250 Telescope.

In this context, CEFCA issues a **Call for Letters of Intent** for Surveys with the JST250[4] Telescope operating at the OAJ. Observations are expected to start in 2027A.

Eligible projects must be observed with the JST250 telescope and its large field of view imager JPCam[5]. Available filters can be used, these include the J-PAS filter system composed by 54 narrow-band filters contiguous and equally spaced between 370 and 920 nm, plus 2 medium-band filters at 350nm and 960nm (see Figure 1). Three broad-band filters are also available: gSDSS, rSDSS, and iSDSS. Projects requiring the development of different filters are also welcomed. **The total open time offered amounts to 240 hours per year and extends over five years of observations**.

The submission deadline for the Letters of Intent is **30 April 2026, 14:00 CET**, and should be submitted in PDF format to the following email: *JST250Surveys@cefca.es*.

All groups submitting a Letter of Intent will be encouraged to present and discuss their project during an open meeting at early June 2026, prior to the formal Request for Proposals process. This will allow the optimal observing strategies for each project to be assessed and tailored on a case-by-case basis, in discussion with the ICTS OAJ staff.

2. JST250

The JST250 telescope is a 2.55 m, F#3.5 alt-azimuthal telescope with a Ritchey-Chrétien-like configuration. The focal plane corresponds to a Cassegrain layout. The M1 and M2 mirrors have hyperbolic aspheric surfaces. The telescope is equipped with a field corrector, located beyond the central hole of M1. This field corrector consists of three lenses made of fused

[3] https://oaj.cefca.es/observingtime/approved_proposals_list?tel=2&offer=54&offerName=2025B-2026A_JST250-JPCam_RP
[4] https://oaj.cefca.es/telescopes/jst250
[5] https://oaj.cefca.es/telescopes/jpcam

silica, with four aspheric surfaces and diameters in the range of 500–600 mm. The two mirrors and the three lenses are designed to optimize the polychromatic image quality and maintain low distortion over the entire field of view, which has a diameter of 3 degrees (476 mm). A baffling system consisting of three conical baffles prevents stray light at the focal plane, whether from direct glimmer on the detector or unwanted reflections on M1 and M2. Overall, the JST250 provides an effective collecting surface of 3.89 m^2 (after accounting for the obscurations due to M2, the spider, and the baffles).

Because of the large field of view (FoV) and fast optics, the JST250 secondary mirror and the JPCam focal plane are actively controlled using two hexapod actuators: the M2 hexapod and the JPCam Actuator System. The M2 hexapod controls the secondary mirror, while the JPCam Actuator System -an additional hexapod- controls the cryogenic camera position. This system utilizes wave-front sensors located at the periphery of the cryogenic camera focal plane. The actuator system attaches the cryogenic camera to the telescope and provides the required focus and tip-tilt adjustments to compensate for telescope deformations caused by gravity and/or temperature variations. A software limit is set at 20 deg elevation, below which observations cannot be performed. Non-sidereal tracking capabilities are available.

3. JPCAM OBSERVING MODES AND FILTER SYSTEM

JPCam is a 1.2 GPixel panoramic camera mounted on the JST250. It is a direct imaging, large field-of-view (FoV) instrument designed to perform J-PAS. The camera consists of a 14-CCD mosaic using large-format, 9.2k-by-9.2k, 10 µm-pixel Teledyne-e2V detectors. JPCam is installed at the Cassegrain focus of the JST250, providing an unvignetted FoV of 3.4 square degrees with a pixel scale of 0.2267 arcsec/pixel. At the time of writing this document, the commissioning of the JPCam auto-guiding system is not completed so, for operational reasons, the longest integration time offered for a single exposure is 100 s, while the optimum maximum value is 60s. The 5σ limiting magnitude for a point source in a single 100 s exposure under optimal observing conditions is 23 mag in the iSDSS broadband filter and 21.6 mag in the J0660 narrowband filter. During the expected execution of the surveys (2027-2031), the auto-guiding system's commissioning will be completed, allowing for longer integration times. The minimum exposure time is 0.1s.

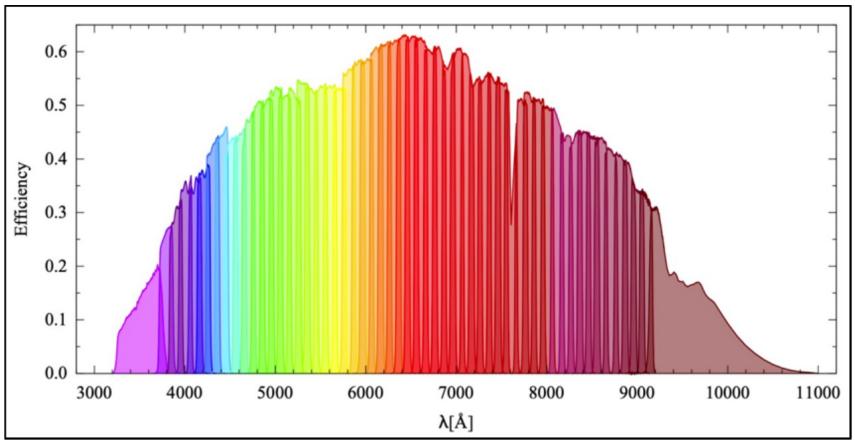

Figure 1: Measured transmission curves of the J-PAS filters including effects of the CCD quantum efficiency, the entire optical system of the JST250 telescope and sky absorption.

JPCam admits 5 filter trays, each of which has 14 filter holders, one for each of the CCDs. This system allows all J-PAS filters to be simultaneously installed on the camera, so no night-to-night filter exchange is required to execute J-PAS observations. However, additional filter trays can be exchanged during day-time if needed by other observation programs. Figure 2 shows the distribution of the narrow-band filters in Trays 1 to 4.

Figure 2: J-PAS filters distribution among JPCam filter tray assemblies from T1 to T4.

Name	CW (Å)	Width (Å)
uJava	3545.16	345.29
J0378	3796.72	147.53
J0390	3904.35	132.92
J0400	4007.05	136.80
J0410	4116.21	139.40
J0420	4209.93	141.16
J0430	4310.85	141.40
J0440	4408.62	143.66
J0450	4515.05	143.74
J0460	4608.91	143.95
J0470	4705.05	140.72
J0480	4808.56	140.71
J0490	4906.78	148.71
J0500	5005.77	148.39
J0510	5102.18	146.66
J0520	5208.42	149.27
J0530	5304.05	150.59
J0540	5397.35	149.54
J0550	5502.11	146.03
J0560	5604.63	148.23
J0570	5710.16	148.83
J0580	5811.75	146.34
J0590	5920.18	147.62
J0600	6010.29	148.38
J0610	6117.67	146.63
J0620	6209.24	147.18
J0630	6312.87	147.53
J0640	6410.68	146.51
J0650	6507.56	146.86
J0660	6607.63	148.55
J0670	6713.15	146.19
J0680	6810.86	146.51
J0690	6916.25	143.56
J0700	7008.56	146.00
J0710	7121.87	144.31
J0720	7212.05	145.13
J0730	7312.16	144.38
J0740	7416.10	146.84
J0750	7501.82	140.78
J0760	7599.48	121.91
J0770	7720.67	139.48
J0780	7808.15	141.48
J0790	7908.32	140.88
J0800	8007.07	140.45
J0810	8114.29	138.52
J0820	8216.72	139.89
J0830	8318.81	144.33
J0840	8410.94	146.73
J0850	8509.07	144.48
J0860	8598.06	146.20
J0870	8709.04	145.76
J0880	8819.03	145.39
J0890	8910.48	142.99
J0900	9003.26	140.91
J0910	9095.89	141.03
J1007	9590.54	619.54
gSDSS	4767.98	1206.30
rSDSS	6245.36	1373.40
iSDSS	7656.20	1399.82

Table 2: Main characteristics of the J-PAS and SDSS filters mounted on JPCam.

The standard available readout modes of the CCDs are be “mode 02” for g, r, and i filters, and “mode 03” for the rest of the filters, with the following characteristics:

	Mode 02	Mode 03
Filter Tray	T5, T6, T7 broad band (g, r, and i)	T1, T2, T3, T4 narrow band
Readout noise	$5.5e^{-}$	$5.5e^{-}$
Gain	$2.274e^{-}ADU^{-1}$	$2.274e^{-}ADU^{-1}$
Binning	1×1	2×2
Readout time	10.9s	6.1s

Table 1: JPCam standard readout modes.

A project may require observations that differ from the standard modes offered in this document and the previous section (e.g., different filter distribution, no filter, longer exposure times, different readout modes, etc.). DDT programs can be used to test the feasibility of non-standard modes for future time requests. In such cases, contacting the observatory staff (email to JST250Surveys@cefca.es) before sending the letter of intent is recommended to perform an initial assessment of the project’s feasibility.

4. JPCAM OBSERVING TOOLS

To help PIs prepare the best possible proposal, the OAJ has developed the following support tools.

JPCam Observing Planner

Different observational strategies arise from using T1 to T4, referred to as the narrow-band strategy, where each CCD observes a different filter, in contrast to using T5 to T7, referred to as the broad-band strategy. To design specific pointings for the area of interest for each project, OAJ has developed the JPCam Observing Planner (JOP), available at https://www.cefca.es/jop/plan/field.html.

Documentation has been created to describe these strategies (https://www.cefca.es/jop/plan/static/help.html) and to provide guidance on using the JOP tool.

Exposure Time Calculator

The depths reachable by JPCam can be obtained using the JPCam Exposure Time Calculator (JETC), available at https://www.cefca.es/jop/. We strongly recommend reading the documentation of the JETC carefully and using it to determine the exposure times required to achieve the scientific goals of interest.

An example of designing an observation for the nearby galaxy M101 is available here: https://oaj.cefca.es/doc/tac/observingtools/example_case.pdf.

5. OBSERVING TIME TO BE OFFERED IN THE NEXT CALL

CEFCA issues a **Call for Letters of Intent** for Surveys with the JST250 Telescope operating at the OAJ. A maximum of 240 hours per year during a 5-year period will be offered.

Eligible projects must fulfill the next set of requirements:

- Carried out with the JST250 telescope and its large field of view imager JPCam.
- Available filters can be used, these include the J-PAS filter system, and the SDSS g,r,i filters. Projects requiring a different set of filters are also welcomed. In this case, the Letter of Intent shall include a description of the proposed filters characteristics.
- Projects must **not exceed 240 hours per year**. The observation of a minimum of 75% of the TAC awarded time will be guaranteed by CEFCA.
- The length of the project shall be up to **5 years**.
- Available observing time includes dark, grey and bright hours in a 50%; 25%; 25% proportion, as well as both photometric (60%) and non-photometric (40%). Projects covering the different observing conditions are encouraged.
- At no time there will be more than 2 active surveys covering the same RA range, and two active surveys will be possible only if they do not require similar observing conditions (dark time, excellent seeing, etc.).
- Observations are expected to start in **2027A**. If the Survey requires new filters, the starting date will be accommodated to adjust to required filters availability.

6. DATA REDUCTION

CEFCA provides access to raw and/or reduced and calibrated (using the standard procedures developed for the J-PAS project) OAJ data through the UPAD/TAC-Data web service (https://tacdata.cefca.es/login). Additional developments in the reduction process and the calibration of the data shall be evaluated in a case-by-case basis.

Access to the project data, including images and catalogues, can be offered through the UPAD data access web portal (http://archive.cefca.es/catalogues) and via protocols of the Virtual Observatory. This possibility depends on the project details (filters, observational strategy…) and shall be evaluated in a case-by-case basis.

Additionally, web frontend services can be offered by CEFCA. This possibility also depends on the project details and shall be evaluated in a case-by-case basis.

7. DATA RELEASES

Given the expected Legacy Value of the awarded projects, a proposal for the Data Release Strategy and Data Proprietary Period will be required in the formal request for proposals.

8. RESEARCH GROUP REQUIREMENTS

Scientific exploitation of the awarded project/s shall be guaranteed. With this aim, the following requirements shall be fulfilled by the Research Group leading a project at the time of submitting a formal observing time proposal:

- The groups shall have access to the required computing and storage facilities to handle the project data. This may include UPAD services upon discussion with CEFCA.
- The groups shall have access to the required scientific and technical human resources to process and analyze the project data.

9. LETTERS OF INTENT FOR NEW JST250 LARGE PROJECTS

Letters of Intent shall include the scientific rationale, emphasizing the *Legacy Value* of the data, and an overall description of the observing strategy and filter system. In the case of new filters is needed, brief technical description will be welcomed.

10. NEXT STEPS

The expected main steps to start observations with the JST250 are:

- Letters of Intent submission deadline: **30 April 2026, 14:00 CET**.
- Open meeting to present JST250 Survey Mode and to discuss potential projects. Identification of Synergies: **June 2026.**
- Call for Proposals OPEN: **July 2026**
- Call for Proposals CLOSED: **September 2026**
- Awarded Surveys announcement: **November 2026**
- Agreements and Survey implementation: **November - December 2026**
- Beginning of observations: **January 2027**(*)

(*) *If the Survey requires new filters the starting date will be accommodated.*