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The Luiz Cruls Astronomical Observatory

An observatory at the University of Brasília

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Abstract. The Luiz Cruls Astronomical Observatory was established in 2007; however, due to difficulties with the dome, the inauguration was postponed and eventually took place on October 21, 2016, with funding from UnB, FAP-DF, and CNPq. It is equipped with various telescopes for nighttime astronomical observation, as well as solar telescopes for daytime observation. Its primary objective is to contribute to the astronomical knowledge of the academic community in Brasília.

Resumo. O Observatório Astronômico Luiz Cruls foi criado em 2007, porem com dificuldades na cúpula, a inauguração foi adiada, sendo feita no dia 21/10/2016 com recursos da UnB, FAP-DF e CNPq. Ele esta com diversos telescópios para observação noturna do céu estrelado e com telescópios solares para observação diurna. Tem seu principal foco, contribuir para o conhecimento astronômico da comunidade acadêmica de Brasília

Keywords. Telescopes – Light pollution – Site testing

1. Introduction

The Luiz Cruls Astronomical Observatory(OLC), shown in Fig. 1, initially focused on contributing to the astronomical knowledge of the academic community in Brasília, conducting night and day observations, and promoting astronomy education among University of Brasília (UnB) students, as well as assisting in scientific outreach in the region (Universidade de Brasília 2025a).

The construction of the observatory began in 2004 and was completed in 2007; however, due to difficulties in finishing the dome, its inauguration was postponed. With the revitalization of the observatory, it became possible to complete the dome and install a fixed telescope inside it. This phase was made possible with resources from UnB, FAP-DF, and CNPq. It was then inaugurated on October 21, 2016, featuring several portable telescopes and a larger permanent 16” Meade LX200 telescope Fig. 2.

The majority of observations are carried out from April to September, due to favorable local weather conditions. During there months, the sky is characterized by clarity and low humidity, which are optimal conditions for astronomical observation.

Figure 1. Observatório Astronômico Luiz Cruls (OLC)

2. Methodology

The methodology used in this work is based on a site characterization approach. The geographical coordinates and altitude of the OLC were determined using a handheld device (Garmin GPSmap76S receiver). The obtained coordinates were used to determine the observatory elevation relative to sea level.

The light pollution conditions at the observatory were assessed using data from the Light Pollution Map (2025) platform, which provides estimates of artificial night sky brightness based on satellite observations.

In addition, direct visual observations of the night sky were performed at the observatory site. Wide field images were acquired using a smartphone camera, and the horizon visibility was evaluated with an angle meter. This allowed the determination of the viewing angles in different directions and the sky conditions experienced during typical observing nights and days at the OLC

2.1. Equipment

The following telescopes are available at the observatory:

- Meade 16” ACF LX200 (1×)
- Meade 12” ACF LX200 (1×)
- Meade 10” ACF LX90 (1×)
- Coronado SolarMax II 90 (1×)
- Coronado Personal Solar Telescope (PST) (2×)

Sensors / cameras:

- Nightscape 8300 CCD (2×)
- Apollo-M Mini Mono Camera (IMX429) (1×)

The main telescope of the OLC is the Meade 16” ACF LX200 Fig. 2.

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Figure 2. Meade 16” ACF LX200

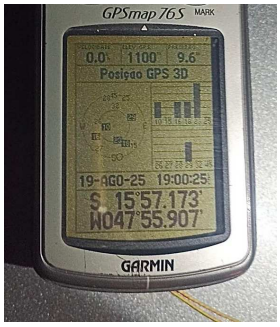

Figure 3. Location of the OLC using a GPSmap76S

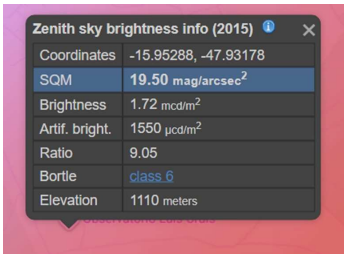

Figure 4. Characteristics of the OLC sky. Source: (Light Pollution Map 2025)

3. Results

3.1. Geographical location and altitude

The Luiz Cruls Astronomical Observatory is located at the Fazenda Água Limpa (Brasília, Brazil), an area of approximately 4,500 hectares (Universidade de Brasília 2025b), with the main focus on environmental conservation, making the site more suitable for astronomical observations near urban centers. The exact coordinates of the OLC is 15°57.173’ to the south and 47°66.907’ to the west, as it can be seen on the GPS device display in Fig. 3.

3.2. Light pollution

The night sky at the OLC is partially illuminated, as can be seen in Fig. 4. The Bortle scale is class 6, associated with a bright suburban area. Under these conditions, it is still possible to observe the Milky Way with some ease, but the sky is approximately nine times brighter than a natural sky.

The elevation indicated by the Light Pollution Map (2025) platform matches the result obtained in Fig. 4. This means that the location has 10% to 12% less air column compared to sea level, reducing light extinction and scattering.

(a) Eastward view at 0° above the horizon

(b) Westward view at 38° above the horizon

(c) Southward view at 21° above the horizon

(d) Northward view at 0° above the horizon

Figure 5. Night sky images obtained at the Observatório Astronômico Luiz Cruls (18 June 2025, 21:32 local time), showing the horizon visibility in different directions: (a) eastward, (b) westward, (c) southward, and (d) northward. The corresponding elevation angles above the horizon are indicated in each panel, highlighting the presence of artificial light pollution along the horizon.

3.3. Viewing angles

To better understand the horizon visibility of the Observatório Astronômico Luiz Cruls, the field of view at the observer’s height was measured using an angle meter in the Fig. 5.

4. Conclusion

This paper presents a characterization of the Observatório Astronômico Luiz Cruls, including its available instrumentation, the geographical location, light pollution conditions, and horizon visibility. The observatory is also open for conducting scientific research, teaching astronomy, and extension projects, serving not only the University of Brasília but also the broader Brasília community.

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They also extend their thanks to the collaborators from IF-UnB Astro Group and Rodrigo A. M. Cerda, whose efforts, as students, professors, and technicians, were essential in developing activities and strengthening initiatives related to the observatory.

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