



4th Announcement of Opportunity for Observing Time in the CHEOPS Guest Observers Programme

Policies and Procedures CHEOPS-EST-SCI-TN-012

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1. INTRODUCTION

This document informs potential users of the European Space Agency's (ESA's) CHaracterising ExOPlanet Satellite (CHEOPS) of the policies and procedures relevant to, and to be followed for, the preparation and submission of proposals requesting observing time in CHEOPS Guest Observers (GO) Programme through the 4th annual Announcement of Opportunity (AO-4). This is the definitive document for AO-4. Any information detailed in this document takes precedence over that presented in other documentation.

AO-4 marks the start of the annual announcements in CHEOPS' first extended mission (EM1) and covers observations during the period from 25 September 2023 until 30 September 2024.

Submitting observing proposals for CHEOPS is a two-step process:

- Phase I Phase I inputs are submitted through the dedicated Proposal Handling Tool for Phase I (PHT1 tool) at ESA. A Phase I proposal is made up of a scientific justification and a technical justification and implementation and includes target details and outputs from tools used in proposal preparation. Proposer information is only input into the online submission tool, and will not be shared with the Time Allocation Committee (TAC).
- Phase II Phase II inputs are required for proposals that have been awarded observing time. They are submitted through the dedicated Proposal Handling Tool for Phase II (PHT2 tool), which is provided and hosted by the Science Operations Centre (SOC) based at the University of Geneva and part of the CHEOPS Mission Consortium (CMC).

As of CHEOPS EM1, ESA strives for a double-anonymous peer-review for Phase I proposals. As such, proposers must not include information that could reveal their or their teams' identity into any of these documents or file names. Breaking this will lead to a rejection on formal grounds.

This document is organised as follows:

- Section 2 provides a brief introduction to CHEOPS;
- Section 3 gives an overview of the different categories of observing time;
- Section 4 explains constraints specific to this Call, including details of the Reserved Target List (RTL) and types of targets that can be observed with CHEOPS;
- Section 5 provides an overview of the tools and documentation available to aid the observer in their proposal preparation, together with a detailed description of the content required for the different elements of the Phase I proposal;
- Sections 6 and 7 give detailed descriptions of the proposal submission procedure and the ESA proposal evaluation/selection procedures, respectively;
- Section 8 provides a short description of the Phase II data entry required from PIs of proposals awarded CHEOPS observing time;
- Section 9 contains information on CHEOPS data products and proprietary periods;
- Section 10 summarises of how personal and intellectual data that is submitted in CHEOPS observing proposals will be used within the CHEOPS mission
- The appendix contains a list of key documents and website links for further information

Prospective proposers are advised to read all Sections of this document very carefully. Attention is drawn to Section 5.2 where the required contents of (and page limits for) individual elements of a proposal are detailed. Prospective proposers are strongly encouraged to monitor the following links regularly during the call:

Any updates will be posted on the webpages for the AO and its frequently asked questions (FAQ):

<https://www.cosmos.esa.int/web/cheops-guest-observers-programme/ao-4>
<https://www.cosmos.esa.int/web/cheops-guest-observers-programme/faq-ao>

Attention is also drawn to the webpages of the Discretionary Programme (DP):
<https://www.cosmos.esa.int/web/cheops-guest-observers-programme/discretionary-programme>
<https://www.cosmos.esa.int/web/cheops-guest-observers-programme/dp-approved>

Users must register to the CHEOPS GO Programme on the ESA Cosmos system to access the PHT1 tool and other necessary software. Details on how to request credentials are provided in Section 6.

Prospective proposers are reminded that the team supporting the GO Programme is small, in-line with the small-class mission status of CHEOPS. Whilst every effort will be made to respond quickly to questions raised in the framework of proposal submission, it is the responsibility of the proposers to get in contact way ahead of any deadline if support is needed.

1.1. Acronyms

AO /AO-4	Announcement of Opportunity/4 th AO
BJD	Barycentric Julian Date
CHEOPS	CHAracterising ExOPlanet Satellite
CST	CHEOPS Science Team
(C)TAC	(CHEOPS) Time Allocation Committee
CMC	CHEOPS Mission Consortium
Co-I	co-Investigator
DP/DT	Discretionary Programme/Discretionary Time
EM1/EM2	First/Second Extended Mission
ETC	Exposure Time Calculator
GO	Guest Observers
GTO	Guaranteed Time Observers/Observing
IOC(R)	In-Orbit Commissioning (Review)
ICRS	International Celestial Reference System
MOC	Mission Operations Centre
MJD	Modified Julian Date
M&C	Monitoring and Characterisation
NM	Nominal Mission
OR(s)	Observation Request(s)
PHT1	Phase I Proposal Handling Tool
PHT2	Phase II Proposal Handling Tool
PI	Principal Investigator
PS	Project Scientist
RTL	RTL
SOC	Science Operations Centre (University of Geneva)
UTC	Coordinated Universal Time

Table 1: Acronyms used in this document.

1.2. Foreseen timeline for the AO-4 Call

Date	Event/comment
4 April 2023, 12:00 (noon) CEST	AO-4 Call opens. GTO RTL of up to 50 targets is frozen and made publicly available. The Proposal Handling Tool for Phase I (PHT1) will be opened shortly after.
25 May 2023, 12:00 (noon) CEST	AO-4 Call closes. Double-anonymous peer-review starts.
19-21 June 2023	Meeting of the CHEOPS TAC.
14 July 2023 (foreseen by)	Announcement of accepted AO-4 programmes. PIs of all submitted AO-4 programmes will be informed of the status of their proposals in due course.
21 July 2023 (starting from)	PIs of accepted AO-4 programmes prepare their Phase II inputs, with reviews by ESA and SOC. First, PIs prepare and save (but not yet submit!) their observation requests (ORs; well in advance of 1 September 2023). Next, ESA and SOC review the saved ORs (by 8 September 2023). Finally, the PIs update and submit their ORs (well in advance of 15 September 2023).
25 September 2023 (starting from)	Start of observations from AO-4 programmes.

Table 2: The foreseen timeline for the 4th CHEOPS Announcement of Opportunity (AO-4).

2. INTRODUCTION TO CHEOPS

CHEOPS is the first mission dedicated to the search for exoplanetary transits through high precision photometry of individual, bright stars already known to host planets. The mission is a partnership between Switzerland and ESA with important contributions from 10 other ESA member states that make up the Swiss-led CHEOPS Mission Consortium (CMC).

CHEOPS was launched from ESA's spaceport in Kourou on 18 December 2019 as a co-passenger on a Soyuz rocket, with the early orbit phase culminating on 22 December 2019. In-orbit commissioning (IOC) started on 7 January 2020, and concluded with a successful IOC Review held on 25 March 2020. On this date responsibility for CHEOPS operations was handed over from ESA to CMC led by the University of Bern, Switzerland. This date also marked the start of the 3.5-year nominal mission (NM) lifetime, running from 25 March 2020 until 24 September 2023. Routine science operations began a few weeks after on 18 April 2020. ESA's Science Programme Committee meeting on 7 March 2023

approved a first mission extension (EM1) from 25 September 2023 until 31 December 2026, and an indicative second mission extension (EM2) from 1 January 2027 until 31 December 2029 (both contingent on ongoing commitments and confirmations from national contributors and partners).

The CHEOPS payload consists of a single instrument - a space telescope with a primary mirror with an effective diameter of 30 cm, which feeds a single CCD focal plane detector covering 330 – 1100 nm with a field of view of 0.32 deg². The payload design and operation has been optimised for ultra-high photometric stability and to achieve a photometric precision of, or better than, 20 parts per million (ppm) on the light curve of a $V_{\text{mag}} = 9$ G dwarf star ($T_{\text{eff}} = 5500$ K) in 6 hours, and 85 ppm or better on the light curve of a fainter $V_{\text{mag}} = 12$ K dwarf star ($T_{\text{eff}} = 4500$ K) in 3 hours. In both cases, these levels of precision are called for over periods of 48 hours and thus, together with high-cadence (from one image circa every 23 s to 1 image every 60 s) sampling, CHEOPS offers the capability to measure high-precision, high-cadence, broad-band light curves covering the visible-near infrared waveband.

Additional details can be found on the [ESA CHEOPS mission](#) website (A1) and in the CHEOPS mission paper (Benz et al., 2021, <https://doi.org/10.1007/s10686-020-09679-4>). The ESA CHEOPS mission website also includes a selection of recently published papers based on CHEOPS observations, the instrument performance, and photometric precision (see also links in the Appendix and Table 2 of Section 5).

For new potential observers, two short, introductory presentations have been prepared. These provide an overview of the mission and its capabilities and are a recommended starting point for those new to the mission as well as those wishing to update their knowledge of the latest performances. The presentations are available at the webpage '[Is Cheops for you?](#)' (A5).

3. OBSERVING TIME ON CHEOPS

3.1. Division of operational and science time

An estimated 10% of the total time in a year is top-sliced for two activities: (a) spacecraft- and instrument-related activities, such as satellite/instrument software maintenance and patching, satellite safe mode and recovery, and anomaly investigation; and (b) a dedicated Monitoring and Characterisation (M&C) programme that has been designed by the CHEOPS Science Team (CST) to establish the scientific performance and characteristics of the payload, and to monitor their evolution over the course of the mission lifetime. An overview of the M&C programme can be found in the [CHEOPS Observers' Manual](#) (A7) which is available on the [ESA CHEOPS GO](#) website (A2).

The time remaining in a year is referred to as nominal science observing time, or science time.

Note in the case that the top-sliced time used is either less than or more than 10% of a CHEOPS year, it will be either reassigned to or taken from the nominal science observing time according to the time split between the Guaranteed Time Observing (GTO) and GO Programmes described below.

3.2. Guaranteed Time to the CHEOPS Science Team

A major part of the nominal science observing time on CHEOPS, eighty percent (80%) in the NM and seventy percent (70%) in EM1, is dedicated to observations that are defined by the CST, and that are collectively referred to as GTO and/or the Core Observing Programme.

In the NM, the GTO programme covered six broad scientific themes in Exoplanet science:

- Finding transits of known exoplanets;
- Improving radii of known transiting exoplanets;
- Exploring systems in search for new exoplanets;
- Characterising exoplanet atmospheres;
- Uncovering new exoplanetary features;
- Stellar and planetary science relevant to the analysis/interpretation of exoplanet data.

In the EM1, the GTO will focus on 3 axes of maximum scientific return:

- Architecture of systems and structure of planets (Axis 1)
- Atmospheres and climates of irradiated planets (Axis 2)
- Deep characterisation of planets and their environments at the frontier of exoplanet science (Axis 3)

A share of the CHEOPS GTO ($\leq 15\%$) will be dedicated to building community synergies through the Synergy with other Missions (SoM) programme run by the Consortium.

A description of the GTO programme at the time of the opening of the various AOs can be found at this [link](#) (A8).

3.3. Guest Observers time

Of the nominal science observing time, twenty percent (20%) in the NM and thirty percent (30%) in the EM1 is available through the ESA-run GO Programme to the global science community to conduct investigations of their choice. The Programme is administered by ESA, using tools and an Observers Manual provided by the CMC. The GO Programme is split into two parts:

- (i) annual Announcements of Opportunity, i.e., calls for proposals (AOs; filling a minimum of 75% of the GO time) and
- (ii) the Discretionary Programme (DP; filling up to 25% of the GO time), to which proposals can be submitted throughout the year.

Details of the GO Programme can be found [here](#) (A2).

4. CONSTRAINTS AND CONSIDERATIONS FOR AO-4

When considering applying for observing time through AO-4, prospective CHEOPS users should consider the constraints and considerations that are detailed in this Section. Any additional information that is requested to justify decisions taken during proposal preparation should be included in the proposal. Failure to do so may result in a proposal being rejected.

4.1. Eligibility

AO-4 is open to the worldwide scientific community, regardless of nationality or institutional affiliation.

4.2. Observing period and available time

AO-4 covers the allocation of observing time/orbits (an orbit is circa 99 minutes in duration) during the period from 25 September 2023 to 30 September 2024. In exceptional cases, it may be possible to schedule observations only 1 week in advance, however this opportunity cannot be guaranteed. Additional orbits may be available in case of a very strong interest in/oversubscription of the AO Call. To facilitate the efficient scheduling of observations, up to a factor of approximately 32% more time than is physically available may be allocated during the AO Call.

4.3. Time requested

There is no maximum amount of time that may be requested in a single proposal.

There is an absolute minimum of 1 orbit per single pointing or “visit” (see Observers’ Manual). In cases where high photometric precision is required, the minimum recommended duration of a visit is 5 orbits. E.g., for a transit observation this would translate to 3 orbits before and 2 orbits after the transit, plus the transit duration itself. More details on this can be found in a presentation on the following [webpage](#) (A6).

An individual visit should be no longer than 100 orbits, which is set by the 1-week duration of the observing schedule (activity plan) that is uplinked to the spacecraft. Under exceptional circumstances it may be possible for an observation with a longer duration (e.g., longer than 1 week) to be scheduled by splitting it into two, contiguous visits. Such long visits have a significant impact on the CHEOPS schedule, however, and will be considered in very rare cases only.

4.4. Sampling/cadence

The maximum image cadence is dependent on the exposure time and the stacking order required to meet the available downlink bandwidth. A higher temporal sampling may be achieved through the processing and analysis of imagerettes which are not stacked (see the CHEOPS Observers Manual for further details).

4.5. Limiting target magnitudes

CHEOPS’ photometric performances are presented in the Observers’ Manual and can be explored further using the Exposure Time Calculator (ETC; see Table 3).

There is no bright limit to the magnitude of an object that can be observed with CHEOPS.

The photometric performance for observations of stars fainter than $G_{\text{mag}} \approx 11$ can vary a lot depending on stray light levels and background contamination, and users proposing targets at this magnitude or fainter can expect the photometric precision of the light curve products to vary, particularly in crowded fields. For such cases, a higher level of photometric detrending (not included in the data reduction pipeline) will be needed to extract the best possible performance from the data.

To get a feel for the precision that has been achieved it is recommended to search for observations of faint targets in the [Mission Archive](#) as many data sets are already public.

As faint-target observations may be carried out under conditions that could be detrimental to the scientific goal of the observations, proposals for objects that are much fainter $G_{\text{mag}} \approx 11$ will be considered at the discretion of the TAC.

4.6. Time criticality of observations

Both time-critical and non-time critical observations may be requested. Proposals for non-time critical observations that can be flexibly scheduled, and either broken up or extended to fill gaps between time-critical observations can also be submitted. A short explanation of why flexible scheduling is appropriate, together with a proposed approach, should be included in the technical justification.

4.7. Uncertainties in ephemeris

Target ephemerides are only required at the Phase II input stage (see Section 8). Once this phase is completed, updates are only foreseen in exceptional circumstances. Where possible, in case of time-critical observations, proposers should therefore allow for uncertainties in ephemerides (e.g., mid-transit times and orbital periods) when considering their observing time requests in Phase I.

4.8. Reserved targets (i.e., lines of sight), unreserved targets, and more

Please pay close attention, as there are several novelties as of EM1. Most importantly, there will only be 50 targets reserved for the GTO Programme. All other targets are open for GO proposals in AO-4 and for the DP in EM1. Due to this novelty in EM1, some special cases may appear (see below). If you have any questions, please contact the ESA PS (cheops-support@cosmos.esa.int).

All targets (i.e., lines of sight) and programmes of the GTO Programme are made available by the CHEOPS Science Team for the community via the PHT2 interface's [Target and Programme Information](#) page (A20), which can also be queried using the interface's [Target Checker](#) (A20). These tools give a full insight into whether targets are reserved, unreserved, or not part of any current GTO or GO programme. The pages also describe the scientific goals of the GTO programmes.

Case 1: A target is part of the GTO Reserved Target List (RTL).

- A target that is part of the GTO's Reserved Target List (RTL), which contains up to 50 targets, must not be included in GO observing proposals. The RTL is set and frozen with the AO-4 call opening (4 April 2023, 12:00 CEST) and will remain frozen until the AO-4 call closure (25 May 2023, 12:00 CEST). The RTL can be consulted at any time using the PHT2 interface's [Target and Programme Information](#) page and its [Target Checker](#) (A20). Both which will be updated with all information relevant for AO-4 on 4 April 2023, 12:00 CEST. Additionally, the RTL will be available in a csv formatted file from the [ESA CHEOPS GO](#) website (A2) on 4 April 2023, 12:00 CEST. Prospective proposers must check their targets again from this date onwards, even if they have recently checked them.
- The [Target Checker](#) (A20) will display the message: *“GO proposals for this target are not possible. This target (i.e., line of sight) is reserved by active GTO programmes.”*

Case 2: A target is part of an active GO programme.

- A target in scheduled/ongoing GO Programmes may still be available to new GO proposals if they address a different science case. However, in these cases it is strictly necessary to contact

the ESA PS before starting to work on a proposal. Submission of such a proposal without the permission of the ESA PS will result in rejection on formal grounds.

- The [Target Checker](#) (A20) will display the message: *“GO proposals for this target are welcome if they address different or additional science cases compared to active GO programmes. This target (i.e., line of sight) is part of active GO programmes. Before submitting a GO proposal, please contact the ESA Project Scientist (cheops-support@esa.cosmos.int). Please consult the CHEOPS Mission archive for past observations on this target.”*

Case 3: A target is not part of any active programme.

- A target that is not part of any active programme is available to new GO proposals for any science case.
- The [Target Checker](#) (A20) will display the message: *“GO proposals for this target are welcome and all science cases can be proposed. This target (i.e., line of sight) is not part of any active GTO or GO programmes. Please consult the CHEOPS Mission archive for past observations on this target.”*

Case 4: A target is part of an active GTO programme but unreserved.

- The GTO Programme will also contain many unreserved targets. These are completely open for all GO proposals in AO-4 and for the DP in EM1. The PHT2 interface’s [Target and Programme Information](#) page and its [Target Checker](#) will also identify these targets clearly. If there happens to occur a science case overlap of a GO proposal with already scheduled/ongoing GTO unreserved targets, then the ESA Project Scientist (PS) will liaise between both parties. First, the GO and GTO teams will be encouraged to collaborate and share resources. Both parties are fully free to decide against this, in which case both programmes may go ahead independently.
- The [Target Checker](#) (A20) will display the message: *“GO proposals for this target are welcome. While the target is already part of active GTO programme(s), it is not reserved and can be included in new GO programmes. If you have any questions, please contact the ESA Project Scientist (cheops-support@esa.cosmos.int). Please consult the CHEOPS Mission archive for past observations on this target.”*

Case 5: A target is part of active GTO and GO programmes but unreserved.

- This is a rare mixture of Case 2 and Case 4, which can only occur if there are already shared GTO and GO programmes running.
- The [Target Checker](#) (A20) will display the message: *“GO proposals for this target are welcome if they address different or additional science cases compared to active GO programmes. This target (i.e., line of sight) is part of active GTO and GO programmes but is not reserved by the GTO programme. Before submitting a proposal, please contact the ESA Project Scientist (cheops-support@esa.cosmos.int). Please consult the CHEOPS Mission archive for past observations on this target.”*

A target is no longer reserved when all requested observations for the target have been completed. Thus, a small number of targets that appear on the RTL at the AO-4 opening may become available again before the AO-4 closure. Moreover, many targets may become available again during the following observation cycle for the DP. The online tool must therefore always be checked, as it provides the definitive status of a target.

The only way in which a targets’ availability might become slightly constrained during the AO-4 opening is if it is added to the GO Programme via the DP before the AO-4 closure. This route is restricted to proposals with a single target

- a) for which observations are required to be scheduled between the AO-4 opening (4 April 2023, 12:00 CEST) and the end of the NM (24 September 2023), and

- b) that has either been newly discovered/published or newly declared to be of high scientific interest.

Failure to meet these criteria will result in an automatic rejection of DP proposals on formal grounds. Further details on the DP and the requirements that a proposal must meet may be found on the ESA [CHEOPS DP website](#) (A12).

Potential proposers preparing proposals for AOs should consult the ESA CHEOPS GO website, in particular the webpage listing [successful DP proposals](#) (A13).

4.9. GO proposals for targets previously observed by CHEOPS

Prospective proposers should contact cheops-support@cosmos.esa.int in cases where the target of interest is not reserved, but for which there are existing observations in the CHEOPS archive mission (even if proprietary). A very brief summary of observations that have been made will be provided to include the name of the target, the type of observation (transit, occultation, phase) and the number of visits. Justification for the additional observations beyond those in the archive needs to be included in the observing proposal.

4.10. Coordinated observations with other facilities

Routine coordinated observations with other facilities are not yet foreseen with CHEOPS. They may, however, be considered in exceptional cases and will be executed on a best-efforts basis.

4.11. Solar system objects

Solar system objects may be observed with CHEOPS, however there are important caveats:

- CHEOPS uses sidereal tracking only and thus cannot track Solar System objects. The resulting static coordinates (in RA and Dec) that are needed to prepare the detailed observation requests mean that such observations can become highly time-critical and limit significantly the period for which such observations can be executed.
- Observations of stellar occultations by, e.g., trans-Neptunian objects, are possible, however require a very precise knowledge of the position of the occultation in the sky relative to the CHEOPS orbit. It is the responsibility of the proposer to determine this. Such programmes introduce significant complexities and will be done on a best efforts basis.

5. PHASE I PROPOSAL PREPARATION

The content of a Phase I proposal has been designed to enable a thorough scientific and technical evaluation of the proposed observations to be made. A short summary of the tools and documents available to support proposal preparation is provided in Section 5.1. This is followed by a detailed description of each Section/component of a Phase I proposal in Section 5.2.

All material must be written in English using a minimum font size of 10 pt, A4 portrait paper format and 1.5 line spacing. Where applicable, page limits for the individual components are noted in Section 5.2. All documents need to be submitted as pdfs, where individual files must not exceed 50 MB. Note that



non-compliance with instructions given in this Section will result in rejection of the proposal on formal grounds.

Word templates for the scientific justification, and for the technical justification and implementation can be found on the webpage for the AO. The equivalent formats should be used when preparing proposals using any other software package.

5.1. Tools, aids and documentation for proposal preparation

Several tools and documents have been developed by the CMC to aid the CST with their preparations for observing with CHEOPS. These are made available to the Community to facilitate their preparation of proposals. A summary of these, together with some AO specific material and overview presentations, is given in Table 3. Further details on the tools are given in the Observers’ Manual.

Tool/Aid/Documentation	Description
Observers’ Manual	<p>The manual provides the point of reference for all aspects of the mission. It includes a comprehensive overview of CHEOPS, a detailed description of the instrument and operations, and examples of simulated data. The latest issue of the manual is available here (A7).</p>
Target Checker	<p>With the start of EM1, the GTO Programme’s RTL contains only up to 50 targets. All other targets are open for GO proposals.</p> <p>The status of all targets can be checked via the PHT2 interface’s Target and Programme Information page and its query tool, the Target Checker (A20). The tool indicates whether a target is on the RTL, part of an existing programme but unreserved (i.e., open for GO proposals), or not part of any existing programme (i.e., open for GO proposals).</p> <p>SIMBAD is used to retrieve/resolve the coordinates of named targets. You are advised to always double check the targets’ status by using the target coordinates, not the target name, as not all target names (e.g., TESS Objects of Interest) are resolvable.</p>
Scheduling Feasibility Checker (SFC)	<p>The tool is used to check whether and when a target is visible to CHEOPS, and to help assess the impact that interruptions due to passage through the South Atlantic Anomaly and Earth Occultation have on target visibility and observing efficiency. It should be noted that the level of interruptions can differ from those achieved due to changes in orbital parameters, and so are indicative only.</p> <p>Details of the periods of target visibility need to be included in the Technical Justification.</p> <p>The tool requires the download and installation of a virtual machine platform, together with an image of the server/client</p>



	<p>interface. Instructions on how to install and use the tool are provided here.</p> <p>For security reasons, the password needed to download the image is on a webpage which requires the user to be logged in to the Guest Observers Webpage and to be a member of the Guest Observers Group. Credentials can be requested following instructions on the AO webpage.</p>
Exposure Time Calculator (ETC)	<p>Used to calculate the predicted photometric precision that can be achieved in a given integration time, and found at this link (A19). The results of the ETC can be exported to pdf and are required input to PHT1.</p>
Proposal Handling Tool for Phase II (PHT2)	<p>Used to generate and submit detailed observation requests, which are only required for <u>proposals that have been awarded time</u>. A short introduction to Phase II proposal preparation and submission process is given in Section 8, with detailed instructions provided in the CHEOPS Observers Manual and to PIs awarded CHEOPS observing time.</p>
Data	<p>The primary source of CHEOPS data is the Mission Archive.</p> <p>There is also a dedicated webpage (A3) providing details of a selection of CHEOPS data that is available. This includes simulated data, reference/calibration files used by the data reduction pipeline, and selected CHEOPS observations.</p>
Visibility maps	<p>Monthly and annual visibility plots showing the sky accessible with CHEOPS. These are available in the CHEOPS Observers Manual in graphic form, as well as in electronic form/ascii data files via a link in the “useful data” Section on the AO webpage.</p>
Instrument performance	<p>Presentations are available from a dedicated webpage (A6).</p> <p>This includes tips and recommendations from the CHEOPS Science Team on calculating the time required for CHEOPS observations; and how to structure visits; experiences of the CHEOPS Science Team in combining multi-epoch data; systematics in CHEOPS data.</p>

Table 3: Summary of the tools, documents and information provided by the CMC to support the Scientific Community with preparing their proposals.

5.2. Components of a Phase I proposal

There are three components to a Phase I CHEOPS observing proposal: the scientific justification and the technical justification and implementation which are detailed below, and inputs to the on-line proposal submission tool which are detailed in Section 6.

5.2.1. Scientific Justification

The main part of the scientific justification must be strictly anonymous to enable double-anonymous peer-review. No information that could identify the proposing team's names, affiliations, or other characteristics is allowed. References must be given in a neutral way, e.g., instead of "We have previously shown..." one should use "XYZ et al., 2023, have previously shown..."

The Scientific Justification shall include the following information, in distinct sections:

- Description of the proposed programme (max. 2 pages), to include:
 - a. Title of the proposal*
 - b. Science goals: questions to be addressed by the observations proposed, to include a clear description of how CHEOPS observations will advance the state of knowledge in the area covered by the proposal.
 - c. Why CHEOPS: to include a clear description and justification for the functionality and performances of CHEOPS that will enable the science goals of the programme to be achieved.

An additional max. 0.5 page is allowed *solely* for tables and figures, if required.

- A concise description of the data reduction/analysis plan (max. 1 page)
- On a separate page, a concise management plan (max. 1/2 page) with a short summary of:
 - a. Team background: List of co-Is (including Name, Institution, Country) together with a short description of the track records of the team.
 - b. Team roles: description of the tasks to successfully complete the science objectives, together with assignment of team roles and responsibilities.

The completed file needs to be uploaded into PHT1 in the form of a pdf no larger than 50 MB (strictly enforced). All items marked with an asterisk (*) must match the PHT1 inputs exactly.

Note that proposals exceeding the limits noted above will be rejected on formal grounds and will not be reviewed further.

5.2.2. Technical Justification and Implementation

The technical justification and implementation is made up of three individual components described below. The three individual files need to be uploaded into the PHT1 tool in the form of pdf, each with a size no larger than 50 MB (files larger than this will be rejected by the tool). All items marked with an asterisk (*) must match the PHT1 inputs exactly.

5.2.2.1. Technical Justification and Implementation case

The main part of the Technical Justification and Implementation must be strictly anonymous to enable double-anonymous peer-review. No information that could identify the proposing team's names, affiliations, or other characteristics is allowed. References must be given in a neutral way, e.g., instead of "We have previously shown..." one should use "XYZ et al., 2023, have previously shown..."

The page limit is max. 1 page excluding target details. To include:

- Title of the proposal*
- Observing strategy: to include overall strategy, as well as criteria used for the target selection.
- The target names*, coordinates (J2000, ICRS) in decimal degrees*, GAIA G band magnitude*, spectral type (where applicable), number of orbits per visit*, number of visits per target*, total observing time requested. 6 and 5 decimal places are required for RA and Dec coordinates respectively.
- Time request: Total time requested (in orbits), together with a full calculation justifying the need for the time requested. This should include an evaluation of precision needed to achieve the science objectives of the proposal, as well as a demonstration through use of the ETC that this can be met within the time requested. Time requests should allow for time lost due to interruptions (see ETC documentation), but not for slewing.
- Any special requirements/constraints and justifications for these: e.g., observing efficiency, the criticality of start and stop times of observation requests, the need for simultaneous observations with other observatories, visits longer than 100 orbits etc.
- A statement and proof that the SFC has been used to check the feasibility of each proposed target, together with dates on which/intervals for which the target can be observed with the required efficiency. Where many observing opportunities are available (e.g., observations of the transit of a very short period exoplanet), a selection will be sufficient, for example the earliest and latest availability dates.

An additional max. 1 page is available for tables containing scheduling and target details, if required.

5.2.2.2. Time estimation

The online ETC calculator has the option to produce a pdf of the calculation, which includes both input parameters and output observing times for a single target. This needs to be uploaded to PHTI. Tips and recommendations on how to plan observations and size the duration of individual visits have been provided by the CST in the form of a [presentation](#) (A6) which can be found on the AO webpage.

5.2.2.3. Target duplication checks

It is essential to check and confirm that:

- a. The target is not already reserved. Check using the RTL Query Tool (see Table 2 in Section 5). You are advised to check whether a target is on the RTL by using the target coordinates, not the target name. SIMBAD is used to retrieve/resolve the coordinates of named targets, however not all targets (eg. TESS objects of interest) are in SIMBAD. A csv file is also available from the webpage of the AO which contains the names and coordinates of all reserved targets.
- b. The target has not already been observed. Check the [CHEOPS mission archive](#) (A4).

Note that the archive target query is sensitive to blank/spaces. You are therefore advised to not only query the archive using target names, but also to try (in a separate query) target coordinates.

Screenshots should be taken and saved in pdf format. Searches need to be made for each target in a proposal, with individual pdfs concatenated into a single pdf for the archive search and the RTL check. The two concatenated pdfs need to be uploaded to PHT1 as part of the proposal.

6. PROPOSAL SUBMISSION PROCEDURE

Phase I proposals must be submitted to ESA using the [PHT1](#) tool (A11).

This is the only way in which CHEOPS proposals can be submitted. The tool is self-explanatory, with concise on-line help available by hovering over the requested inputs.

The tool calls for a combination of online input and the upload of pdf files: the detailed content and format of the uploaded files must be in line with the guidelines provided in the previous Section, which will be strictly enforced.

Access to the PHT1 tool requires user credentials on the ESA Cosmos system, together with registration to the GO Programme group. Users can try to login via the [CHEOPS GO Programme website](#) (A2) to see if they already have an ESA Cosmos account, also whether they are already members of the GO Programme group. Details of how to apply for credentials/to register are provided on this [webpage](#) (A18).

The following mandatory information needs to be entered for each Phase I proposal:

- Principal Investigator contact details;
- Equivalent details of an additional contact (this person will also be able to consult PHT2 inputs and have access to observational data taken for the proposal in the Mission Archive during the proprietary period);
- The names/institutes of co-Is;
- Title (maximum of 200 characters);
- Abstract (maximum of 1500 characters);
- Classification of proposal science (Exoplanet Science, Stellar Science, Other);
- Scientific Justification (pdf file) – see Section 5.2.1;
- Technical Justification and Implementation (pdf file) – see Section 5.2.2.1;
- A single pdf with the output of the ETC tool for each target – see Section 5.2.2.2;
- A single pdf containing screenshots of checks of the RTL made for each target in the proposal target list – see Section 5.2.2.3;
- Target name, RA (**J2000, ICRS**) and Dec (**J2000, ICRS**) in decimal format, GAIA magnitude, (tick-box) confirmation that the target is not on the RTL, whether an observation is time-critical or non-time-critical, the number of CHEOPS orbits requested per target visit and the total number of visits per target.

Importantly:

- Requested observing time needs to be provided in units of orbits and visits, and shall include time for interruptions due to passage through the South Atlantic Anomaly and Earth occultation – see Section 4.3 for guidelines on the minimum duration of a visit.
- Time to slew, to point, and to acquire targets must not be included in the time request.

- Coordinates are strictly required in J2000, ICRS, format and at the level of 6 and 5 decimal places for RA and Dec, respectively.

Bulk upload of targets is possible via a csv file, an example of which can be downloaded from the webpage for the AO. Care should be taken when editing this file, as some file editors can introduce hidden characters which may prevent the successful ingestion of the file.

Coordinates entered into PHT1 must be checked very carefully as they will be used “as is”, as the starting point for the detailed definition of observation requests in Phase II. Updates will not be possible. Wrong coordinates or wrong coordinate formats can lead to observations not being scheduled, even if time is awarded.

Additional information - including orbital period, transit duration and mid-transit time – is requested for time-critical observations (relevant to exoplanet observations) to facilitate the technical evaluation of proposals. However, this additional information is not mandatory (in which case the input "NA" can be provided).

Note the total number of orbits and visits requested in a proposal will be calculated automatically based on the inputs provided for the individual targets and will be included in the proposal template accordingly.

An email will be sent to the PI to acknowledge proposal submission. This contains the number of your proposal.

Proposals can be updated at any time up to the AO closure (see table in Section 1). This can be done by clicking on the “Update” button in the proposal submission tool. Whatever is in PHT1 at the time of closing will be considered as final input.

When submitting a given proposal for the first time you will be asked to confirm that you have read and agree to the data privacy notice that governs the use by ESA of personal data in the Guest Observers Programme. This can also be found at this [link](#) (A17).

The PI of a proposal is responsible for ensuring that they have the consent from team members to use the personal data of the team members in proposals.

7. PROPOSAL EVALUATION AND SELECTION

Phase I proposals submitted via PHT1 by the time of the AO closure will be evaluated by the CHEOPS TAC. The TAC and TAC Chair are scientists from the European exoplanet community, appointed by ESA in consultation with the CHEOPS PI. Additional scientists may be called upon in case of need. The CHEOPS Project Scientist (PS) will be the secretary to the TAC but does not evaluate/grade/rank the proposals.

The technical feasibility for each proposal will be reviewed by the CHEOPS PS using inputs provided in the submitted technical justification and ETC output. The following points will be considered as part of the review:

- Overall feasibility and technical merit;
- Appropriate determination (and justification) of the observing time requested, per target and per proposal;
- Any target duplication with other proposals submitted to previous AOs;

- Confirmation that no targets in a given proposal are on the RTL.

A short summary of the assessment will be provided to TAC members, according to a standard format, before the TAC meeting.

The TAC members will individually evaluate proposals and rank them according to:

- Scientific excellence and relevance of the proposed observations;
- The uniqueness and applicability of CHEOPS to achieve the proposed scientific objectives of the proposal;
- Technical feasibility and robustness of the proposed observations and data analysis.

The management plan will also be taken into consideration in the overall evaluation.

During the TAC meeting, evaluations of proposals by individual TAC members will be discussed, and the recommendation on which proposals are to be awarded time will be consolidated. Targets in proposals that are recommended for award of time will be given a priority of 1, 2 or 3, which will be used by the science planning tool to prioritize the scheduling of observations.

A technical check of all proposals recommended for execution will be made by members of the Science Operations Centre (SOC), and any found to be unfeasible will be rejected. It should be noted that establishing the technical feasibility of a proposal is the responsibility of the PI of the proposal, and it is not foreseen that many (if any) proposals will be rejected at this stage.

ESA's Director of Science will receive the recommendations of the CHEOPS TAC and will take the final decision on the award of observing time.

PIs of all proposals – including those not awarded time – will be informed of the results of the proposal evaluation process by e-mail. A list of all successful proposals, including the PI name, proposal title, and time awarded for each proposal will be made available on the ESA CHEOPS mission website and on the PHT2 platform. It is possible that the target lists and proposal abstracts will also be made public via the same channels.

After this step, a target from successful GO proposals cannot be added to GTO programmes until all GO observations are concluded. The only exception is that the target was already previously part of an active GTO programme but unreserved, and thus both parties now share this target – see Section 4.8.

Other GO proposals (e.g., via the DP) may still propose different science cases for targets in active GO programmes if and only if the ESA PS agrees – see Section 4.8.

Observers are reminded that whilst every attempt will be made to schedule observations of proposals that have been awarded time, for operational reasons there is no guarantee that this will be possible.

8. PHASE II DATA ENTRY

PIs of accepted proposals will be required to follow Phase II of the proposal preparation. The purpose of Phase II is to provide the detailed information required to schedule observations, in the form of observation requests (ORs). Target information (including coordinates) together with the time awarded for each target will be sent by ESA to the SOC, based on the inputs given to PHT1 and the time and priority levels awarded. This will be used to pre-populate the ORs and will not be changeable. Access

to the tool will require user credentials, which will be provided by the SOC to the proposal PI and the additional contact shortly before the tool is made available.

The timelines for the PHT2 opening, OR creation, review, and submission are given in Table 1. PIs of proposals awarded observing time must plan accordingly and provide their inputs as part of the multi-step process within the relevant timeframe.

Details of how to use the PHT2 are provided in Section 1.4 of the Observers Manual, Additional instructions on how to complete the inputs will be provided to PIs of successful proposals.

Once submitted, the ORs will be added to those from all other GO Programmes and from the GTO programme as input to the mission planning tool used to generate the weekly activity plans (observing schedules).

9. DATA PRODUCTS AND PROPRIETARY PERIODS

CHEOPS has the following level data products:

- Level 0: Received at the SOC from the Mission Operations Centre. Includes science data, as well as housekeeping and auxiliary data. The data format is either telemetry packets (as downlinked from the spacecraft) or XML or plain ascii files as produced by the MOC;
- Level 0.5: Output of the preprocessing step at SOC. All data are time-tagged with UTC and MJD. Telemetry, science and housekeeping data are converted into FITS files at the level of visits and passes, and housekeeping data are converted into physical values;
- Level 1: Calibrated and corrected science images (full-array images as well as sub-array images) as produced by the Data Reduction Pipeline. Engineering meta-data are associated to the science data. Data are time tagged with UTC, MJD and BJD.
- Level 2: Photometric time series (light curves) and associated meta-data resulting from processing of the Level-1 images.

Further details can be found in the Observers Manual, with descriptions of the individual products (including metadata and contents) detailed in the Data Product Description Document (DPDD) which is available from the webpage for the AO.

All data products are ingested into the [Mission Archive](#) (A4), together with an automatically generated report detailing the data processing that is produced by the data reduction pipeline. Details of examples of CHEOPS observations and data products can be found on the [CHEOPS data page](#) (A3): Data from all GTO programmes and GO observations granted time through AOs will be subject to an initial proprietary period of 1 year. The proprietary period will be set at the level of observation requests: it will begin after the last visit of a given observation request has been made and declared complete following quality checks of the data at SOC. The proprietary period will not exceed a period of 1.5 years that starts from the time of successful completion of the first visit of the observation request.

The proprietary period for observations that are obvious extensions of proposals already awarded observing time in the GO Programme may be substantially shorter than 1/1.5 years.

Only the PI of the proposal associated with an observation, together with the additional contact detailed in the Phase I proposal, will be able to access proprietary data and associated reports.

10. USE OF DATA IN CHEOPS OBSERVING PROPOSALS

10.1. Personal data

Protection of Personal Data is of great importance for ESA, which strives to ensure a high level of protection as required by the ESA Framework on Personal Data Protection which applies in this field. ESA implements appropriate measures to preserve the rights of data subjects, to ensure the processing of personal data for specified and legitimate purposes, in a not excessive manner, as necessary for the purposes for which the personal data were collected or for which they are further processed, in conditions protecting confidentiality, integrity and safety of personal data and generally to implement the principles set forth in the PDP Framework.

Please consult the applicable [Privacy Notice](#) (A17) for further information.

10.2. Scientific/intellectual data

Both the proposal submission and evaluation process, and execution of operational activities have been devised to minimise the exchange of information between the GO Programme and the CMC. All parties in the Consortium and at ESA that do handle information relating to the GO programmes are subject to confidentiality agreements.

APPENDIX: REFERENCES AND WEBSITE LINKS

- A1. CHEOPS mission website:
<https://cosmos.esa.int/web/cheops>
- A2. CHEOPS GO Programme website:
<https://cosmos.esa.int/web/cheops-guest-observers-programme/>
- A3. CHEOPS data:
<https://www.cosmos.esa.int/web/cheops-guest-observers-programme/cheops-data>
- A4. Mission Archive:
https://cheops.unige.ch/archive_browser
- A5. Introductory/overview presentations:
<https://www.cosmos.esa.int/web/cheops-guest-observers-programme/is-cheops-for-you>
- A6. In-orbit updates for observers:
<https://www.cosmos.esa.int/web/cheops-guest-observers-programme/in-orbit-updates/>

- A7. Observers Manual:
<https://cosmos.esa.int/web/cheops-guest-observers-programme/cheops-observers-manual/>
- A8. GTO Programme overview:
<https://www.cosmos.esa.int/web/cheops-guest-observers-programme/>
- A9. AO-4 webpage:
<https://www.cosmos.esa.int/web/cheops-guest-observers-programme/ao-4/>
- A10. Frequently asked questions (FAQ) for AOs:
<https://www.cosmos.esa.int/web/cheops-guest-observers-programme/faq-ao/>
- A11. Proposal Handling Tool for Phase I (PHT1):
<https://www.cosmos.esa.int/web/cheops-guest-observers-programme/pht1-ao4/>
- A12. DP webpage:
<https://cosmos.esa.int/web/cheops-guest-observers-programme/discretionary-programme/>
- A13. Approved DP proposals:
<https://www.cosmos.esa.int/web/cheops-guest-observers-programme/dp-approved/>
- A14. Publications:
<https://www.cosmos.esa.int/web/cheops/cheops-in-the-literature/>
- A15. Previous AOs:
<https://www.cosmos.esa.int/web/cheops-guest-observers-programme/ao-1/>
<https://www.cosmos.esa.int/web/cheops-guest-observers-programme/ao-2/>
<https://www.cosmos.esa.int/web/cheops-guest-observers-programme/ao-3/>
- A16. Approved AO programmes:
<https://www.cosmos.esa.int/web/cheops-guest-observers-programme/ao-1-programmes/>
<https://www.cosmos.esa.int/web/cheops-guest-observers-programme/ao-2-programmes/>
<https://www.cosmos.esa.int/web/cheops-guest-observers-programme/ao-3-programmes/>
- A17. Privacy Notice:
<https://www.cosmos.esa.int/web/cheops-guest-observers-programme/cheops-privacy-notice/>
- A18. Register for the GO Programme:
<https://www.cosmos.esa.int/web/cheops-guest-observers-programme/register/>
- A19. Exposure Time Calculator (ETC):
<https://cheops.unige.ch/pht2/exposure-time-calculator/>
- A20. Target Checker:
<https://cheops.unige.ch/pht2/search-reserved-targets/>