

# ToI TEC Data Access and Science Exploitation Policies

V1.2

2023

## 1. Introduction

ToI TEC is a large-format (kilo-pixel) imaging polarimeter that will conduct simultaneous polarization-sensitive surveys at 1.1, 1.4 and 2.1mm from 2023 onwards. The combination of a large-format, mm-wavelength imaging polarimeter and the 50m diameter Large Millimeter Telescope Alfonso Serrano (LMT) offers an unequalled platform for high-resolution wide-field mm-wavelength imaging. Under the Mid-Scale Innovations Program (MISP) of the National Science Foundation (NSF), four wide-field legacy surveys will be conducted in 2023-2025 of roughly 100 hrs each:

- a) The Clouds-to-Cores Legacy Survey, which explores the collapse of giant molecular clouds into star-forming cores.
- b) The Fields in Filaments Legacy Survey designed to probe the distribution of magnetic fields in filaments as traced by the polarization of dust.
- c) The Ultra-Deep Survey of Star-forming Galaxies, a confusion-limited survey which ties the entire Luminous Infrared Galaxy population from redshifts 2 to 10 directly to their optical counterparts.
- d) The Large Scale Structure Survey, probes the relationships between the spatial distribution of star forming galaxies and large scale structure.

Beyond this program, the LMT Project has agreed to assign an additional 600 hours of LMT Key Project time to additional ToI TEC surveys that will take place from 2025 onwards and are still to be defined.

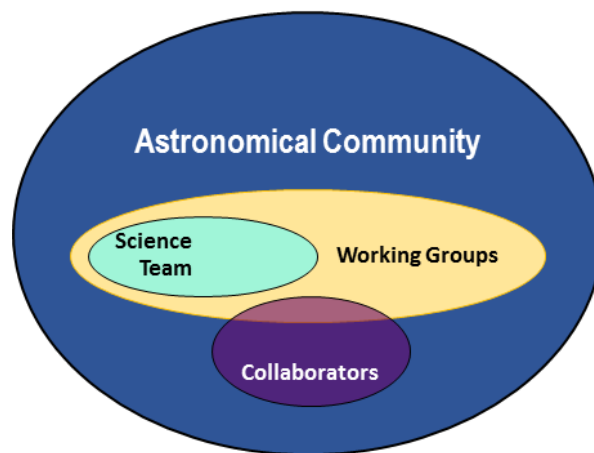
The ToI TEC project calendar establishes two data releases as the four initial surveys get acquired and processed: Data Release 1 (DR1) will be 1 year after first data is taken, and Data Release 2 (DR2) will be 4 months after the last data is taken. Previous to that there will be a First look data release (FLDR) of a very small (~8hr) project performed during commissioning time. Scientific data products, consisting of calibrated images (signal and noise estimates) and a bright source catalog, will be made available to the public and the astronomical community. A final data release, 12 months after the end of data taking, will be accompanied by more extensive quality analysis and data validation products.

To support these releases, the ToI TEC team will work with the survey data as soon as they are available. Validation of the data quality will include characterization and analysis by members of the ToI TEC science team and their collaborators. Dissemination of results from the survey via press releases, education and public outreach products, and popular and

professional talks and publications by Science Team and approved collaborators will be encouraged.

This document establishes the rules for data analysis and publication before and after the Data Releases by the Science Team and associated scientists in the Survey Definition Working Groups and other Collaborators. Disagreements regarding data access that are not adequately addressed in this document will be resolved by the SGB, or the PI as the final authority, if necessary.

## 2. Organization and Definition of Terms



### 2.1 Science Team (ST)

The ST is responsible for the proposed Science Plan of TolTEC. They are responsible for executing the Science Plan and delivering quality products in the Data Releases. ST members have access to the full data set of TolTEC since acquisition. Current members of the ST are listed in Appendix A.

New members of the ST will be proposed by sponsorship of one or more members of the ST, and the proposals will be analyzed and approved by the Science Governance Board according to an established record of proven contributions to TolTEC instrument and pipeline development, survey definition and/or execution by Working Group members or Collaborators.

### 2.2 Working Group (WG) members and Collaborators

There will be a WG for each of the surveys mentioned in 1, and each will be coordinated by two Science Team members (listed in Appendix D). Working group members are scientists that have expressed interest in defining the TolTEC surveys through the public Web Page facility. Science Team members are also part of one or more of the WGs.

We encourage WG members to form sub-teams to push scientific areas of their interest pre and post data release, together with Science Team members. Those with an established record of consistent contributions will be eligible to join the Science Team (see 2.1).

Collaborators are scientists (they may be members of the WGs but this is not required) who propose to use data before Data Release for an approved project (see 4.2) or who propose to use proprietary tools or advanced products developed by the science team or working groups.

### 2.3 Science Governance Board (SGB)

The SGB guides the planning, organization and implementation of the TolTEC public legacy surveys as described in the NSF MSIP proposal and this document. It writes and adjudicates the collaboration policies and resolves any disputes, makes decisions on issues such as how to engage and communicate with the larger astronomy community, finalizes survey plans (targets, depth, etc.), makes a schedule for observations and plans for public data releases.

The SGB meets quarterly (via telecon) but may be called on more frequently as important decisions arise.

SGB members will be internal to the LMT and TolTEC projects. The board will be led by the Project Scientists and should have members spanning the different partners.

The current membership of the Board is detailed in Appendix B.

### 2.4 Science Advisory Board (SAB)

The SAB evaluates the planning, organization and implementation of the TolTEC public legacy surveys as described in the NSF MSIP proposal. They advise on the ongoing activities and future plans including: communication and engagement with the astronomy community, survey plans (targets, depth, etc.), scheduling of observations and plans for public data releases.

The SAB will periodically assess the scope of the work plan given the current funding level. Accordingly they will suggest modifications, improvements or additions not included in the current work plan.

The advisory board will meet once a year (via telecon). The TolTEC project scientists will provide the board with a summary of activities for that year to be assessed. The advisory board will then provide a brief report to the TolTEC project.

The advisory board members will be external to the LMT and TolTEC projects.

The membership of the SAB is detailed in Appendix C

### **3. Public Data Release**

#### **3.1 Education and Public Outreach (EPO) images**

Candidate EPO images may be nominated by any TolTEC Science Team member. The EPO team will recommend candidates for final approval by the PI and the SGB will approve each EPO release before it is made public.

The EPO team is detailed in Appendix E

#### **3.2 Scientific Data Product Release**

There is a nominal schedule for Scientific Data Product releases, however, in order to guarantee the quality of each data product release, the final decisions on when and if to release certain data products lie in the hands of the SGB.

### **4. Pre-Release Access**

To support science data releases, the TolTEC Science Team will work with the survey data as soon as they are available. A comprehensive list of names of those with pre-release access will be maintained by the SGB including a list of which datasets they have access to. This access will be controlled using password protected services. Any member of the Science Team who distributes data beyond those on the science team will be removed from the science team and lose all associated privileges.

#### **4.1. TolTEC Science Team.**

In particular, early data access will be provided to all TolTEC Science Team members to help ensure high quality data products for release. Experience shows that the most stringent tests of the quality of data products comes from focused analyses for specific scientific objectives, and the Science Team is expected to begin such analyses as soon as the initial data processing allows. A list of these analyses, including an abstract, the lead for analysis, the Science Team members involved, and the status of the analysis will be maintained. Approval for such analyses will not be required though competing claims for “ownership” of a particular analysis will be mediated and decided by the Science Governance Board. All such decisions are binding on the Science Team members.

#### **4.2 Collaborators and Survey Definition Working Group members**

Requests for pre-release access to TolTEC data by collaborators outside the TolTEC Science Team must come from a sponsoring TolTEC Science Team member, via written proposals. The TolTEC Science Governance Board will evaluate such proposals and make a recommendation for final approval by the PI. Approval is granted only for the specific people, data and use proposed; other uses of the same data will require a separate proposal and approval. Approval is expected to be routine in the case of a student, data aide, or postdoctoral associate working on a previously identified analysis under the direct supervision of a TolTEC science team member. Those scientists already making key contributions to commissioning and analysis can be promoted to associated scientists by request of a Science Team member. A list of approved requests and their current status will be maintained by the SGB.

4.2.1 Sponsor responsibilities. The Science Team Sponsor will serve as the liaison between the project and the collaborators, ensuring that the collaborators understand and abide by all TolTEC data policies, that the collaborators have the information necessary to properly interpret the data, and that potential TolTEC data problems found by the collaborators are brought to the attention of the TolTEC project.

4.2.2 Proposals for pre-release access by collaborators. These proposals must include who will use the data, the use to which they will put it, the data characterization and analysis products which will be provided to the TolTEC project to support validation of public data releases, and the role of the sponsoring TolTEC Science Team member. A proposal template shall be developed by the Science Governance Board prior to the commencement of the public surveys.

#### 4.3 Written and Oral Presentations and Publications

Written external presentations and publications based on pre-release data or on unpublished TolTEC test data, models, or analysis require review and approval, whether or not they are refereed. If a contemplated publication involves an analysis not already listed in section 4.1, a working title and abstract, lead author, and coauthors for the publication should be presented to the SGB at the beginning of the analysis period, not just prior to submission. Requests for publications including collaborators outside the TolTEC team will require approval as in section 4.2. Publication manuscripts or public presentation slides must be provided to the SGB for review at least 2 weeks before submission or presentation. It is the responsibility of the submitter to confirm that the document(s) have been received. The SGB will make a recommendation including any suggested changes to the manuscript or slides for final approval by the PI of the TolTEC project. If a paper has been received and no response is provided from the PI and SGB prior to the planned submission date, approval is assumed.

Public presentations (e.g. invited talks, conferences, class-room lectures) based on prerelease data or on unpublished TolTEC test data, models, or analysis must be approved

using the same procedure above. Copies of presentations will be stored on a controlled-access TolTEC web site.

4.3.1 Internal refereeing step for first TolTEC publications. To ensure robustness and accuracy of the first generation of TolTEC papers, the SGB will organize an internal refereeing process prior to submission to the journal. The referees will be drawn from the science team based on their expertise on the topic of the paper. Papers should be submitted to this internal refereeing process 4 weeks before anticipated submission.

4.3.2 Announcements of transient objects. The PI has the option of issuing a blanket authorization to any subteam(s) of the TolTEC Science Team for the purpose of alerting the IAU's Minor Planet Center and/or the IAU's Central Bureau of Astronomical Telegrams of transient objects in a timely manner. Such submissions shall be understood to constitute release to the public of the reduced data that were sent to the IAU, but not the original imagery from which they were derived.

#### 4.4 External Proposals

Proposals for non-TolTEC funding or observations based on pre-release TolTEC data or on unpublished TolTEC test data, models, or analysis must be approved by the Science Governance Board. The TolTEC data as it will be submitted, along with the proposal title, abstract, lead author, and list of collaborators, must be sent to the SGB at least 2 weeks prior to submission. The SGB will provide a template for these proposals. It is the responsibility of the submitter to confirm that the proposal has been received. The TolTEC SGB will evaluate such proposals and make a recommendation for final approval by the PI. Approval is expected to be routine when a proposal is based on a previously identified analysis or approved collaboration and is led by a TolTEC team member. If a proposal has been received and no response is provided from the PI and SGB prior to the submission date, approval is assumed. A list of TolTEC-approved proposals and their status will be maintained for access by the entire TolTEC Science Team.

#### 4.6 Press Releases

Press releases based on pre-release TolTEC data require approval by the PI of the TolTEC Project. Links to press releases will be maintained on the TolTEC public web site.

#### 4.7 Post-release collaboration

The science team is encouraged to continue to work together post-release, especially since they will be the core team for the subsequent 2021-2023 surveys.

Authors using specific TolTEC tools or specific data products not included in the released data package should formally invite the corresponding TolTEC members to collaborate on their post-release publications.

## **5. Authorship policy**

The first author on publications based on pre-release TolTEC data is expected to be the TolTEC Science Team member who actually led the analysis and writing of the manuscript. Any TolTEC team member may request his/her name be added to the list of co-authors, with the presumption that permission will be granted if the person has been engaged intellectually in the work and has made some significant contribution to that research project. Examples of such contributions include: (1) contributions at the early stages of the project, such as in sample definition, selection, or scientific rationale; (2) providing a TolTEC data product or non-TolTEC ancillary data (or their analysis) that were used in the paper; (3) formulating significant theoretical interpretation or a quantitative model for interpreting the data; (4) writing portions of the text of the paper; (5) serving as an aggressive internal referee and/or editor for the team; and (6) performing literature searches, or analysis of literature data, that were significant in the interpretation of the TolTEC data. Coauthors should understand the science if their name is on a paper and take personal responsibility for it. Disputes regarding authorship will be resolved by the TolTEC Science Governance Board.

## **6. Acknowledgements to TOLTEC**

All publications based on TolTEC data should include an acknowledgment which reads:

"This publication makes use of data products from the TolTEC imaging camera operated at the Large Millimeter Telescope Alfonso Serrano (LMT), which is a joint project of the Mexican Consejo Nacional de Ciencia y Tecnología (CONACyT) and the University of Massachusetts, also supported by the US National Science Foundation via the University Radio Observatory programme, and the Instituto Nacional de Astrofísica, Óptica y Electrónica (INAOE). The TolTEC Project is funded under NSF MSIP Grant #1636621.

## **7 Large Collaborations Outside the TolTEC Team**

In cases where the TolTEC team is collaborating with a large outside team, additional procedures beyond those in section 4.2 may be needed. The impact of the proposed collaboration on public TolTEC data release should be explicitly presented. The outside team will be asked to name a point of contact, who will coordinate activities within their team. The collaboration should state explicitly what data will be exchanged and what paper(s) will be worked on, what the schedule should be and what resources are needed. The SGB will provide a template for describing these collaborations. Regular telecons shall be established to coordinate this collaboration. When collaborating with an outside team, the outside team should suggest an order of authorship among their members. First authorship of papers with an outside collaborator shall be based on which team made the primary

contributions to the paper. Cases of disputed authorship will be resolved by the TolTEC Governance Board and the point of contact (or the PI of the outside team) as necessary.

When accepting proprietary data from collaborators, the TolTEC team lead and the leader of the collaborating team will jointly produce a written agreement of who is permitted to use the data and the uses TolTEC will make of it.

### **Acknowledgements for this Policies Document**

These TolTEC rules are heavily drawn and adapted from the WISE collaboration policies in use. We thank Peter Eisenhardt WISE Project Scientist for drafting a careful set of scenarios.

### **Endorsement**

This document was endorsed by the science team on 10 May 2023

### **Appendix A: Science Team**

Aretxaga, Itziar (Py. Sci.)	INAOE	Mexico
Austermann, Jayson	NIST	USA
Avila Reese, Vladimir	IA-UNAM	Mexico
Bertone, Emanuele	INAOE	Mexico
Bryan, Sean A.	ASU	USA
Calzetti, Daniela	UMass	USA
Carrasco, Carlos	IRyA-UNAM	Mexico
Castillo, Edgar	Univ. Oxford	UK
Chávez, Miguel	INAOE	Mexico
Chen, Che-Yu	LLNL	USA
DeNigris, Nat	UMass	USA
Doyle, Simon	Cardiff U.	UK
Eales, Stephen	Cardiff U.	UK
Ferrusca, Daniel	INAOE	Mexico
Fissel, Laura	Queens Univ.	Canada
Gaztañaga, Enrique	IEEC	Spain
Gear, Walter	Cardiff U.	UK
Gómez, Haley	Cardiff U.	UK
Gómez, Víctor	INAOE	Mexico
Gómez-Ruiz, Arturo	INAOE	Mexico
Gordon, Sam	ASU	USA
Gropi, Christopher	ASU	USA



Gutermuth, Robert	Umass	USA
Heyer, Mark	Umass	USA
Hughes, David H.	INAOE	Mexico
Ibarra, Eduardo	INAOE	Mexico
Lazarian, Alex	U. Wisconsin- Madison	USA
Lee, Dennis	NorthwesternU	USA
Lizano, Susana	IRyA-UNAM	Mexico
Luna, Abraham	INAOE	Mexico
Lunde, Emily	ASU	USA
Ma, Zhiyuan	UMass	USA
Mauskopf, Philip	ASU	USA
McCrackan, Michael	UMass	USA
McMahon, Jeff	Michigan	USA
Mo, Hojung	Umass	USA
Montaña, Alfredo	INAOE	Mexico
Novak, Giles	NorthwesternU	USA
Offner, Stella	UT Austin	USA
Pascale, Enzo	Cardiff U.	UK
Pasetto, Alice	IRyA-UNAM	Mexico
Patience, Jennifer	ASU	USA
Plionis, Manolis	Obs. Athens	Greece
Pope, Alexandra (Deputy Py. Sci.)	Umass	USA
Rodríguez Montoya, Iván	INAOE	Mexico
Rosa González, Daniel	INAOE	Mexico
Sánchez, David	INAOE	Mexico
Scannapienco, Evan	ASU	USA
Schloerb, Peter	Umass	USA
Sinclair, Adrian	UBC	Canada
Simon, Sara	FermiLab	USA
Tang, Yuping	CASSACA	Chile
Ventura, Salvador	INAOE	Mexico
Velázquez, Miguel	INAOE	Mexico
Wilson, Grant (PI)	Umass	USA
Yun, Min S.	Umass	USA
Zaragoza-Cardiel, Javier	INAOE	Mexico
Zeballos, Milagros	INAOE	Mexico

## Appendix B: Science Governance Board

Itziar Aretxaga (INAOE)  
 Alexandra Pope (UMass)  
 Phil Mauskopf (ASU)

Giles Novak (Northwestern)  
Miguel Chavez (INAOE)  
Min Yun (UMass)  
Steve Eales (Cardiff)

### **Appendix C: Science Advisory Board**

Mark Dickinson, NOAO, USA  
Peter Eisenhardt, JPL, USA  
Suzanne Madden, CEA, France  
Brenda Matthews, NRC Herzberg, Canada  
Luis Felipe Rodríguez, IRyA UNAM, Mexico  
Sebastián Sánchez, IA UNAM, Mexico

### **Appendix D: Survey coordinators**

- a) The Clouds-to-Cores Legacy Survey: Robert Gutermuth (UMass), Stella Offner (U Texas-Austin)
- b) The Fields in Filaments Legacy Survey: Laura Fissel (NRAO), Giles Novak (Northwestern U.)
- c) The Ultra-Deep Survey of Star-forming Galaxies: Min S. Yun (UMass), Itziar Aretxaga (INAOE)
- d) The Large Scale Structure Survey: Alexandra Pope (UMass), David H. Hughes (INAOE)

### **Appendix E: Past Science Team members**

Faucher-Giguère, Claude-Andre	Northwestern	USA
Hull, Chat	CfA	USA
Ventura, Salvador	INAOE	Mexico
Wall, William	INAOE	Mexico