

# Transform Generator User's Guide

(TG – Version 6.8)

## 1. Introduction

The Transform Generator (TG) program provides an easy way to calculate photometry transformation coefficients. The program reads text file(s) containing machine magnitude measurements of standard star reference fields (currently M67, NGC 7790, M11, NGC 1252, NGC 3532, Melotte 111 and the Landolt Fields) and calculates the standard transformation coefficients. Plots of the instrument magnitudes used to compute each transform are displayed allowing users to deactivate bad data points whereupon the transforms are immediately recalculated. Deselected data points can be reactivated. Transform sets can be saved for future use. Results from multiple transform sets can be compared and averaged together to obtain a final set of coefficients. An export file can be created containing the transform coefficients in a format compatible with the AAVSO TransformApplier tool.

The program works with standard export files from AIP4WIN and MaxIm. It will also process photometry report download files from VPHOT.

(Transform Generator was previously known a Photometry Transformation Generation Program (PTGP). The name was changed to Transform Generator with release 5.5)

**Screen captures in this user's guide sometimes show previous version numbers. Other than the version number, those screens have not changed in the updated version.**

## 2. System Requirements and Installation

TG requires the use of Python along with several additional libraries. It runs on Windows, Apple, and LINUX computers. The simplest installation uses an integrated set of Python software libraries known as Anaconda (<https://store.continuum.io/cshop/anaconda/>). Detailed installation instructions can be found at <http://www.aavso.org/tg>. Following these procedures will ensure all of the necessary software is installed on your computer.

## 3. Program Overview

TG allows users to compute and maintain transformation coefficients for multiple telescopes.

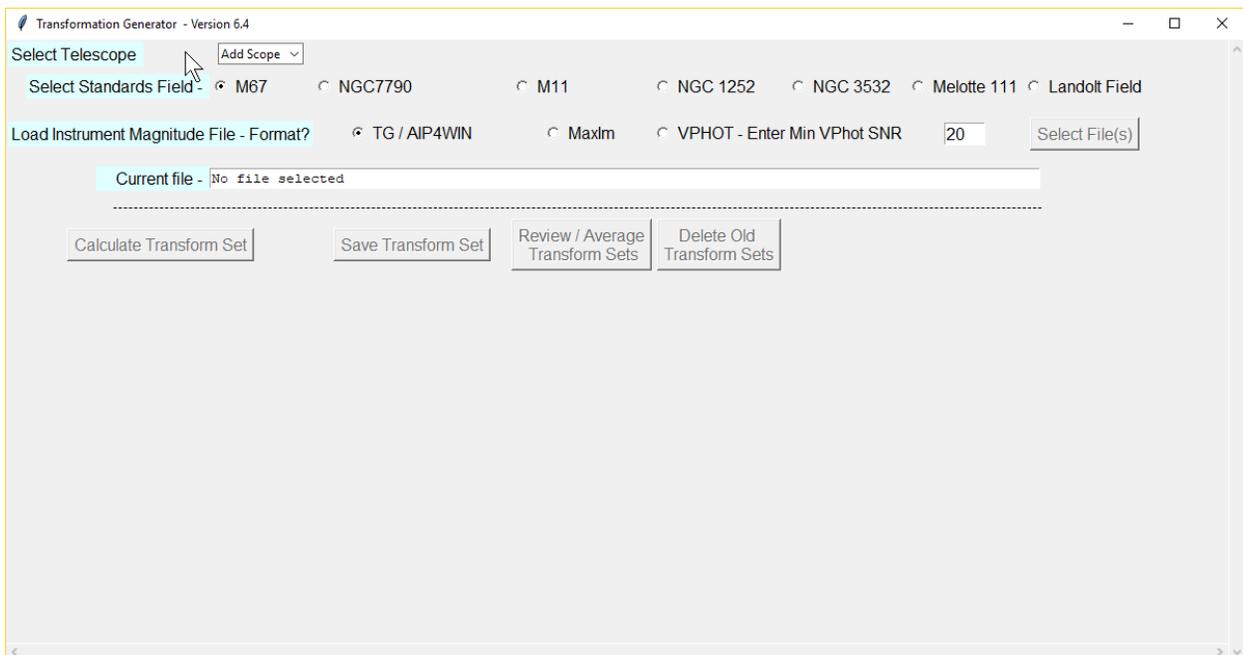
Using TG, users proceed through the following steps to generate coefficients:

1. Identify telescope (enter telescope name the first time used)
2. Select standard star field used (M67, NGC 7790, M11, NGC 1252, NGC 3532, Melotte 111 or Landolt Fields.)
3. Load user provided file(s) containing instrument magnitudes of standard field stars (formats defined below.)
4. Compute transforms using TG

5. Review plots of individual transforms, deactivating any invalid observations
6. Save transform set
7. Repeat the above steps if multiple sets of observations available
8. Compare different sets of transforms
9. Select sets to be averaged
10. Average selected observation sets to create a final “master” transform set
11. Export a file containing the final transform values for printing and for input into Transform Applier (TA)

#### 4. Program Operation

- 4.1. Start program using the start-up icon. (See installation instructions at [www.aavso.org/tg](http://www.aavso.org/tg))
- 4.2. Select telescope name – or “Add Scope” if it’s the first time you enter data from that scope. (To use the demonstration file, enter T17 as a scope name).
- 4.3. Select the standards field used. Currently M67, NGC 7790, M11, NGC 1252, NGC 3532, Melotte 111 and the Landolt Fields are available. (Select M67 to use the demonstration file.)



- 4.4. Load the Instrument Magnitudes - to load the telescope instrument magnitude file, identify the file format and click the “Select file(s)”. For both TG/AIP4WIN and MaxIm formats, only one file is loaded. For VPHOT photometry download files, one file exists for each image/filter combination. The user selects ALL the files at one time for processing.

**(Users of AIP4WIN should refer to Appendix C for specific details using**

**AIP4WIN generated output files.**

**Also, use of VPHOT to identify stars and generate instrument magnitude files is recommended. It can save a lot of time. Skip to section 4.4.3. You won't need to understand the details of the instrument magnitude file format)**

**4.4.1. TG and AIP4WIN Instrument Magnitude File Format:**

The format for this file is a standard CSV file – the delimiter may be either a semicolon or comma.

Three types of lines in the file are processed - all other lines in the file are ignored.

**4.4.1.1. Filter identification line -**

A filter identification line identifies what filters were used and which fields of subsequent star measurement lines contain which filter measurements. The first key word of this line must be “Filt” – case sensitive. Subsequent fields contain u,b,v,r, and/or i (upper or lower case). Fields may be skipped (e.g. many programs output error data in between machine magnitudes) by entering successive delimiters.

Two examples:

Filt,b,v,i

Filt;;u;;b;;l;;v;;r (note, this is a standard AIP4WIN output format)

**4.4.1.2. Date of observation line -**

This is optional, but is included in the program output to help identification. The first key word is “Julian\_Day”, and the second field contains the date

Example:

Julian\_Day; 2456628.19110; (again, this is part of a standard AIP4WIN format)

**4.4.1.3. Star instrument magnitude measurement lines-**

These lines contain the filtered instrument magnitudes for each star. The filter sequence and spacing are defined by the earlier Filter identification line.

The first field of a star instrument magnitude measurement line contains the star id.

M67 ids may be either those in Appendix A (with “Boulder” star ids 1-63) or the current AUID.  
NOTE: The most recent standard reference magnitudes are retrieved from the AAVSO VSP tool

independent of whether one uses the original Boulder ID's or current AUID's. (Users of the original "Boulder" numbers should know some of those stars are no longer reference stars. A message will be displayed by TG indicating which stars were not used in the calculation.)

NGC 7790 ids may be either those in Appendix B (with "Boulder" star ids 1-31) or current AUID's.

The second and subsequent fields in the star instrument magnitude measurement line have the magnitudes defined in the earlier Filt line.

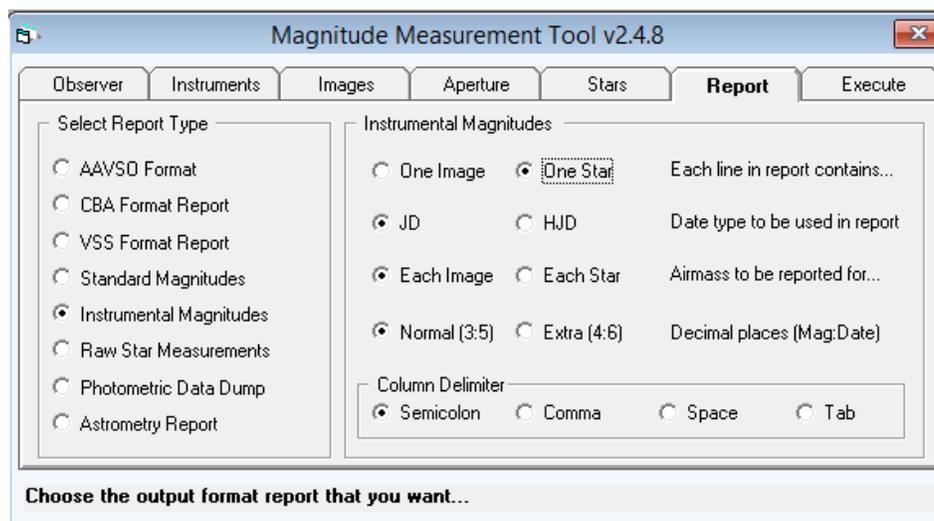
Examples 1:

```
Filt;      B;;      V;;      R;;      I;;  
1; 9.063; 0.001; 9.047; 0.001; 8.784; 0.001; 9.375; 0.001;  
2; 10.711; 0.002; 9.325; 0.001; 8.408; 0.001; 8.369; 0.001;
```

Example 2:

```
Filt,b,snr,v,snr,r,snr  
112,-7.747,258,-9.436,411,-9.475,415  
117,-7.9,282,-9.002,332,-8.7,235
```

- 4.4.1.4. To use the demonstration file, click "Select File" and pick:  
"M67\_T17\_20140330\_Photometry\_Demo\_instrument\_mags.txt" from the default directory.)



#### 4.4.2. MaxIm Format

The MaxIm instrument magnitude report format from MaxIm v. 6 is used. Star id's are the numbers immediately in front of the “:Instrument Magnitude (Centroid)” text.

##### Instructions for MaxIm v. 6

1. Go to analyze----photometry
2. Go to add files
3. Select your B,V,R,I images
4. Make sure you highlight the image that you intend to identify your stars
5. On the match tab, select auto-star matching
6. Go to identify tab
7. Right click and tag new object for the stars that you want to identify in the image. Barbara Harris has the chart that identifies the stars in NGC 7790 by number. Tag all of your stars as new objects. You must tag one star as a reference star but you do not have to input any magnitudes.
8. Go to the graph tab. At the bottom, select CSV export options. Magnitude is selected by default. The only other field that is needed is Instrumental magnitude.
9. Save file as CSV
10. You can go into excel and delete the magnitude column but it is not necessary because the TG will read the file with or without the magnitude column there.
11. In TG select Maxim as file type and select the file and click on calculate transform set.

##### Example file format:

Timestamp (JD), Filter, 21 : Instrument Magnitude (Centroid), 21 : Magnitude (Centroid), 17 : Instrument Magnitude (Centroid), 17 : Magnitude (Centroid), 11 : Instrument Magnitude (Centroid), 11 : Magnitude (Centroid), 13 : Instrument Magnitude (Centroid), 13 : Magnitude (Centroid), 5 : Instrument Magnitude (Centroid), 5 : Magnitude (Centroid), 8 : Instrument Magnitude (Centroid), 8 : Magnitude (Centroid), 18 : Instrument Magnitude (Centroid), 18 : Magnitude (Centroid), 9 : Instrument Magnitude (Centroid), 9 : Magnitude (Centroid), 26 : Instrument Magnitude (Centroid), 26 : Magnitude (Centroid)

2456849.8309953702, B, 14.979, 14.826, 14.899, 14.745, 12.895, 12.742, 14.003, 13.850, 14.426, 14.273, 11.667, 11.514, 13.918, 13.764, 14.072, 13.919, 15.921, 15.768

2456849.8324421295, I, 12.437, 11.771, 12.247, 11.582, 12.194, 11.528, 13.281, 12.615, 13.754, 13.088, 11.457, 10.791, 13.164, 12.498, 13.207, 12.542, 13.819, 13.153

2456849.8295486113, R, 12.287, 12.531, 12.115, 12.359, 11.662, 11.907, 12.741, 12.986, 13.146, 13.390, 11.006, 11.251, 12.599, 12.843, 12.673, 12.918, 13.576, 13.820

2456849.8272453705, V, 13.351, 13.342, 13.231, 13.222, 12.148, 12.139, 13.252, 13.243, 13.694, 13.685, 11.330, 11.321, 13.185, 13.176, 13.281, 13.272, 14.528, 14.519

#### 4.4.3. VPHOT Format

To use VPHOT, do the following:

Upload one (or more) of your images for each filter. In VPHOT, view one image at a time. Select “Catalogs” → “Load AAVSO Standard Stars”. Then select “View Photometry Report”. Select the “Download” option towards the top of the screen, and save the file on your computer. Repeat this for each image. For example, if you have a full UBVRI set of images, you will have 5 separate files. (You can also have multiple images for any filter(s) creating multiple files for the same filter. TG will average the measurements from all the files.)

Start TG. Select the VPHOT format, and also enter a minimum SNR setting for the VPHOT data. (You can make it 0 to use all the data VPHOT marks as “True”.)

Click “Select File(s)” and select ALL THE DOWNLOADED VPHOT FILES at one time.

Click “Calculate Transforms” – and the data appears in 10 – 15 seconds.

(FYI, the program sorts out the problem associated with VPHOT using inconsistent star\_ids. It uses other data in the VPHOT download file (the standard magnitude and B-V values) to match to the AUID. TG reads through all the files creating a master array containing the AUID and all the instrument magnitude values. It also keeps track of “False” data – and knows when a particular AUID only contains data for a subset of the filters.)

The number of stars used for each transform varies – based on the minimum SNR entered and which stars VPHOT downloaded.

The screenshot shows the Transformation Generator software interface. The main window has a title bar "Transformation Generator - Version 6.4". Below the title bar, there are several input fields and buttons:

- Select Telescope:** T17
- Select Standards Field:** M67 (radio buttons for NGC7790, M11, NGC 1252, NGC 3532, Melotte 111, Landolt Field)
- Load Instrument Magnitude File - Format?:** TG / AIP4WIN (radio buttons for Maxlm, VPHOT - Enter Min VPhot SNR)
- Enter Min VPhot SNR:** 20
- Select File(s):** Button
- Current file:** C:/ProgramData/Anaconda3/Photometry/M67\_T17\_20140330\_Photometry\_Demo\_instrument\_mags\_WITHOUT\_RA\_DEC.

Below these fields are four buttons: Calculate Transform Set, Save Transform Set, Review / Average Transform Sets, and Delete Old Transform Sets.

On the left side, there is a section titled "Transform Values" with a table of data:

Transform Values		
Telescope = T17		
Julian Date = 2456746.906		
Select Transforms for Review and Analysis		
Tub	=	1.161 err = 0.062 r^2 = 0.96
Tu_ub	=	0.103 err = 0.047 r^2 = 0.26
Tb_ub	=	-0.036 err = 0.013 r^2 = 0.37
Tbv	=	0.958 err = 0.005 r^2 = 1.00
Tb_bv	=	-0.045 err = 0.014 r^2 = 0.42
Tv_bv	=	-0.001 err = 0.014 r^2 = 0.00
Tvr	=	0.949 err = 0.011 r^2 = 1.00
Tv_vr	=	-0.002 err = 0.027 r^2 = 0.00
Tr_vr	=	0.052 err = 0.023 r^2 = 0.27
Tri	=	1.061 err = 0.010 r^2 = 1.00
Tr_ri	=	0.065 err = 0.027 r^2 = 0.29
Ti_ri	=	0.007 err = 0.026 r^2 = 0.01

An error message dialog box is overlaid on the main window. The dialog box has a title bar "Error Message" and a red background. The text inside the dialog box reads:

Reference Star ids not found in VSP -  
1  
8  
9  
18  
Stars excluded from calculation  
OK

Select Telescope

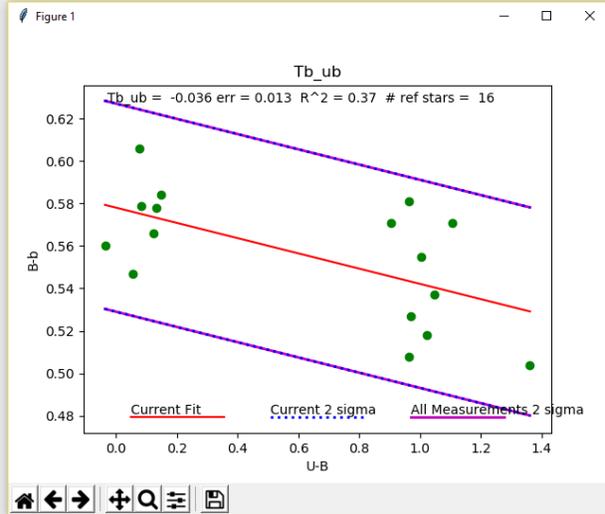
Select Standards Field -  M67  NGC7790  M11  NGC 1252  NGC 3532  Melotte 111  Landolt Field

Load Instrument Magnitude File - Format?  TG / AIP4WIN  Maxlm  VPHOT - Enter Min VPhot SNR

Current file - C:/ProgramData/Anaconda3/Photometry/M67\_T17\_20140330\_Photometry\_Demo\_instrument\_mags\_WITHOUT\_RA\_DEC.

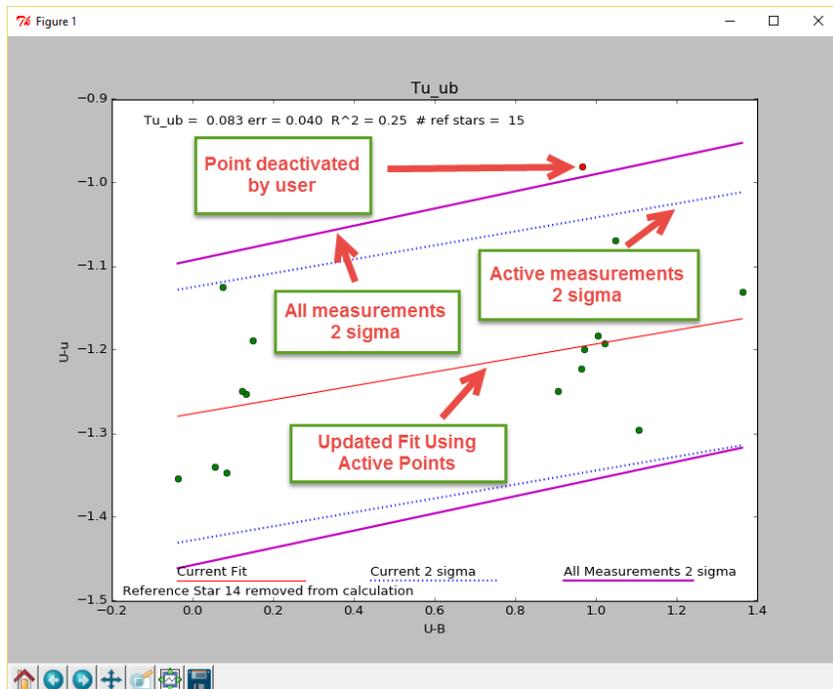
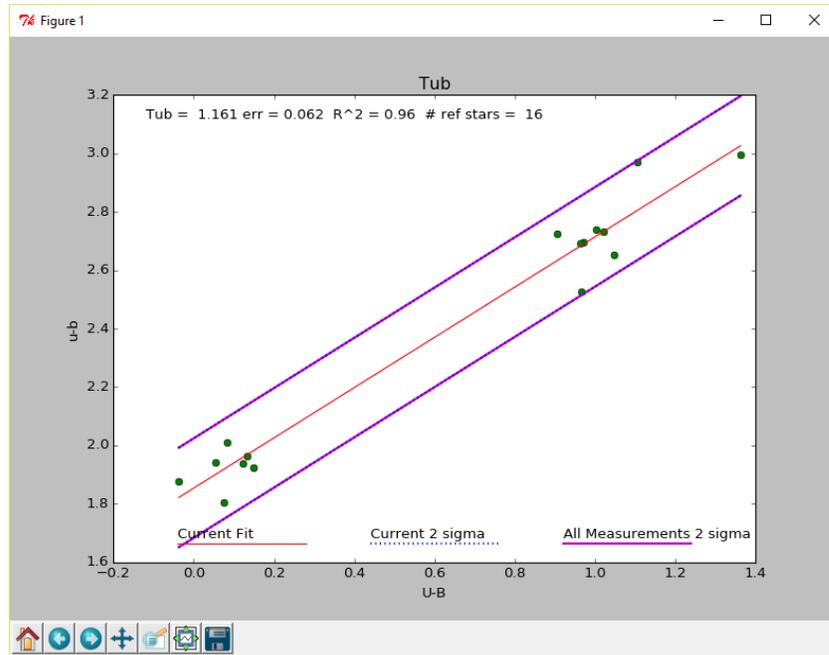
Transform Values  
Telescope = T17  
Julian Date =2456746.906  
Select Transforms for Review and Analysis

Tub	=	1.161	err = 0.062	r^2 = 0.96
Tu_ub	=	0.103	err = 0.047	r^2 = 0.26
Tb_ub	=	-0.036	err = 0.013	r^2 = 0.37
Tbv	=	0.958	err = 0.005	r^2 = 1.00
Tb_bv	=	-0.045	err = 0.014	r^2 = 0.42
Tv_bv	=	-0.001	err = 0.014	r^2 = 0.00
Tvr	=	0.949	err = 0.011	r^2 = 1.00
Tv_vr	=	-0.002	err = 0.027	r^2 = 0.00
Tr_vr	=	0.052	err = 0.023	r^2 = 0.27
Tri	=	1.061	err = 0.010	r^2 = 1.00
Tr_ri	=	0.065	err = 0.027	r^2 = 0.29
Ti_ri	=	0.007	err = 0.026	r^2 = 0.01
Tvi	=	0.997	err = 0.007	r^2 = 1.00
Tv_vi	=	-0.001	err = 0.015	r^2 = 0.00
Ti_vi	=	0.003	err = 0.012	r^2 = 0.00
Tr_vi	=	0.029	err = 0.012	r^2 = 0.28



4.7. Analyzing transforms - The red line shows the plot resulting from the calculated transform. Two sigma error lines calculated using all observations are shown in purple. **These two sigma lines remain static during subsequent analysis and deletion/addition of data points.**

The user may select any individual observation measurement to deactivate from the calculation. Deactivated observations switch from green to red in color, and the transform value is immediately recalculated, an updated fit line redrawn in red, and new "Current 2 sigma" lines are **drawn in dotted blue**. The deactivated star id and the number of active reference stars used in the current calculation are shown. Users can deactivate additional stars and also, by reselecting a deactivated star, re-activate it for use in the calculation.



Select Telescope T17

Select Standards Field - M67 NGC7790 M11 NGC 1252 NGC 3532 Melotte 111 Landolt Field

Load Instrument TG/AIP4WIN MaxIm VPHOT - Enter Min VPhot SNR 20 Select File(s)

Transforms saved at UT 2018-01-13 18:36:15

Calculate Transform Set Save Transform Set Review / Average Transform Sets Delete Old Transform Sets

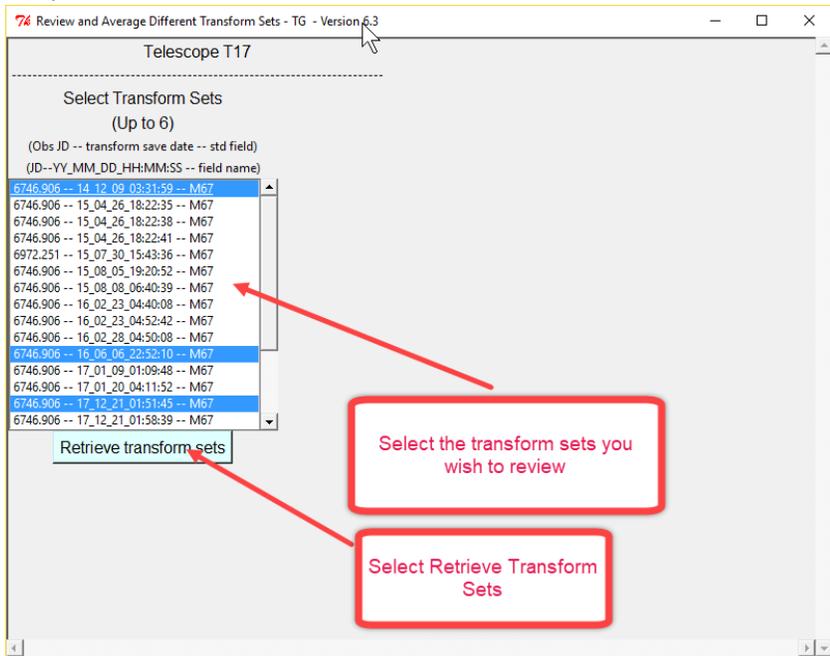
Transform Values		
Telescope = T17		
Julian Date = 2456746.906		
Select Transforms for Review and Analysis		
Tub	= 1.161	err = 0.062 r^2 = 0.96
Tu_ub	= 0.103	err = 0.047 r^2 = 0.26
Tb_ub	= -0.036	err = 0.013 r^2 = 0.37
Tbv	= 0.958	err = 0.005 r^2 = 1.00
Tb_bv	= -0.045	err = 0.014 r^2 = 0.42
Tv_bv	= -0.001	err = 0.014 r^2 = 0.00
Tvr	= 0.949	err = 0.011 r^2 = 1.00
Tv_vr	= -0.002	err = 0.027 r^2 = 0.00
Tr_vr	= 0.052	err = 0.023 r^2 = 0.27
Tri	= 1.061	err = 0.010 r^2 = 1.00
Tr_ri	= 0.065	err = 0.027 r^2 = 0.29
Ti_ri	= 0.007	err = 0.026 r^2 = 0.01
Tvi	= 0.997	err = 0.007 r^2 = 1.00
Tv_vi	= -0.001	err = 0.015 r^2 = 0.00
Ti_vi	= 0.003	err = 0.012 r^2 = 0.00
Tr_vi	= 0.029	err = 0.012 r^2 = 0.28

1. Save current transform set

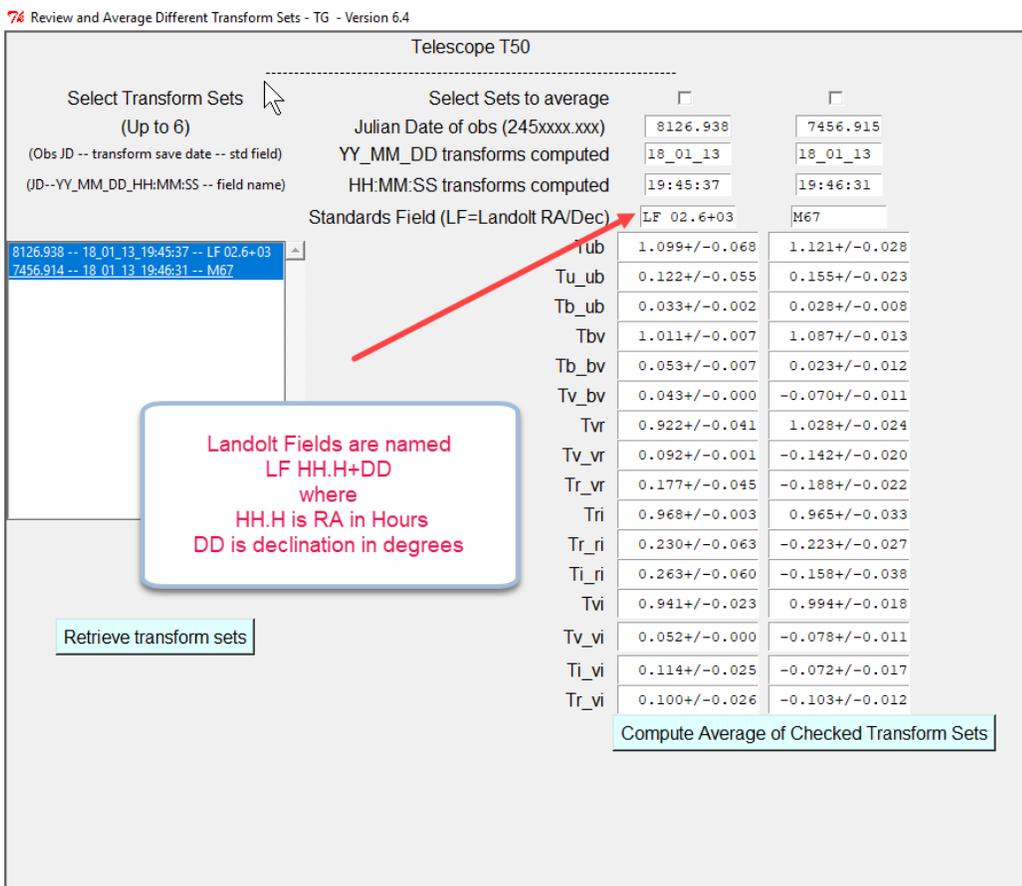
2. Note transforms have been saved with current time as identifier

3. Select "Review/Average Transform Sets" to proceed to next menu where you can compare multiple sets to be used to create a master set of transforms. You can then save a file with that master transform set for printing or input to AAVSO's TA tool

- Reviewing and combining existing transform sets - select the "Review / Average Transform Sets" box (above figure step 3) to see a list of your saved transforms. A new window appears. Select the transform sets you want to compare, and click "Retrieve transform sets"



Note that if Landolt Fields are used, the field name is LF HH.H+DD where HH.H is the RA hour angle and DD is the declination.



7. After reviewing the data, select the sets you want averaged together by clicking on the check boxes at the top of each column. Then select "Compute Average of Checked Observation Sets" –

Telescope T17

Select Transform Sets (Up to 6)  
 (Obs JD -- transform save date -- std field)  
 (JD--YY\_MM\_DD\_HH:MM:SS -- field name)

Select Sets to average

Julian Date of obs (245xxxx.xxx)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
6746.907	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
YY_MM_DD transforms computed	14_12_09	16_06_06	17_12_21
HH:MM:SS transforms computed	03:31:59	22:52:10	01:51:45
Standards Field	M67	M67	M67

Retrieve transform sets

Standards Field	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Tub	1.161+/-0.044	1.161+/-0.062	1.161+/-0.062
Tu_ub	0.083+/-0.040	0.103+/-0.047	0.103+/-0.047
Tb_ub	-0.036+/-0.013	-0.036+/-0.013	-0.036+/-0.013
Tbv	0.958+/-0.006	0.958+/-0.005	0.958+/-0.005
Tb_bv	-0.045+/-0.014	-0.045+/-0.014	-0.045+/-0.014
Tv_bv	-0.001+/-0.014	-0.001+/-0.014	-0.001+/-0.014
Tvr	0.949+/-0.012	0.949+/-0.011	0.949+/-0.011
Tv_vr	-0.002+/-0.027	-0.002+/-0.027	-0.002+/-0.027
Tr_vr	0.052+/-0.023	0.052+/-0.023	0.052+/-0.023
Tri	1.061+/-0.009	1.061+/-0.010	1.061+/-0.010
Tr_ri	0.065+/-0.027	0.065+/-0.027	0.065+/-0.027
Ti_ri	0.007+/-0.026	0.007+/-0.026	0.007+/-0.026
Tvi	0.997+/-0.007	1.000+/-0.009	0.997+/-0.007
Tv_vi	-0.001+/-0.015	-0.001+/-0.015	-0.001+/-0.015
Ti_vi	0.003+/-0.012	0.003+/-0.012	0.003+/-0.012
Tr_vi	0.029+/-0.012	0.029+/-0.012	0.029+/-0.012

Compute Average of Checked Transform Sets

Select the sets to be averaged, then "Compute Average of Checked Transform Sets"

Telescope T17

Select Transform Sets (Up to 6)  
 (Obs JD -- transform save date -- std field)  
 (JD--YY\_MM\_DD\_HH:MM:SS -- field name)

Select Sets to average

Julian Date of obs (245xxxx.xxx)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Avg Transform
6746.907	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
YY_MM_DD transforms computed	14_12_09	16_06_06	17_12_21	
HH:MM:SS transforms computed	03:31:59	22:52:10	01:51:45	
Standards Field	M67	M67	M67	

Retrieve transform sets

Standards Field	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Avg Transform
Tub	1.161+/-0.044	1.161+/-0.062	1.161+/-0.062	1.161 err= 0.062 r^2= 0.96
Tu_ub	0.083+/-0.040	0.103+/-0.047	0.103+/-0.047	0.103 err= 0.047 r^2= 0.26
Tb_ub	-0.036+/-0.013	-0.036+/-0.013	-0.036+/-0.013	-0.036 err= 0.013 r^2= 0.37
Tbv	0.958+/-0.006	0.958+/-0.005	0.958+/-0.005	0.958 err= 0.005 r^2= 1.00
Tb_bv	-0.045+/-0.014	-0.045+/-0.014	-0.045+/-0.014	-0.045 err= 0.014 r^2= 0.42
Tv_bv	-0.001+/-0.014	-0.001+/-0.014	-0.001+/-0.014	-0.001 err= 0.014 r^2= 0.00
Tvr	0.949+/-0.012	0.949+/-0.011	0.949+/-0.011	0.949 err= 0.011 r^2= 1.00
Tv_vr	-0.002+/-0.027	-0.002+/-0.027	-0.002+/-0.027	-0.002 err= 0.027 r^2= 0.00
Tr_vr	0.052+/-0.023	0.052+/-0.023	0.052+/-0.023	0.052 err= 0.023 r^2= 0.27
Tri	1.061+/-0.009	1.061+/-0.010	1.061+/-0.010	1.061 err= 0.010 r^2= 1.00
Tr_ri	0.065+/-0.027	0.065+/-0.027	0.065+/-0.027	0.065 err= 0.027 r^2= 0.29
Ti_ri	0.007+/-0.026	0.007+/-0.026	0.007+/-0.026	0.007 err= 0.026 r^2= 0.01
Tvi	0.997+/-0.007	1.000+/-0.009	0.997+/-0.007	0.998 err= 0.008 r^2= 1.00
Tv_vi	-0.001+/-0.015	-0.001+/-0.015	-0.001+/-0.015	-0.001 err= 0.015 r^2= 0.00
Ti_vi	0.003+/-0.012	0.003+/-0.012	0.003+/-0.012	0.003 err= 0.012 r^2= 0.00
Tr_vi	0.029+/-0.012	0.029+/-0.012	0.029+/-0.012	0.029 err= 0.012 r^2= 0.28

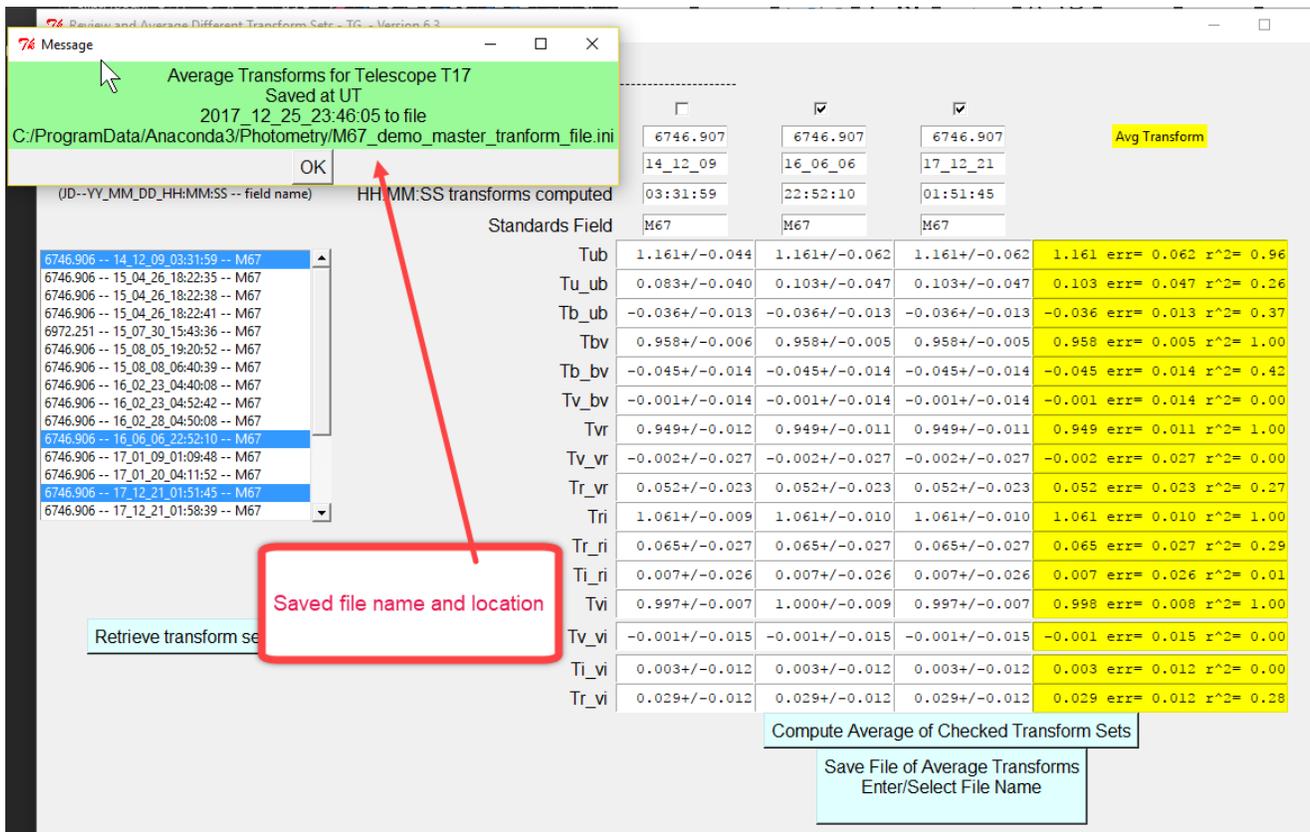
Retrieve transform sets

Select this box to create export file for printing and/or input to the AAVSO TransformApplier tool

Compute Average of Checked Transform Sets

Save File of Average Transforms  
Enter/Select File Name

- Save Transform Export File - To save a file with this final averaged set of transforms, click the "Save File of Average Transforms – Enter/Select File Name" box. A message appears with the full file name when saved. This file is an "ini" format compatible with the AAVSO TransformApplier tool. It can also be printed as a text file. It contains the transform values, one sigma error estimate, and r-squared values.



Output File Example (can be printed or directly imported into the AAVSO TransformApplier tool):

[Setup]

description= TG - Version 5.6, Telescope= T17, Time created (UT) = 2015\_03\_03\_06:58:03

[Coefficients]

Tub= 1.161

Tu\_ub= 0.103

.....

[Error]

Tub= 0.044

Tu\_ub= 0.047

.....

[R Squared Values]

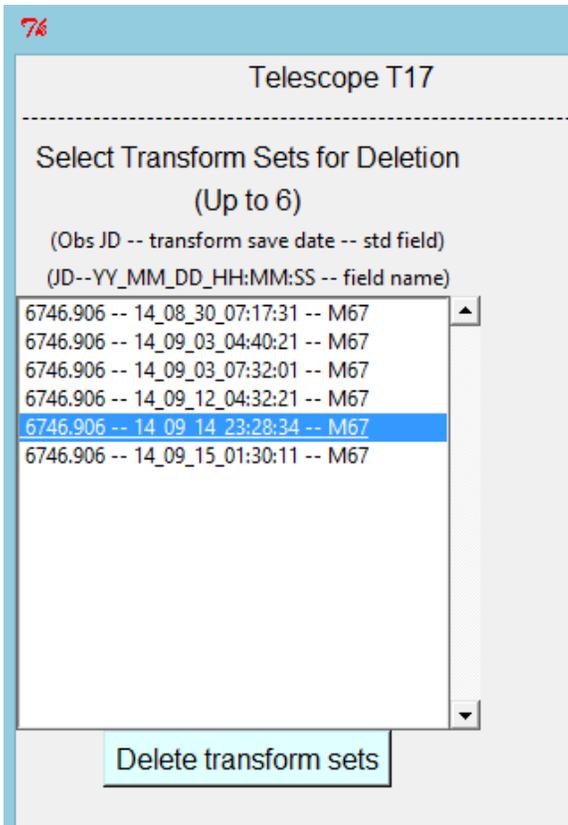
Tub= 0.965

Tu\_ub= 0.256

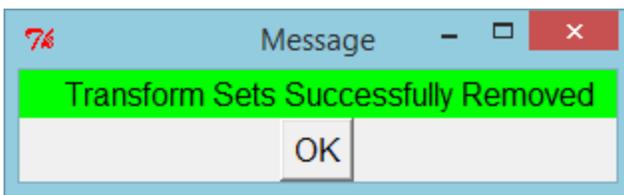
Tb\_ub= 0.365

## 9. Transform Set Deletion:

To delete existing transform sets, select “Delete Old Transform Sets” button. A new window appears –



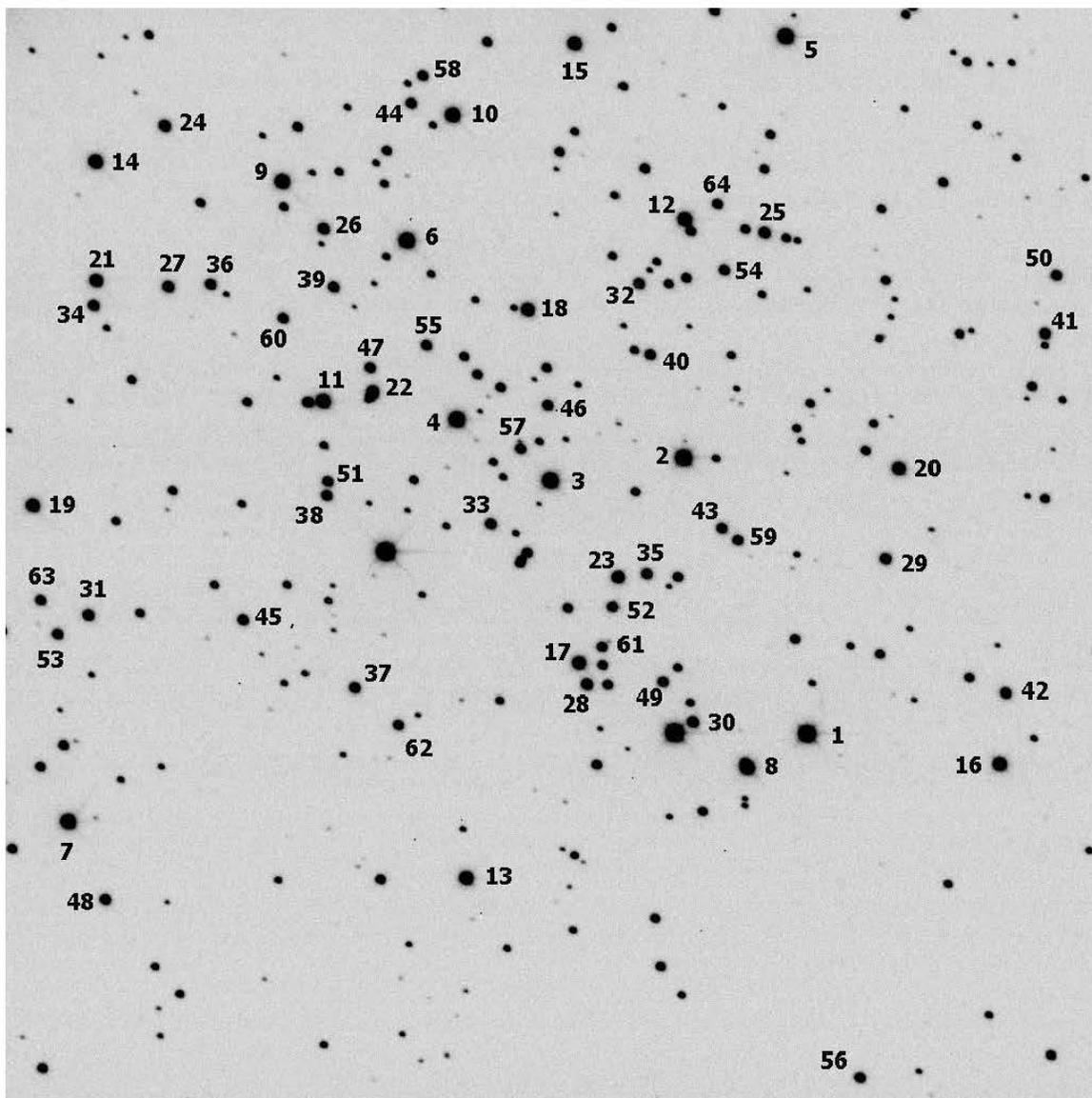
Select the set(s) to delete, click on the Delete transform sets button. A success message will appear –



## 10. TransformGenerator Support

Questions and suggestions can be emailed to: [gordonmyers@hotmail.com](mailto:gordonmyers@hotmail.com)

### M67 Standards Field



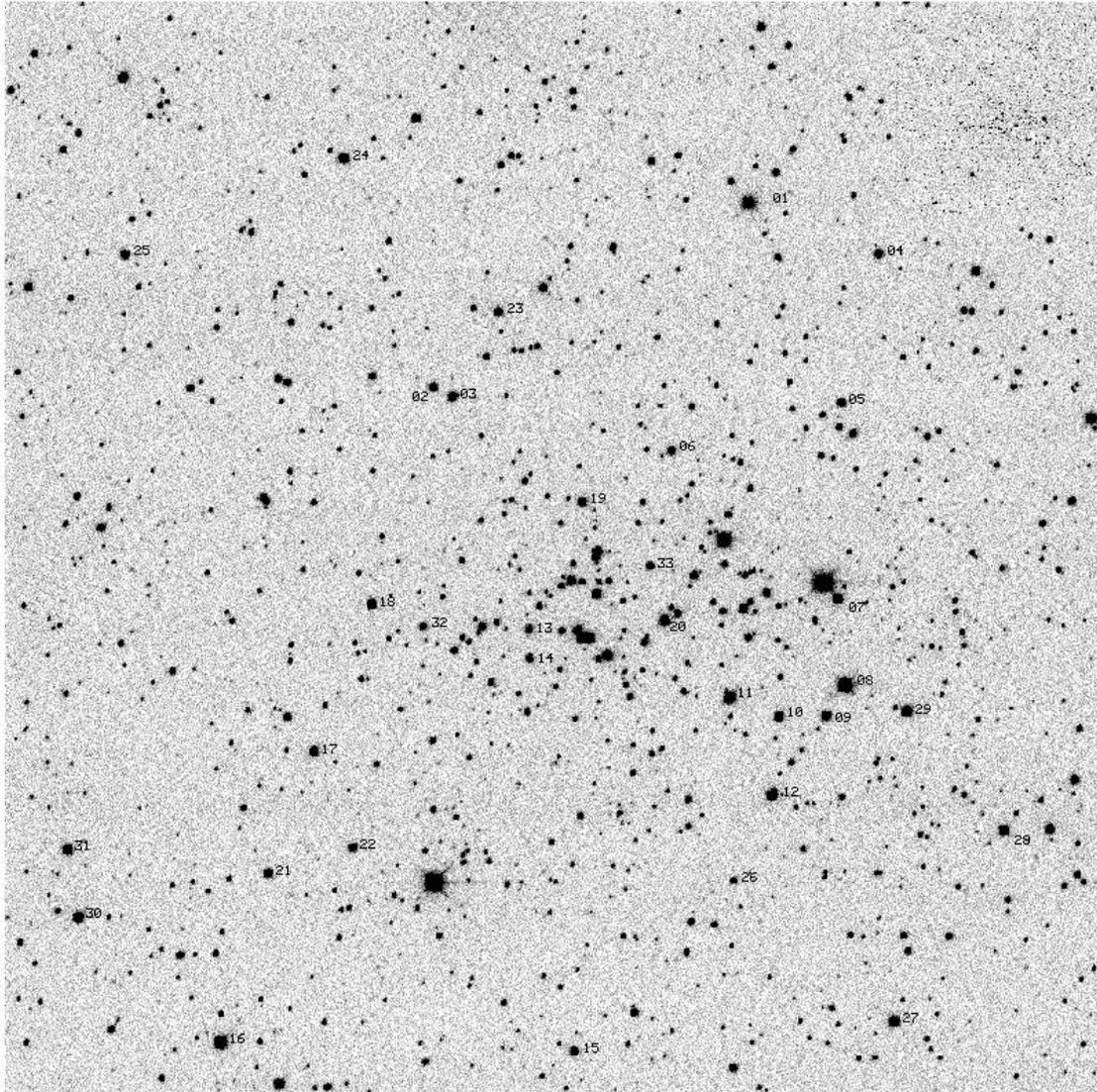
Approximate field center: 08:51:20+11:47:00 J2000

[Arne's UBVRcIc data for the numbered stars in the image above](#)

[Arne's full set of M-67 calibration data](#)

[Arne's full writeup on the M67 experiment](#)

## NGC 7790 Standards Field



Calibration data from Arne:

NGC7790 Standard Field  
 Update 14 October 1999  
 field center approximately star 20 at  
 23:58:23.20 +61:12:25.0 J2000  
 4 Observations

ID	RA (J2000)	DEC	V	B-V	U-B	V-R	R-I	verr	bverr	uberr	vrerr	rierr
1	359.566634	61.280182	11.659	0.567	0.130	0.349	0.346	0.005	0.006	0.044	0.002	0.014
2	359.681309	61.247799	13.518	0.458	-0.047	0.316	0.366	0.005	0.012	0.014	0.006	0.003
3	359.674397	61.246143	13.135	0.537	0.271	0.323	0.354	0.006	0.007	0.019	0.008	0.013
4	359.519403	61.271313	13.469	0.428	0.209	0.255	0.280	0.006	0.003	0.051	0.006	0.007

## Appendix C: Details for using AIP4WIN data with TG

This note was posted on the AAVSO web site in response to a member's question:

### Using AIP4WIN with TG



[mgw](#)

Online

Joined: 2010-08-01

Posted: March 10, 2015 - 3:19pm

Keith,

You don't need all the magnitude information on the M67 stars. TG automatically retrieves it from the AAVSO web site's VSP tool.

What you do need is a comp list with the 64 ids (1-64) so you can select those stars in AIP4WIN and get the right Boulder identifier. (The TG Users guide V 5.6 has a new appendix A that shows an image of the M67 field with the 1-64 star ids).

To help get the right comp star ids I created an AIP4WIN "STAR" file that contains all 64 M67 standard stars. It is attached to this post. (NOTE: When you download it, remove the `_.txt` at the end of the file name. I had to add `_.txt` to be able to post the file on this blog. AIP4WIN is looking for the file to end in `.STAR`.) Copy this `M67_Henden_Field_Comps.STAR` file into the AIP4WIN/Data directory (usually `C:\Program Files (x86)\AIP4Win\Data`).

Now start MMT. On the MMT Images tab load all your M67 images for all the filters. Select one image to locate the comps (I usually select one of the V filter images). Go to the MMT Stars tab and click "Recall..." to load that M67 file containig all the comps.

Select any star as the M67 target (i.e. AIP4WIN's "V" star - which again, is not used). Now select the comp stars - you'll see the comp number matches the boulder id. Once all the comps are selected, go to the AIP4WIN Report tab and select the options shown in the TG Users Guide section 4.4.1.5. Then go to the AIP4WIN Execute tab, pick a good guide star and "Run Photometry". Because you have different filter images, AIP4WIN will usually ask you reconfirm the guide star between images.

AIP4WIN will find all the stars in each image. Sometimes stars in one band won't have adequate SNR for AIP4WIN, but that's OK. AIP4WIN indicates the error in the output report file and TG handles it.

The AIP Instrument Magnitudes file created this way can be directly loaded into TG.

FYI, TG goes to the AAVSO web site to retrieve the current standard star magnitudes from VSP, so don't worry about the magnitudes in the STAR file.

One other suggestion - if you want to ease the star selection burden and only identify the first 30 standard stars, edit the STAR file (in Notepad) by deleting all stars above 30.) Pragmatically I find the results are very good.

Another point - when you run TG you will get an error message that some of the Boulder id do not have an AUID counterpart. That's true - some of the original stars are no longer in the standards field. Don't worry, TG will generate the transforms based on the other stars.

Again, think about using VPHOT to identify the stars - it saves a lot of work