



Comet 1P/Halley

Image taken by Michael Jäger



## Dark Sites – Austrian Voralpen



180mm/2.8 Zeiss Sonar Lens

23P/Brorsen-Metcalf September 1989





Schmidtcamera  
f 450mm 1:1,9









Kodak Technical Pan Film – performed not nearly in resolution to the Schmidt camera

We had only one image for a print – no stacks have been possible





One have to hypering the film









Dynamic Range was very low











Thankfully digital imaging find ones way into astroimaging  
Corona Australis\_Namibia 2001\_14" f 3.3\_6x9cm Film





A picture is worth a thousand words  
Namibia 2004\_Starlight SXV-H9 50mm lens





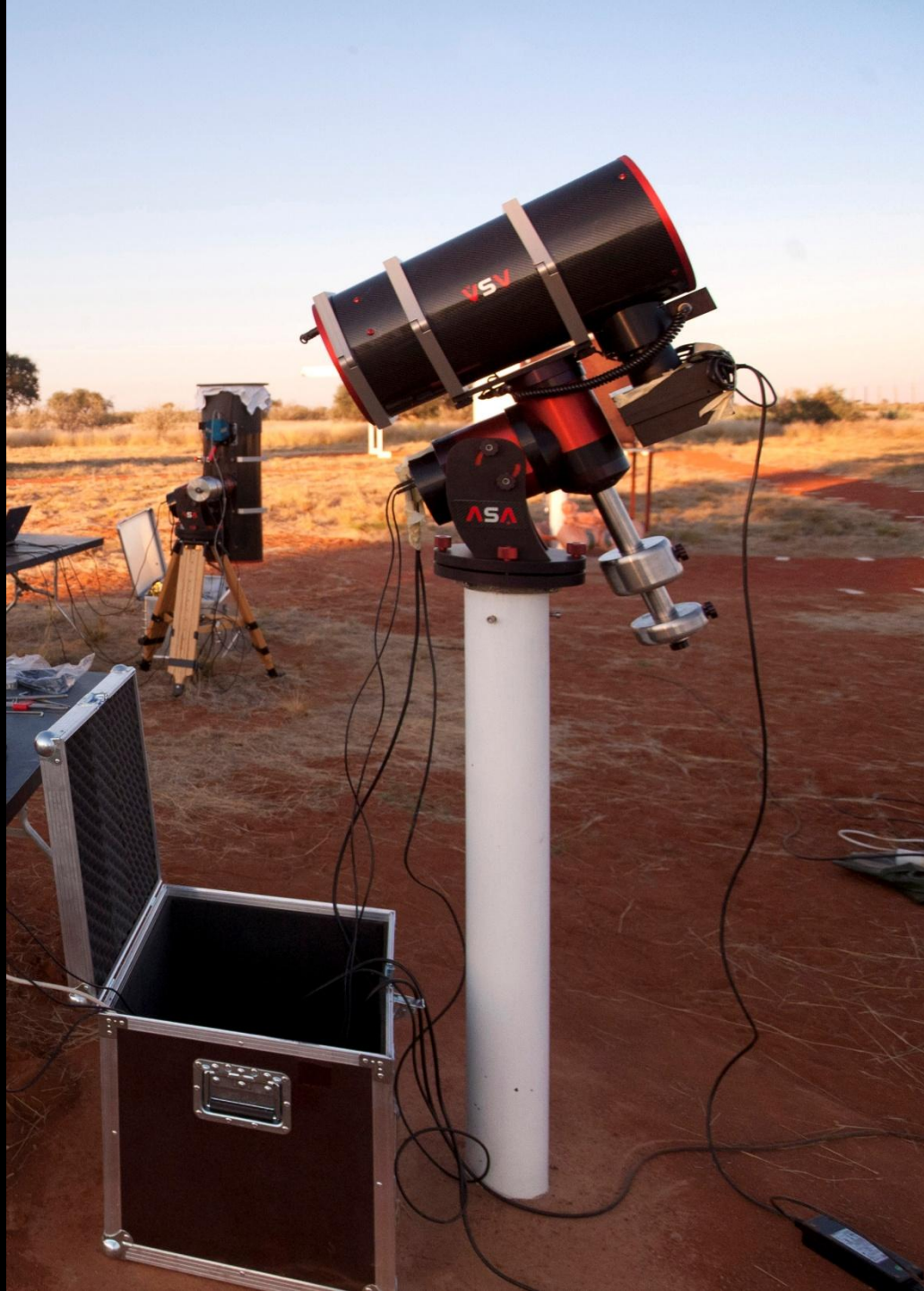
Nowadays expose times are several hours and images are aquired over several nights





Performance and Deepness are constantly shifting in a range we never expected before





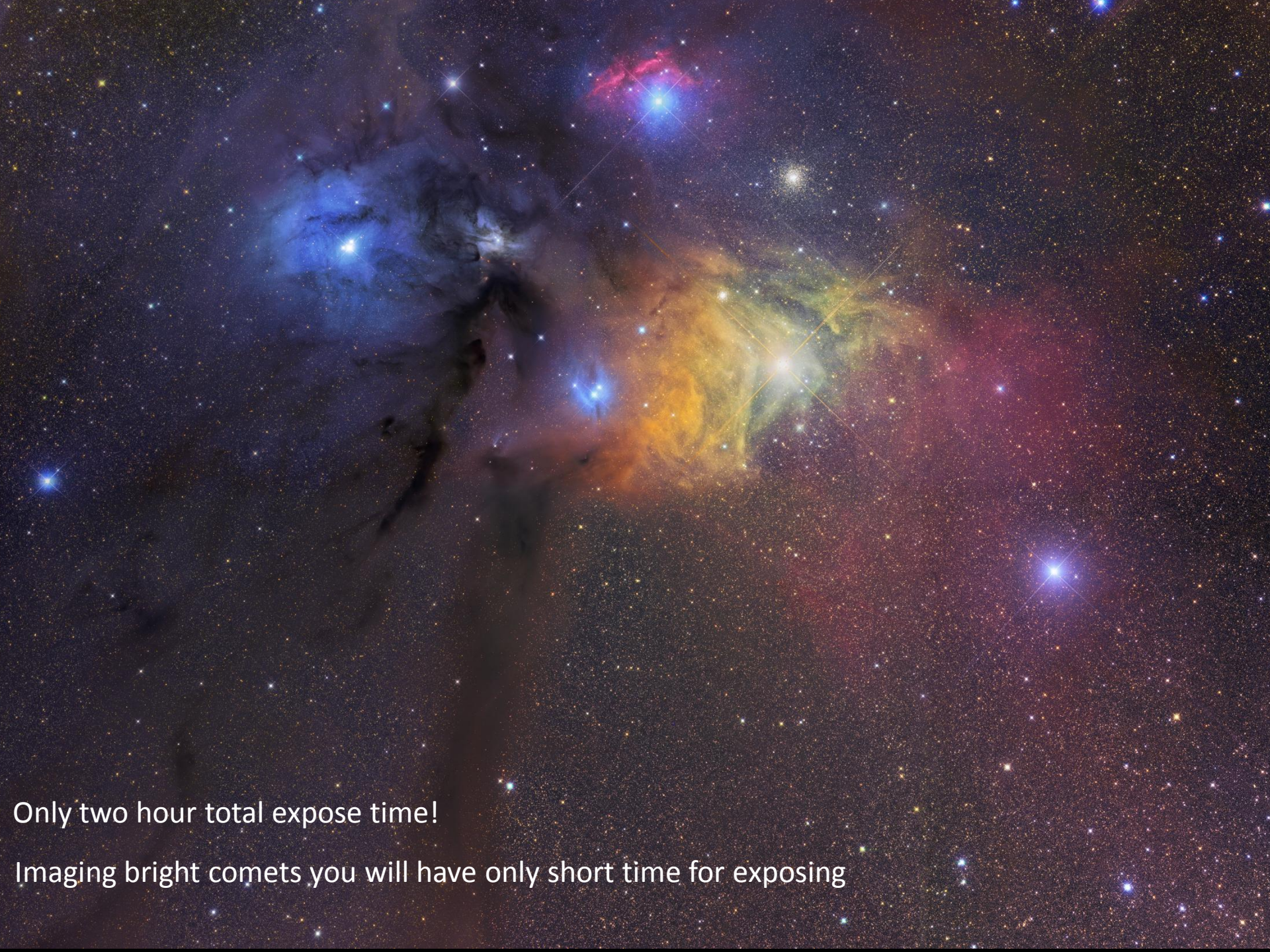
Fast focal ratio – portable – wide field

Hyperbolic Astrograph f 2.8 60mm CFOV

FLI PL 16803 camera 52mm Sensor Diagonal

Corrected FOV 3,5 x 3,5 °





Only two hour total expose time!

Imaging bright comets you will have only short time for exposing





The difference to Deep Sky imaging are:

- Images of comets are unique - you have only one chance
- The time window for imaging is very short
- Motion of the comet
- Motion of the tail
- You have to be fast in processing





Komet C/2009 P1 Garradd Video

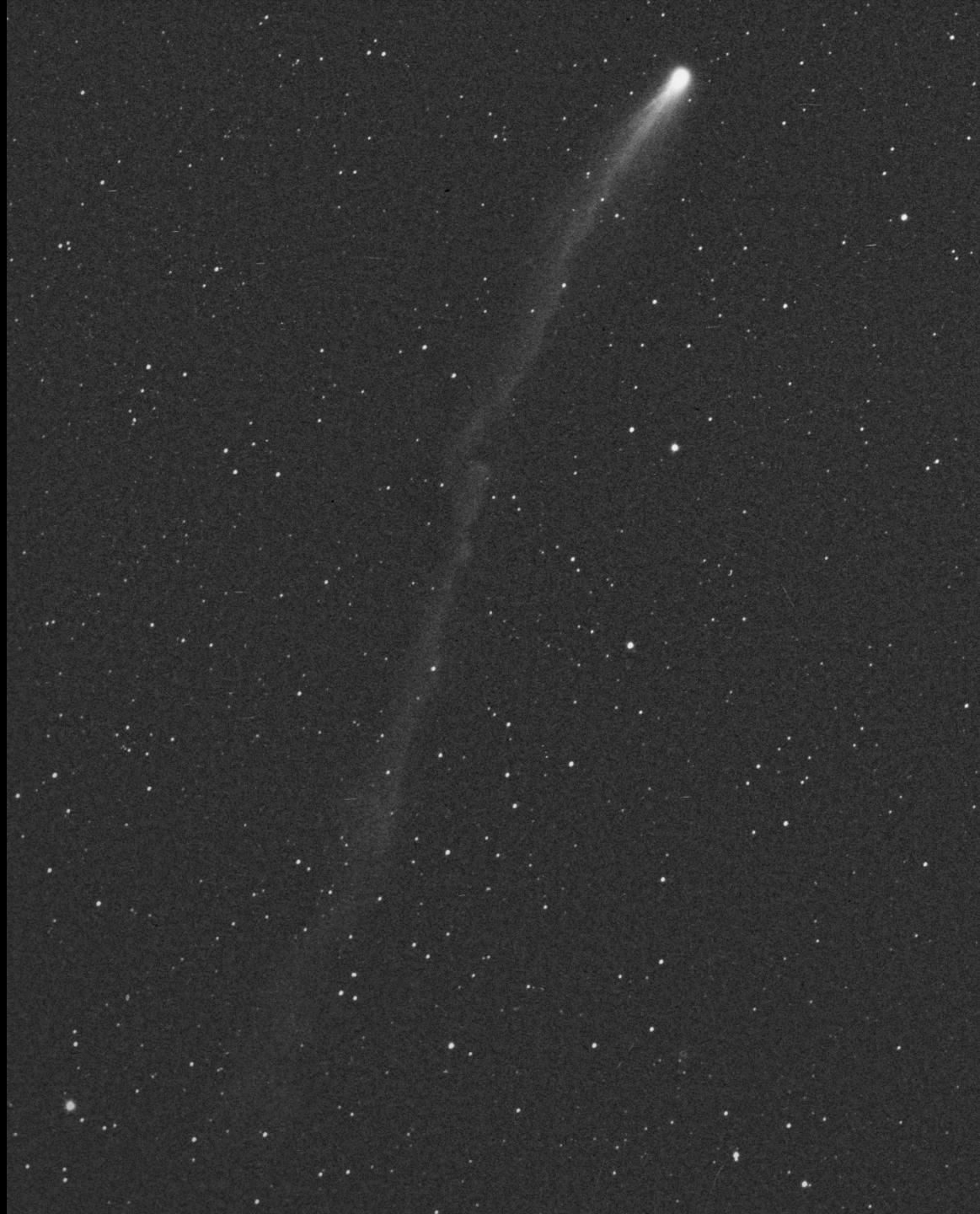
March 2012



153P/ Ikeya-Zhang

March 2002 Schmidtcamera







45P/Honda-Mrkos-Pajdusakova

October 2011



A deep-sky photograph showing a comet, C/2012 K5 LINEAR, in the center. The comet has a bright, yellowish-white nucleus and a faint, diffuse, yellowish coma. The background is a dark, deep blue space filled with numerous stars of varying colors, including white, yellow, and blue. Some stars show prominent diffraction spikes. In the bottom center, there is a very bright, blue-white star with a large, prominent X-shaped diffraction pattern. The text "C/2012 K5 LINEAR" is written in white, underlined font in the bottom left corner.

C/2012 K5 LINEAR

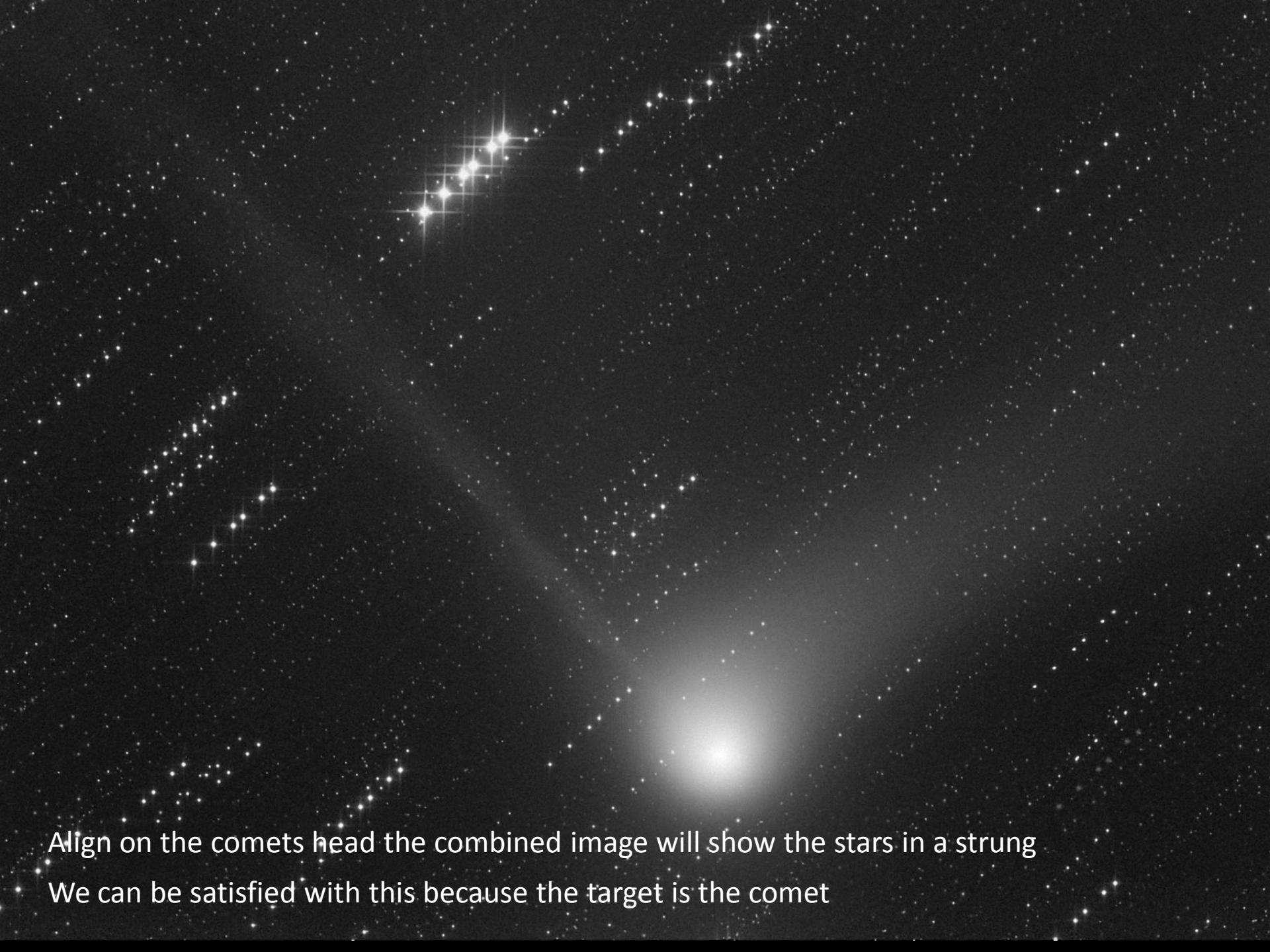




Expose time of a single image is limited by the motion of the comet


When we align on the stars the combined image will show us a blurred comet image





Align on the comets head the combined image will show the stars in a strung  
We can be satisfied with this because the target is the comet



The background of the slide is a black and white photograph of a starry night sky. A bright comet with a long, diffuse tail is visible, streaking from the lower right towards the upper left. The comet's head is a bright, glowing orb, and its tail is a wide, soft, white-to-greyish band that fades into the background. Numerous sharp, point-like stars of varying brightness are scattered across the entire field of view, some showing diffraction spikes.

Or we can try to receive a pretty picture which shows comet and stars sharp as well

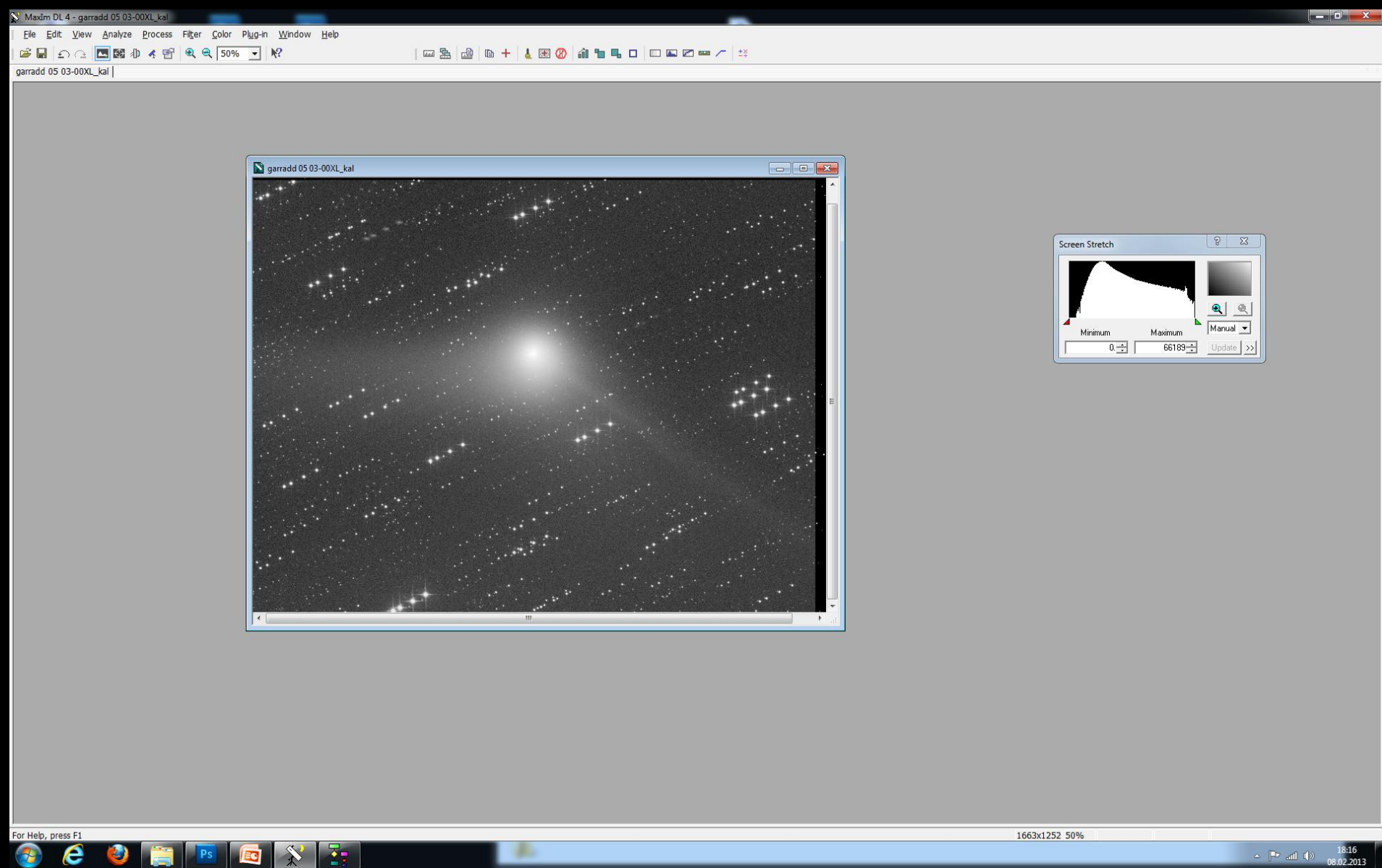
How can we achieve such a result:

We have to align and combine on the comet and eliminate the stars from the image

Next we have to align and combine on the stars and eliminate the comet from the starfield

Finally we have to fade in the comet image into the star field





Make sure at imaging that there is enough space between the stars

Maxim DL 4 - Combine - garradd 05 03-001L\_kal.FIT

File Edit View Analyze Process Filter Color Plug-in Window Help

Combine - garradd 05 03-001L\_kal.FIT

Information

Cursor (X= 780, Y= 532 ), Rad= 10, Rad2= 22

Pixel	62194.930	Magnitude	-6.965
Maximum	62634.902	Intensity	6.106802e6
Minimum	30894.658	SNR	122.094
Median	44230.160		
Average	46633.008	Bgd Avg	27368.650
Std Dev	10941.824	Bgd Dev	2809.253

Centroid (X= 782.752, Y= 530.047 )  
FWHM 13.495 Flatness 0.060

Mode Aperture Display in Arcsec Calibrate <<

Magnitude Calibration

Intensity 1 Extract from image

Exposure 1 Set from FITS

Magnitude 10 Apply

Spatial Calibration

Pixel scale X 10.00 Y 10.00

FITS scale not available

Diagonal from Start corner

Screen Stretch

Minimum 9875.1 Maximum 30723 Update >>

Combine Files

Align Mode Manual 1 star - shift only

File 1 of 4: garradd 05 03-001L\_kal.FIT  
Center point: Not set

Images to be included: 0 of 4  
Reference: garradd 05 03-

Manual Controls

☒ Use Centroid ☒ Auto Next

Star 1 Star 2

Overlay Controls

Nudge Size (pixels) 1

Click on the image to set rotation point

OK Cancel

Overlay All Images

Set As Reference

Reject Image

Next Image

Previous Image

Bicubic Resample

Output SD Mask Settings...

FITS Format IEEE Float

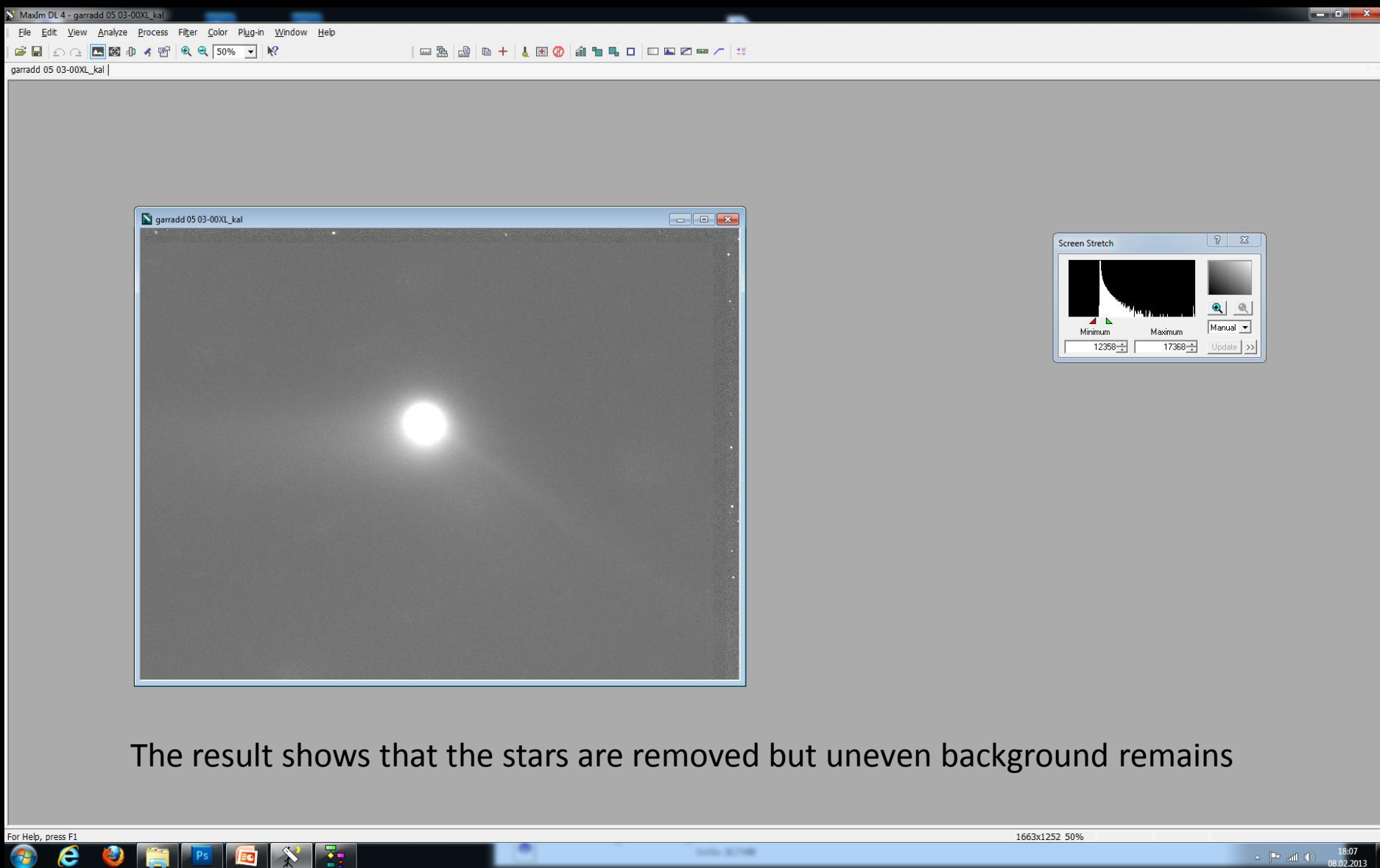
Align on the comets head and combine with SD Mask or Sigma Clip

Right-click for options, or roll mouse wheel to zoom. CTRL or SHIFT for more options.

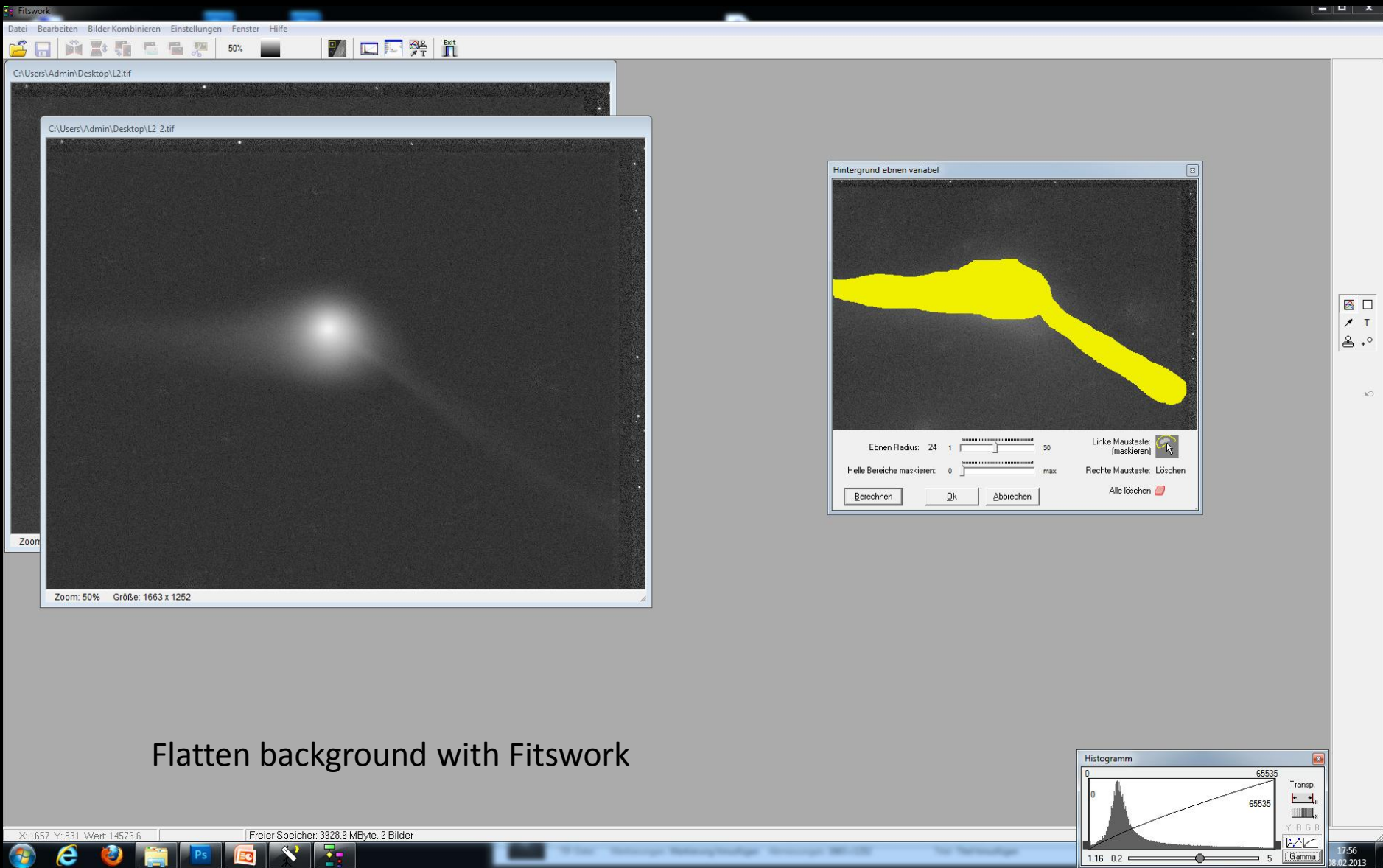
1663x1252 50% (780, 532) 62194.930

18:08 08.02.2013





The result shows that the stars are removed but uneven background remains



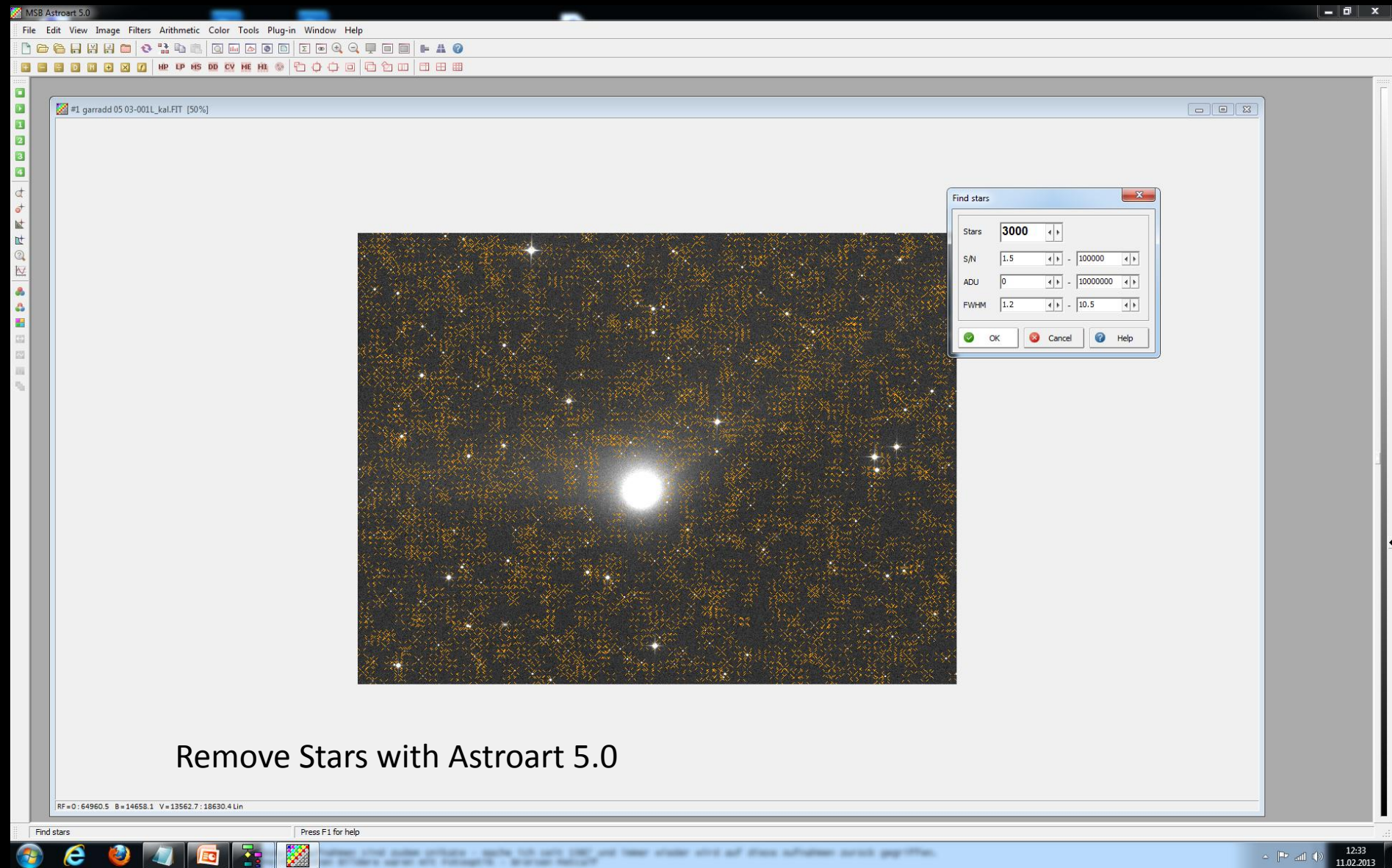


The algorithm of the programs to eliminate the stars requires at least 4 images

In respect of bright comets with small elongation at perihelion the time for imaging before dusk or after dawn is very short

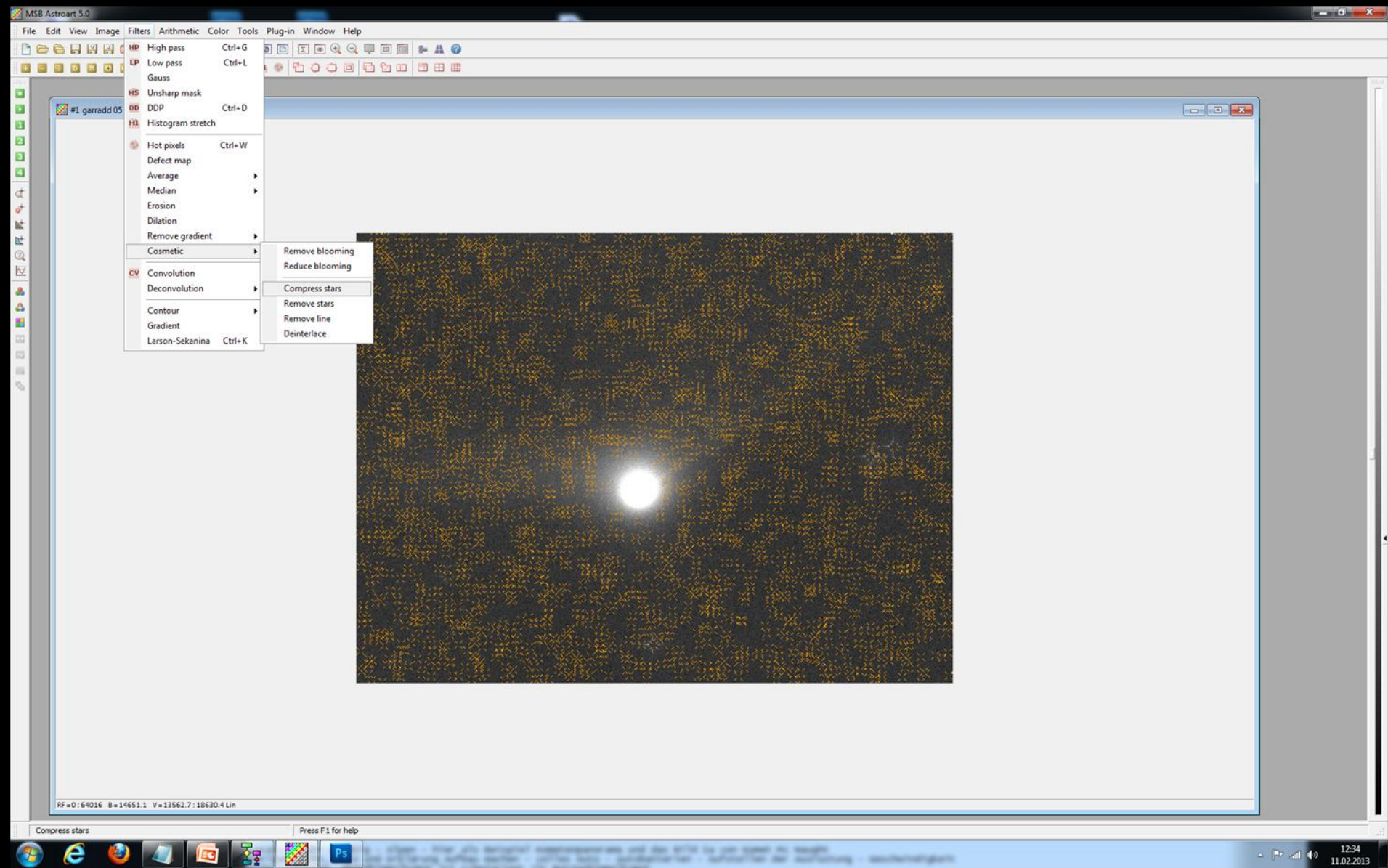
Thus we have to expect that we will not have the number of images required

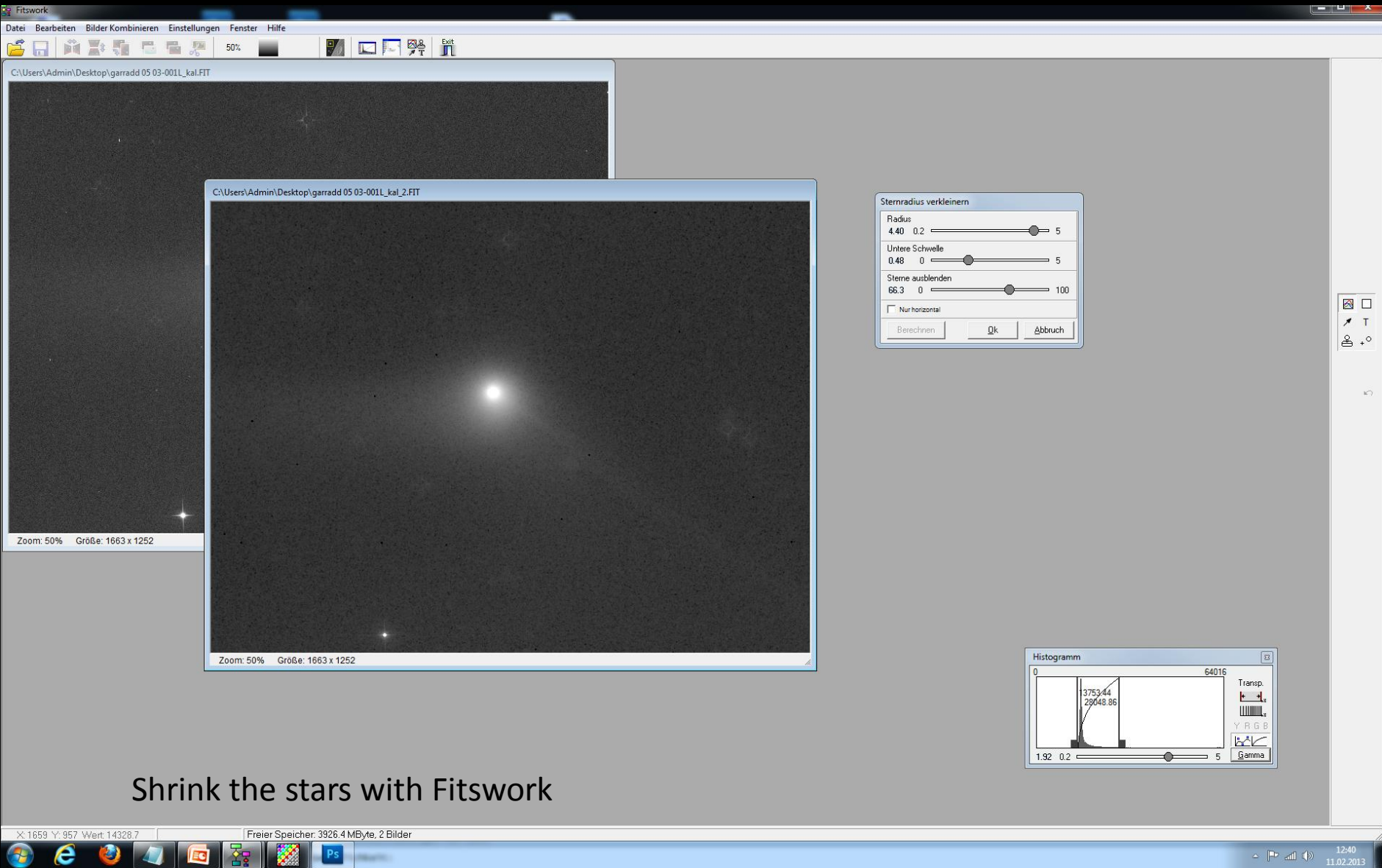
How can we proceed in this case, to eliminate stars



Remove Stars with Astroart 5.0

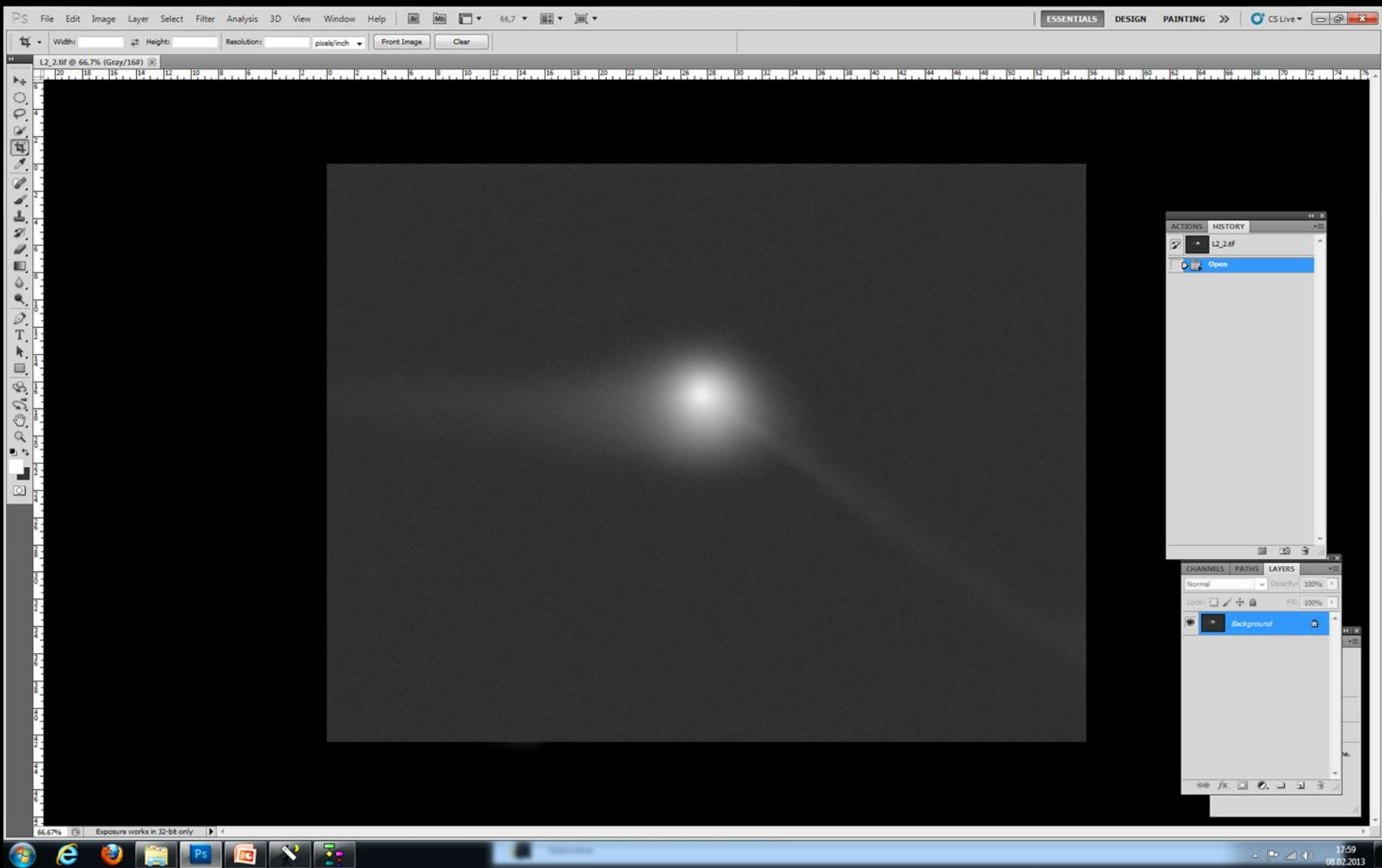




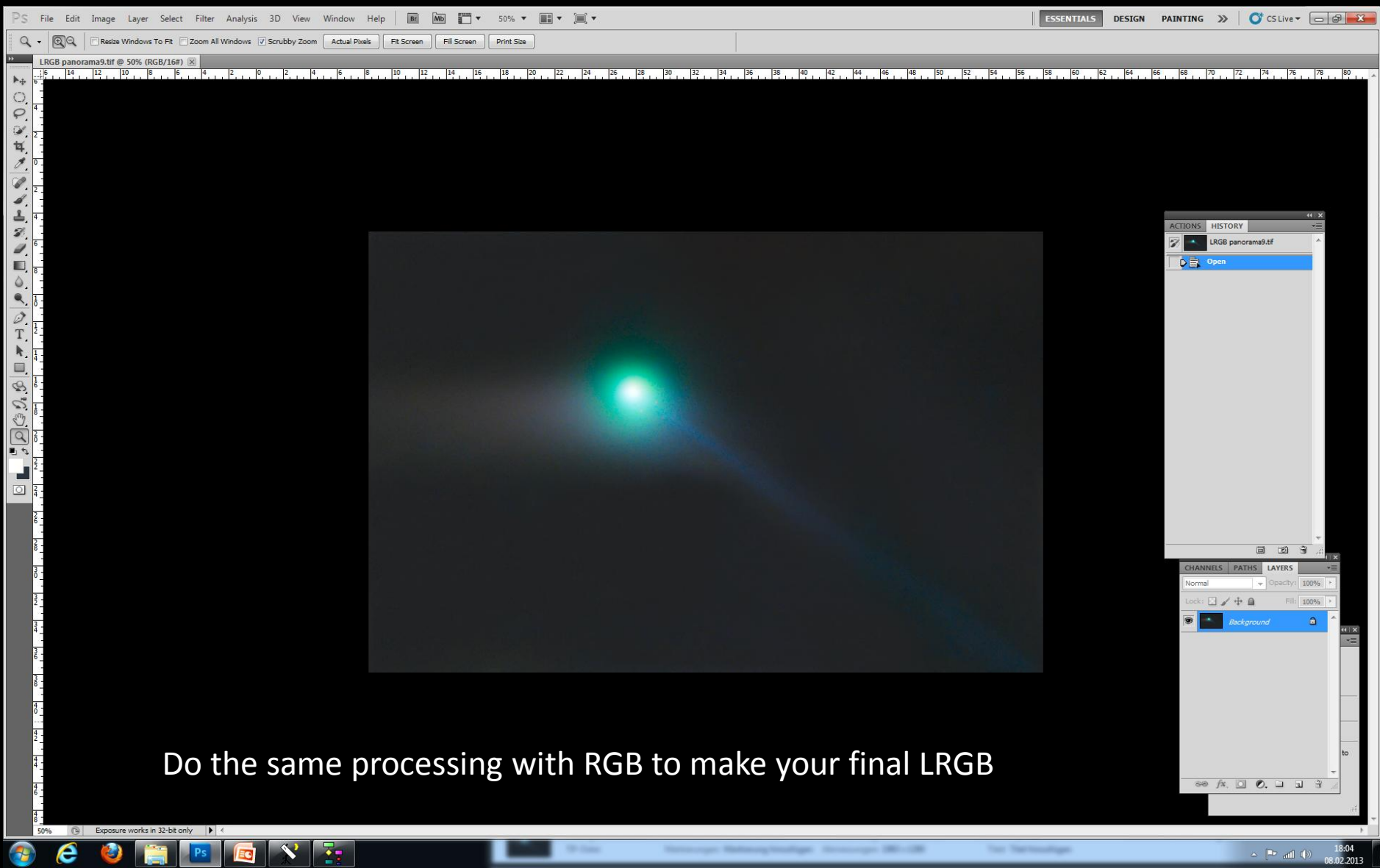


Shrink the stars with Fitswork



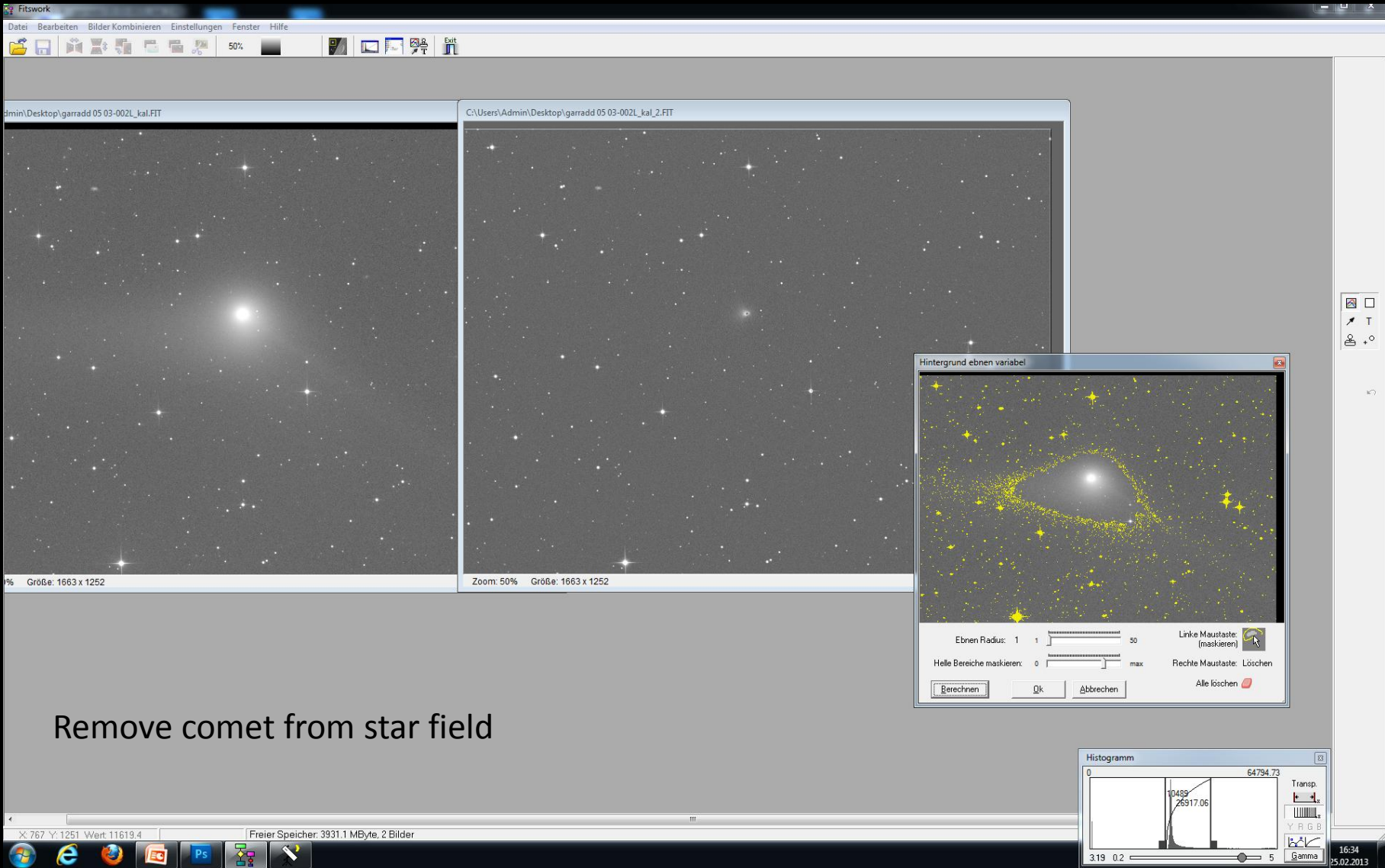


I prefer Photoshop to stretch the image to taste

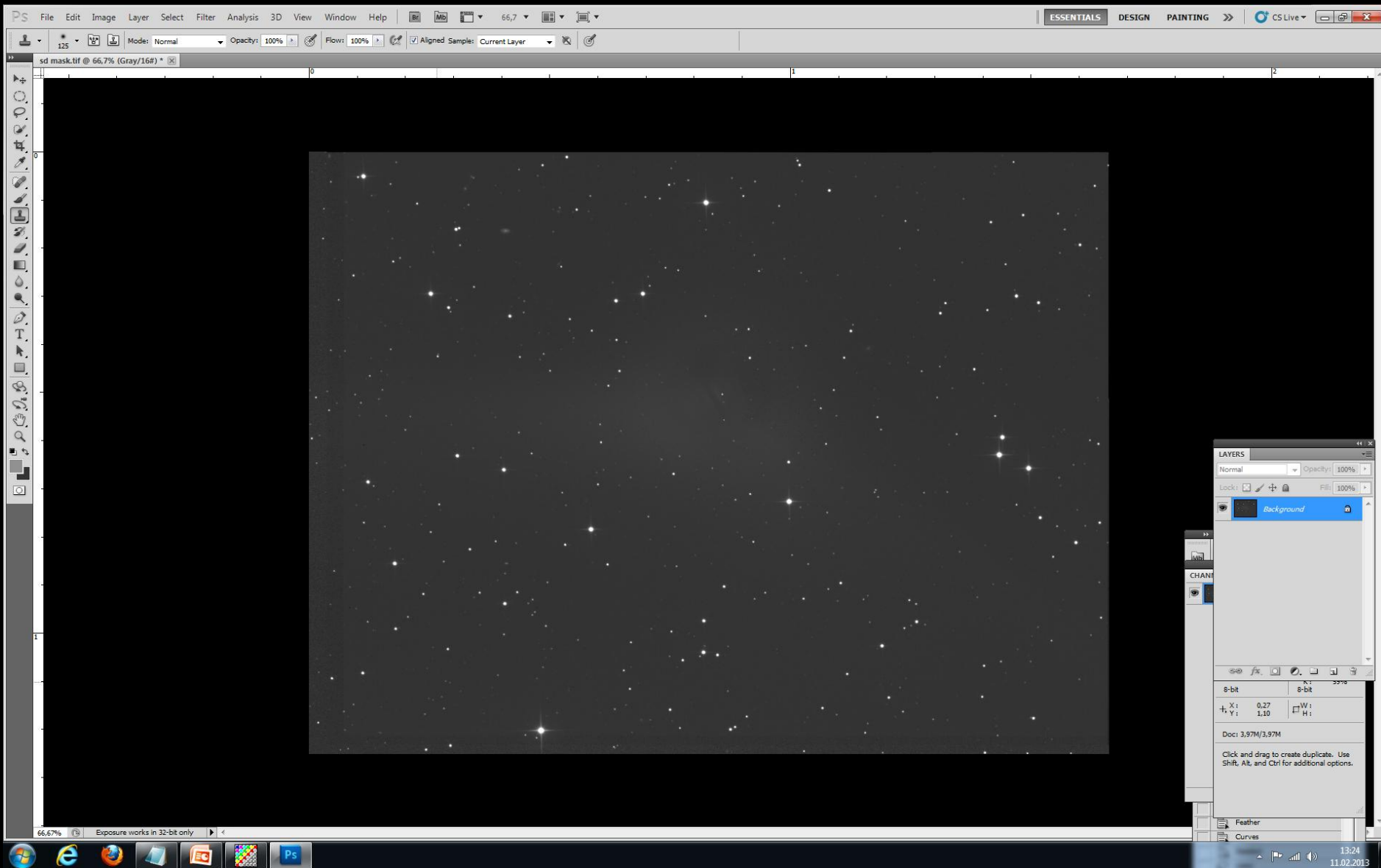


Do the same processing with RGB to make your final LRGB

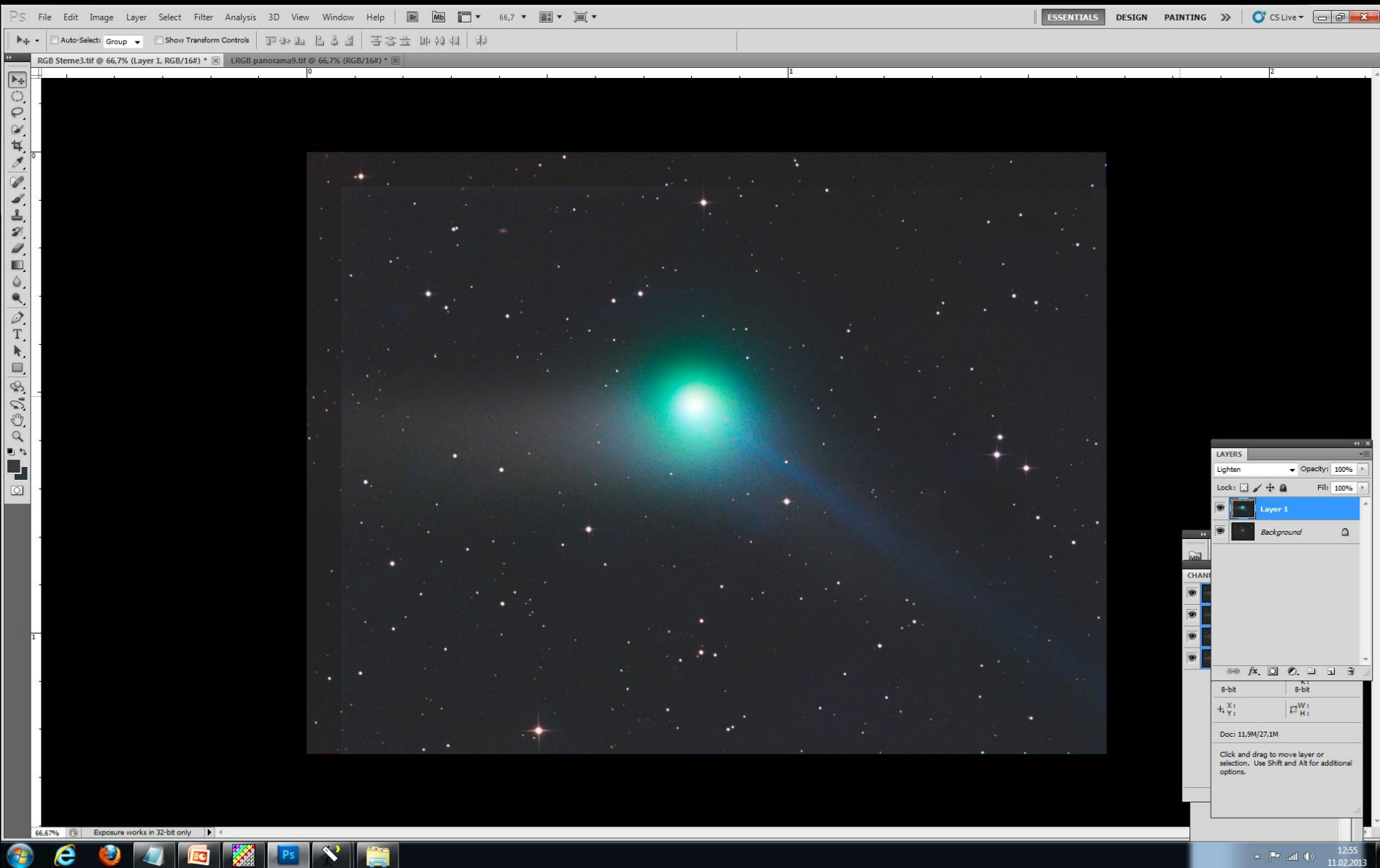




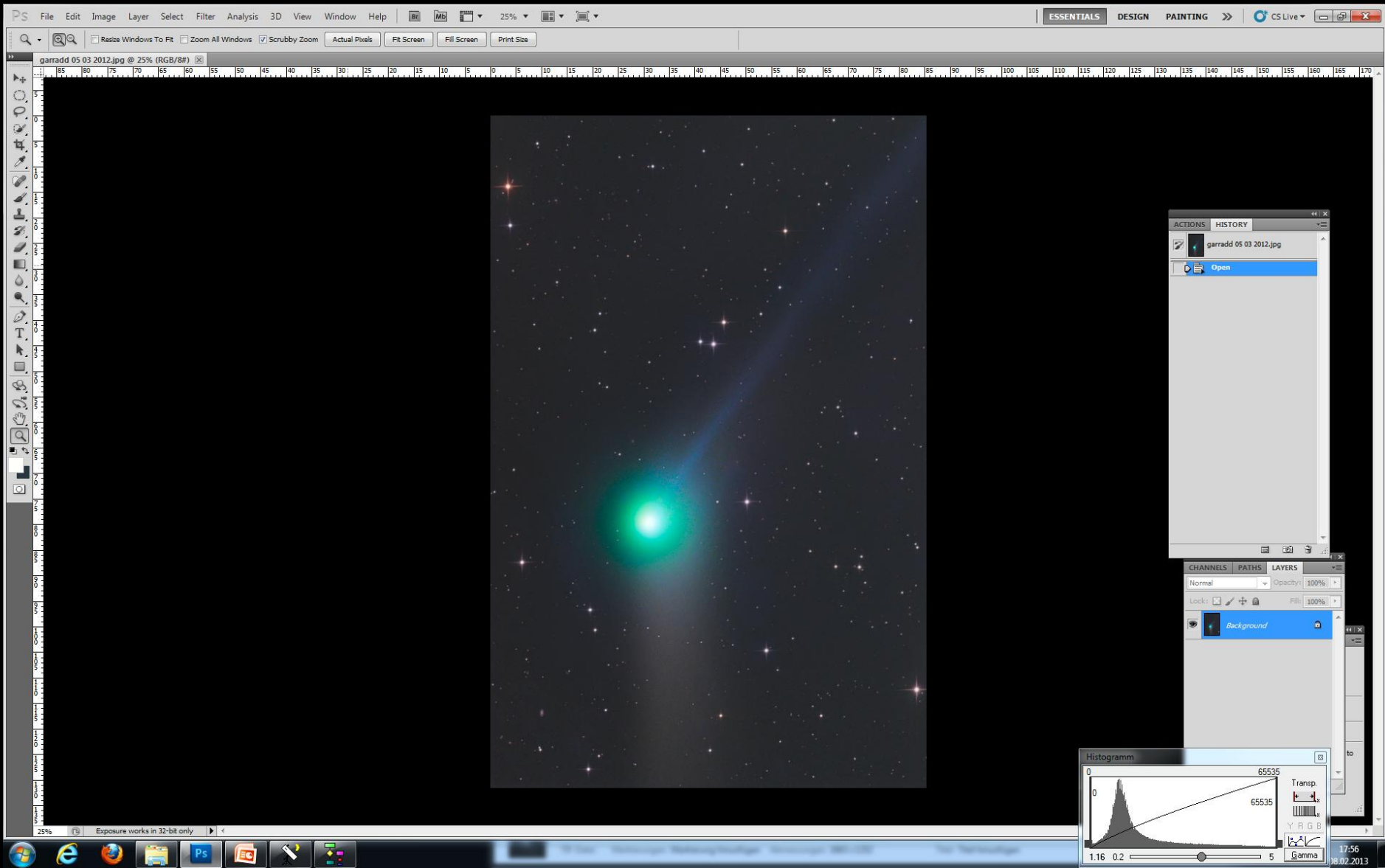
Remove comet from star field







Insert the comet image into the starfield



After flatten the layers one will process the image to taste





Famous and bright comets in the past  
109P/Swift-Tuttle November 1992



153P/Ikeya-Zhang April 2002







Schmidtcamera 225/250/450mm





Namibia May 2004





C /2002 T7 LINEAR





Morning May 15 2004







C/2004 Q2 Machholz January 2005







Comet 73P/Schwassman-Wachmann 3  
*Hubble Space Telescope • ACS/WFC*





Namibia May 2006







C/2006 M4 SWAN    Oct. 2006



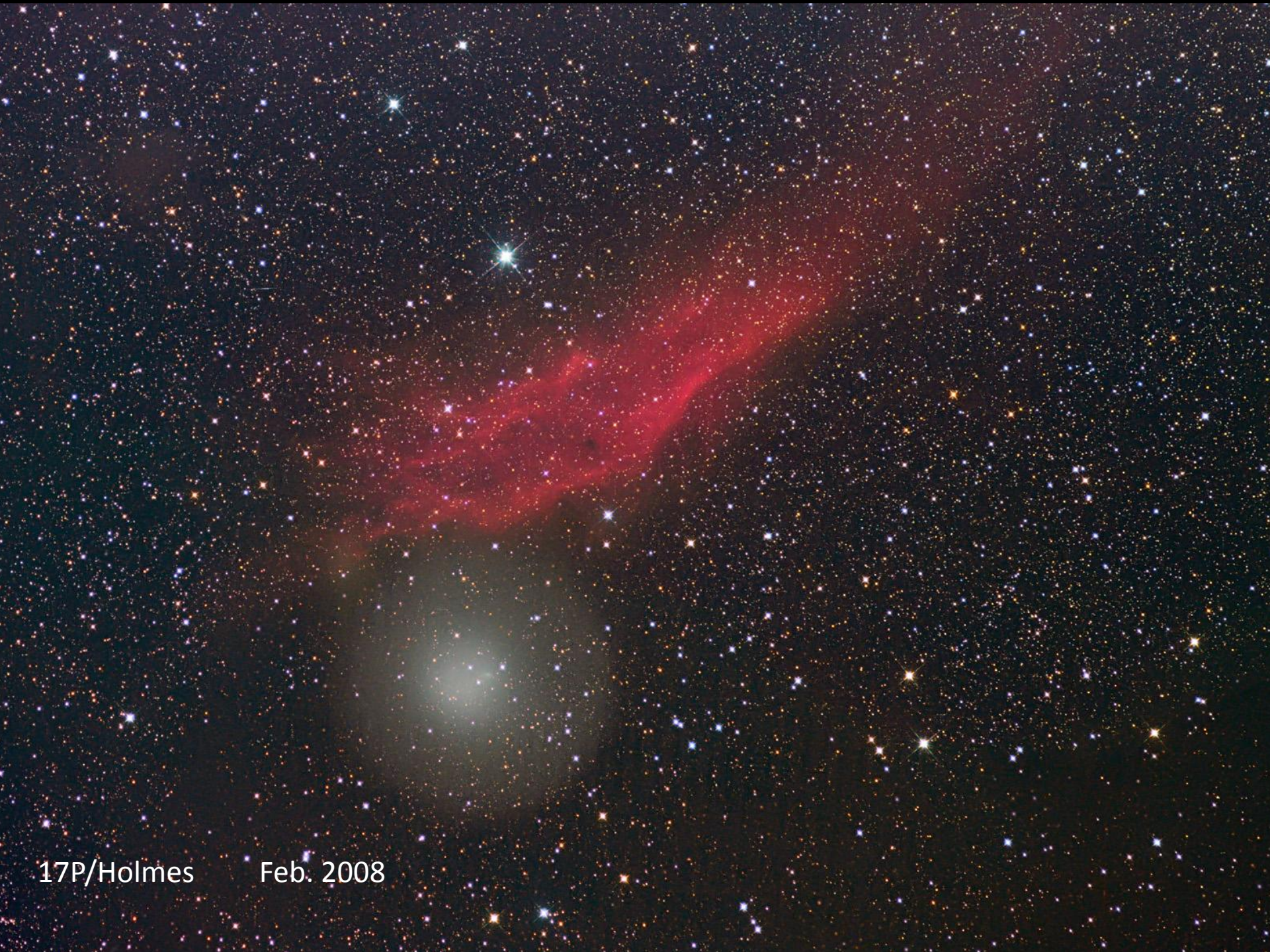
C/2006 P1 McNaught

January 2007









17P/Holmes

Feb. 2008





81P/Wild 2 April 2010





C/2009 P1 Garradd     January 2012





C/1996 B2 Hyakutake    March 1996





















C/1995 O1 Hale-Bopp

24mm Lens – mosaic



50 mm Lens  
Kodak 400 ASA Film







Light poluted place near Vienna  
135mm Lens, Kodak 400 ASA Film





Schmidtcamera 225/255/450 mm



Mosaic of two Schmidtimages













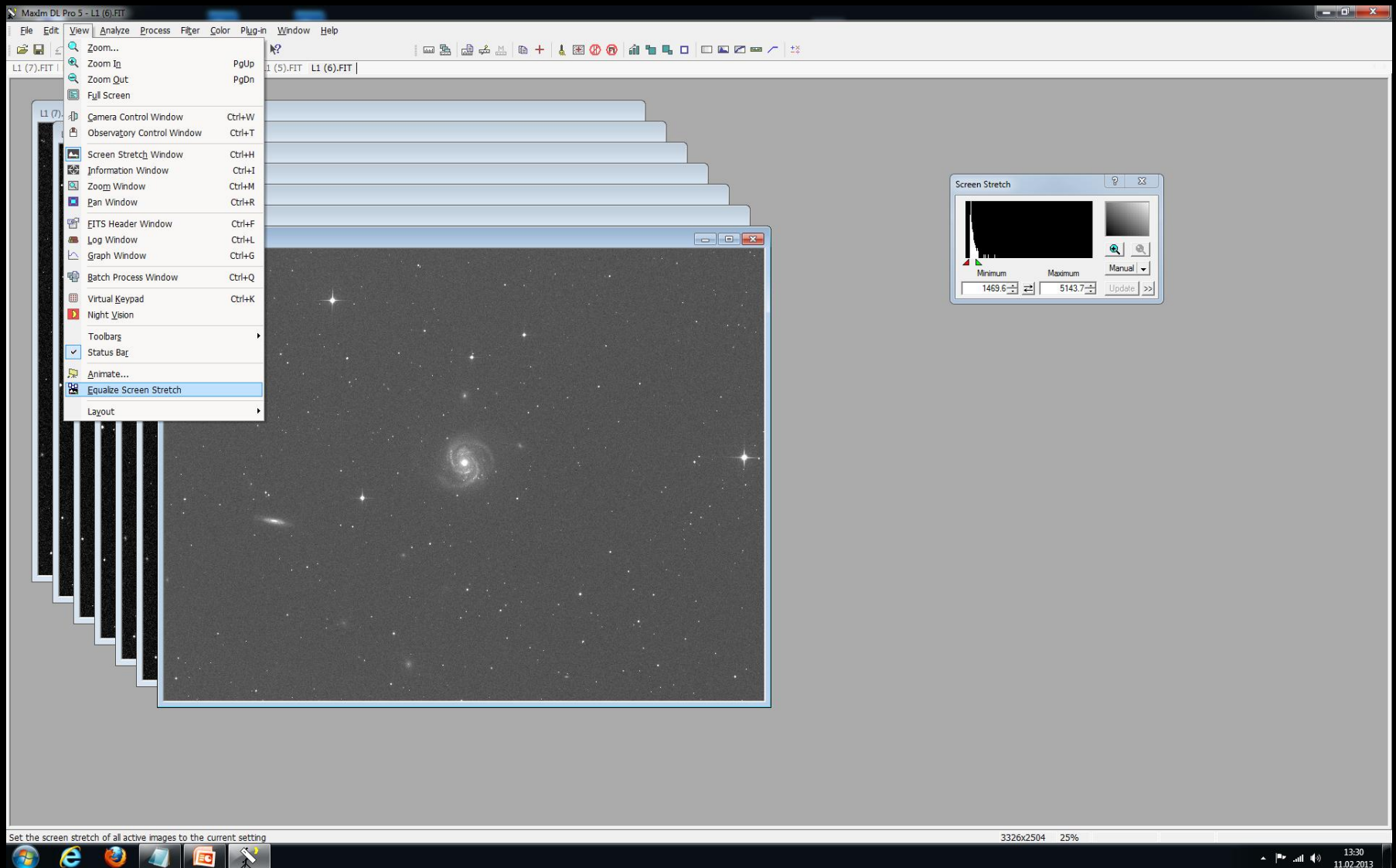






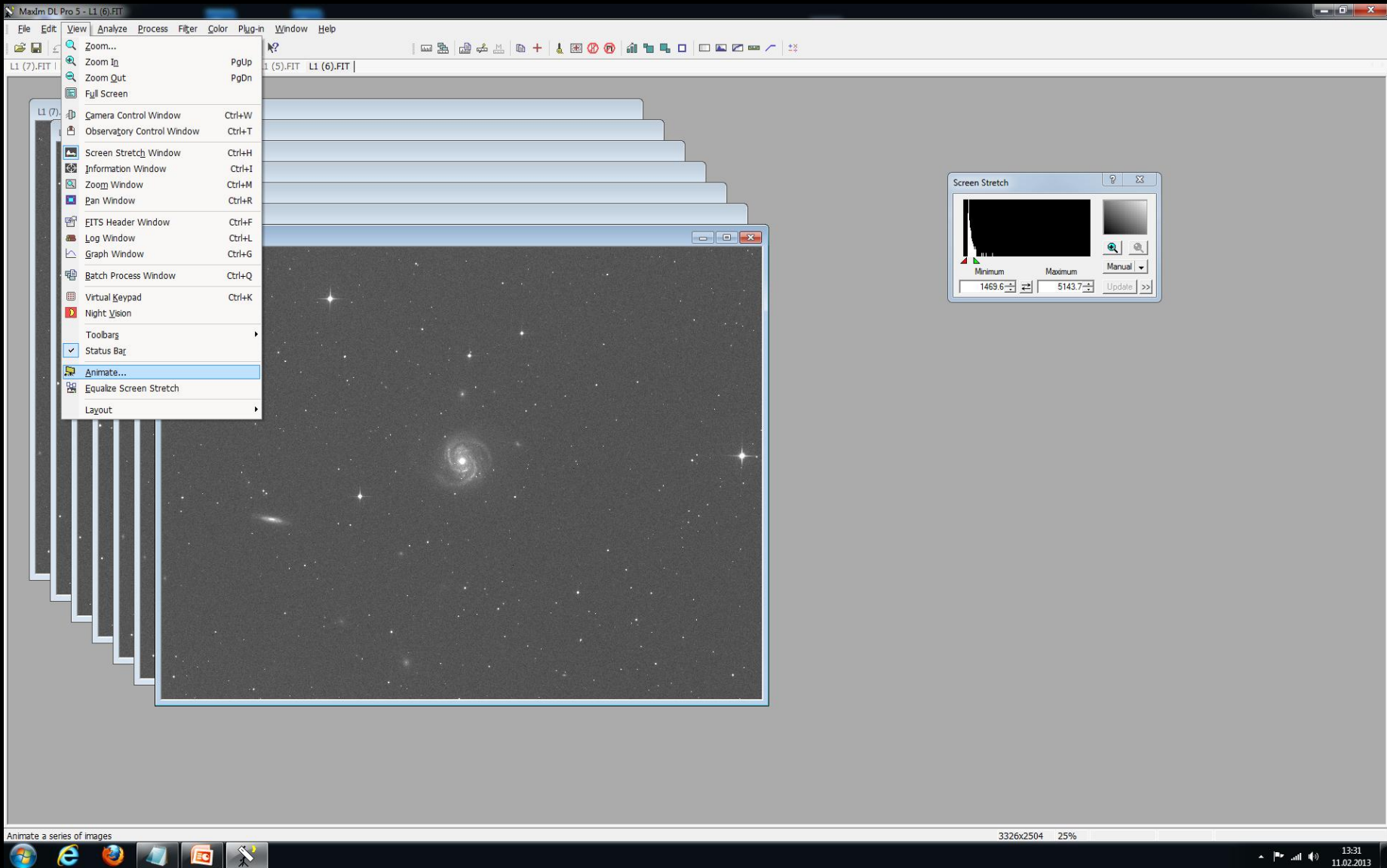
MP 1889 Pakhmutova Video

It should become a habit to check your images for moving objects

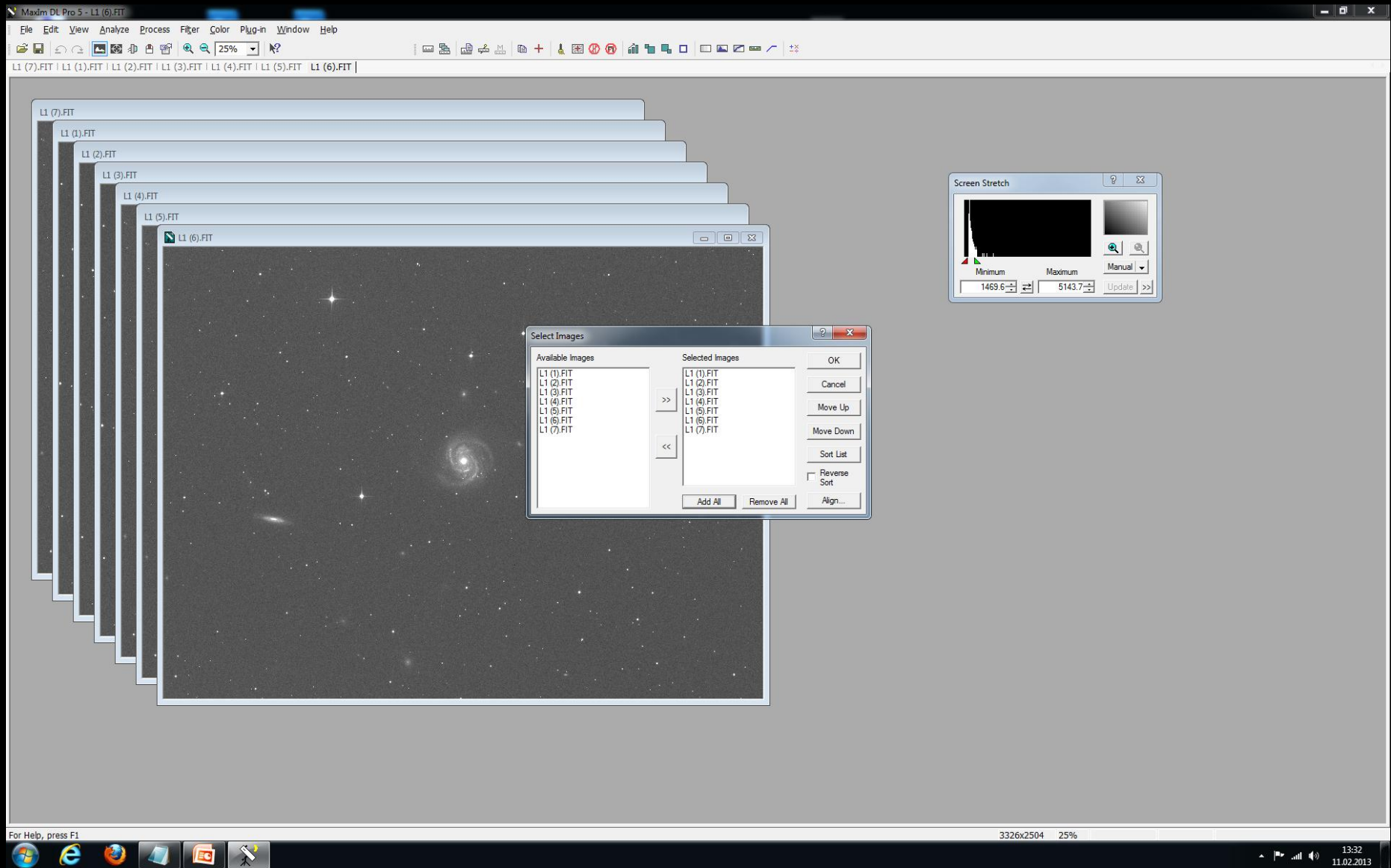


Equalize Screen Stretch



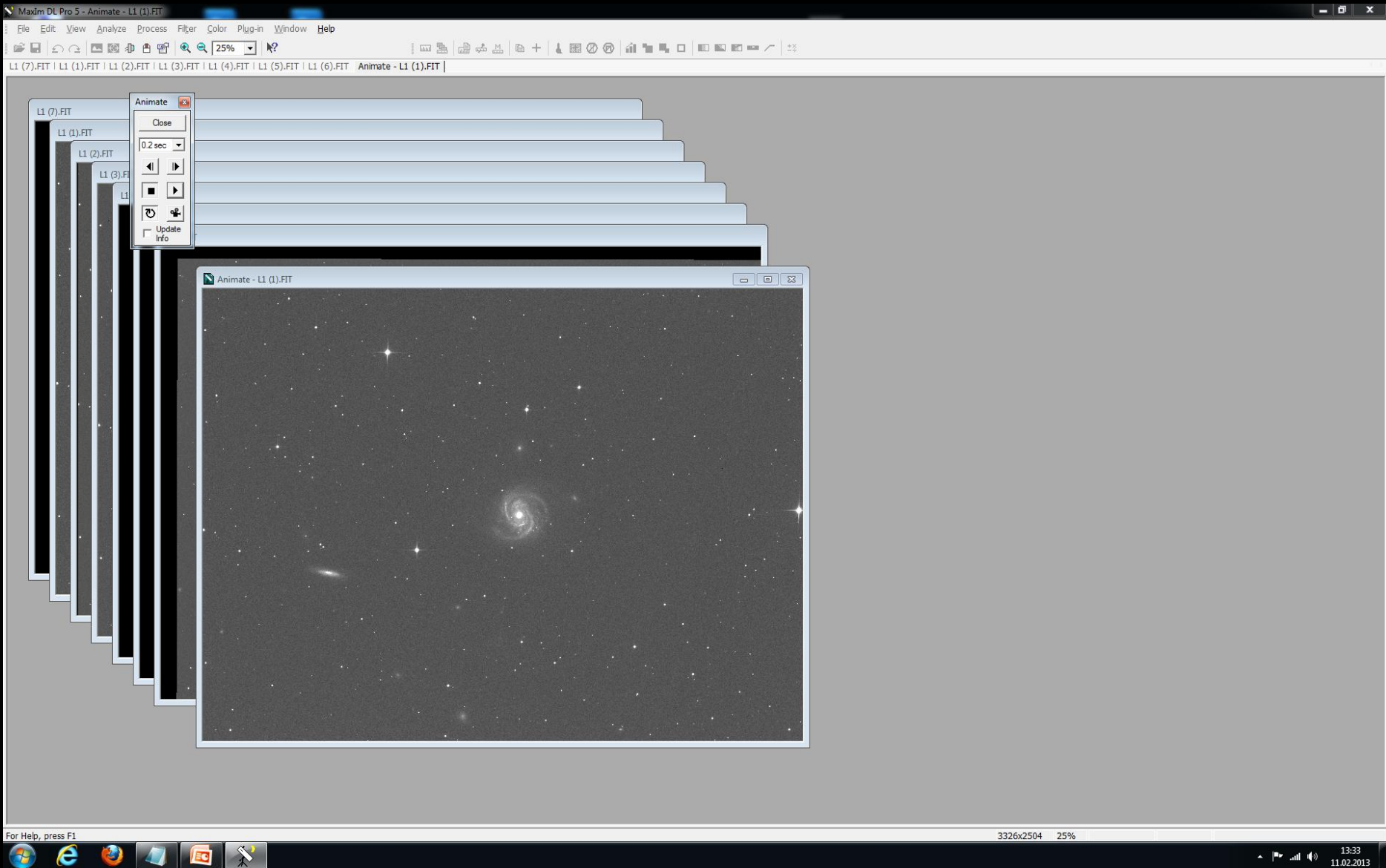


Animate

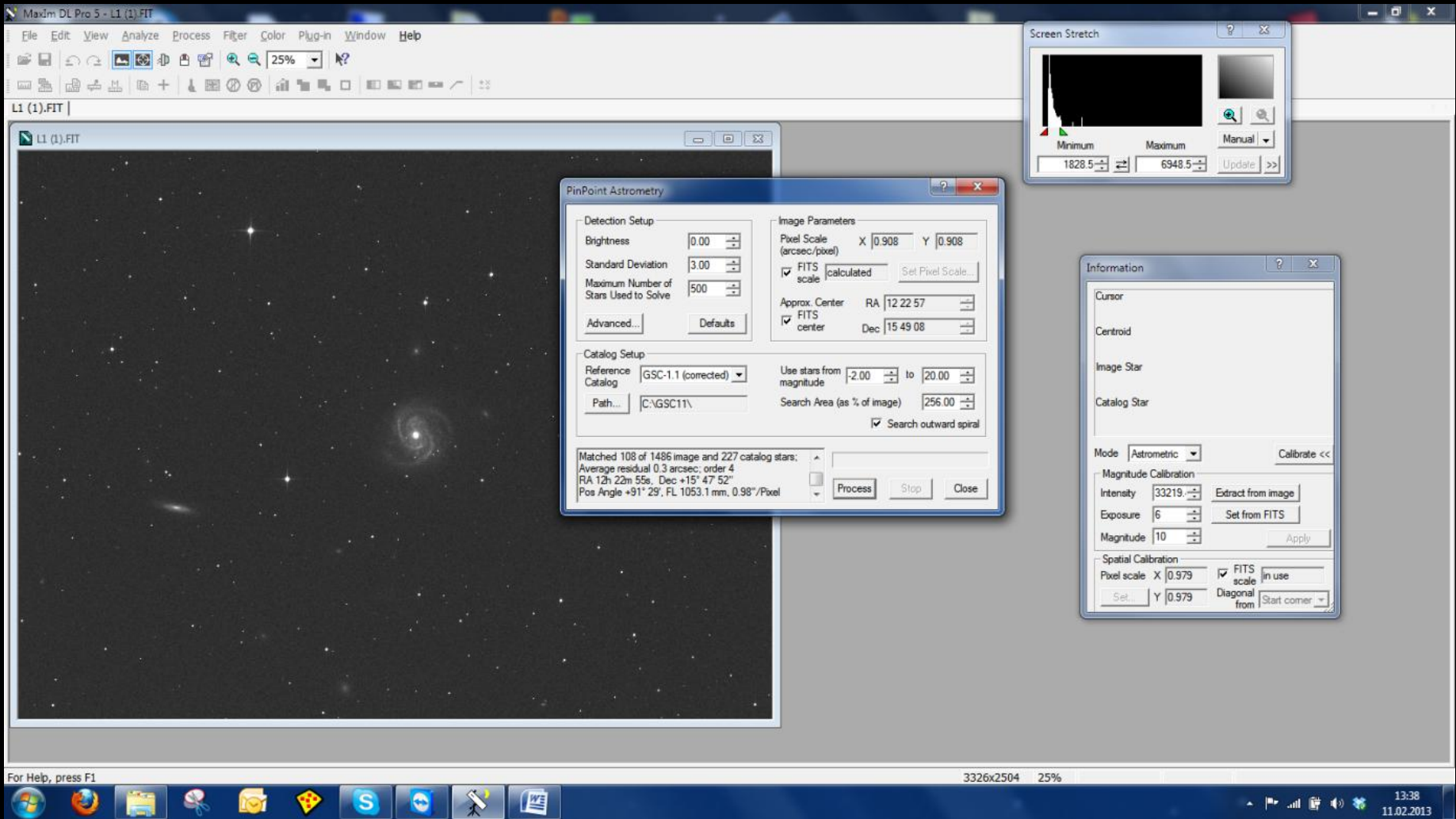


Add it all and align



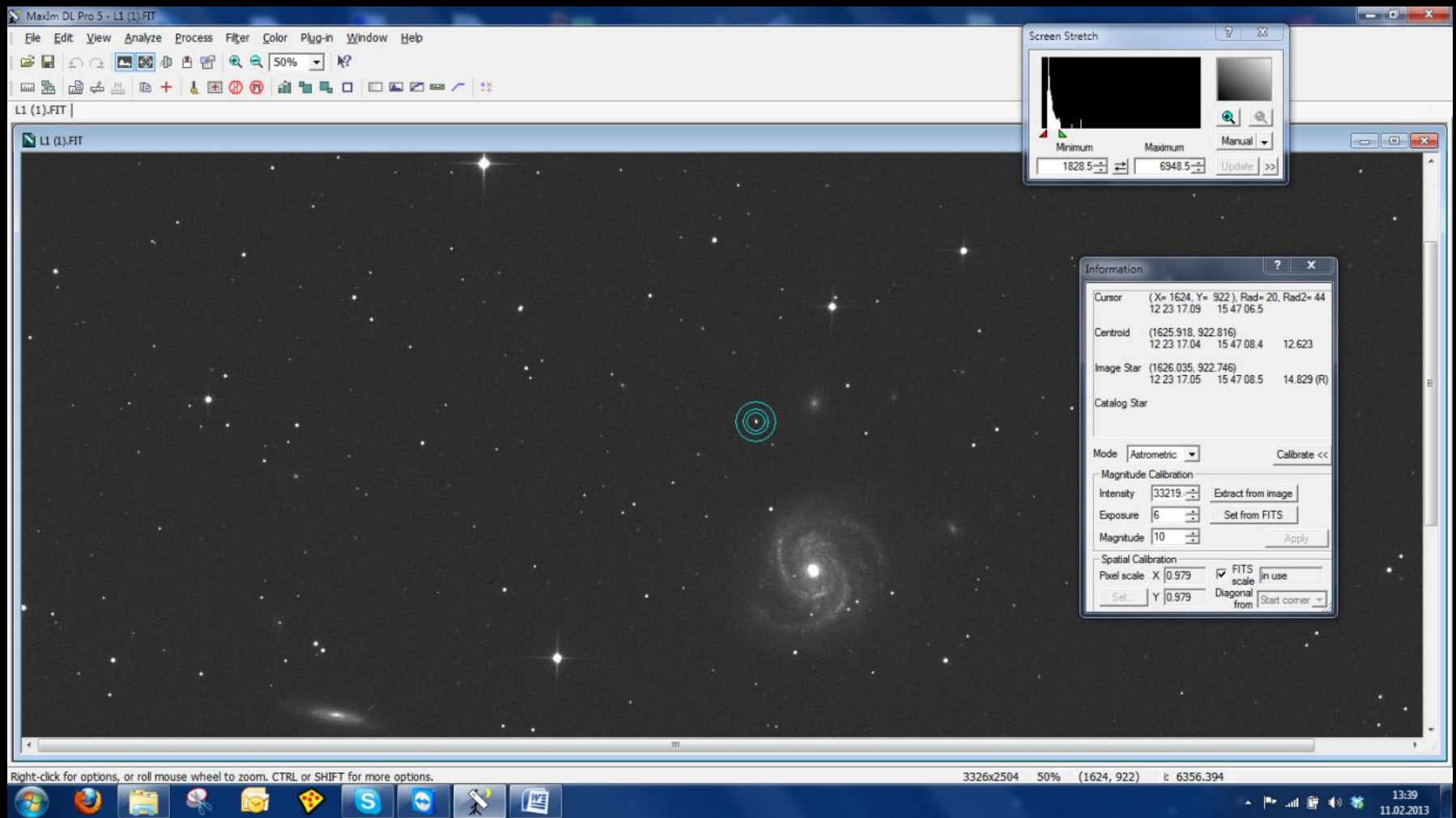


Start to blink the images



If you have pin point you can astrometry your files now





Place the cursor to the object and read the given coordinates

## MPChecker: Minor Planet Checker

Use the form below to prepare a list of known minor planets in a specified region. Notes on using this form are given at the bottom of this page.

If you wish to report the non-functioning of (or errors in) this service, please use [this feedback form](#). But ensure that you have seen [this note on computing limits](#) before reporting anything.

Date : 2013 02 28.54 UT

Produce list of known minor planets around:

☒ this J2000.0 position: R.A. =  Decl. =

or around ☐ these observations:

Radius of search = 15 arc-minutes

Limiting magnitude,  $V$  = 20.0 Observatory code = 500

Output matches in order of:

☒ increasing distance from specified position ☐ increasing Right Ascension

Display motions in arcseconds per ☐ minute or ☒ hour  
or ☐ degrees per day

Display ☐ total or ☒ separate motions

Output designations in ☒ unpacked or ☐ packed form

Output:

- ☒ all objects
- ☐ just those flagged as needing observations
- ☐ just numbered objects
- ☐ just unnumbered objects
- ☐ just those nearly-numberable unnumbered objects

Return: ☒ plain HTML page or ☐ MPES-aware HTML page



