PhotoShop for Astro-Imagers

Larry Owens

What is PhotoShop?

- ***Photoshop, Photoshop CS, CS2, CS3***
  - Written nearly 17 years ago by Adobe
  - Used in the professional "Pre-Press" industry
- ***Image Enhancement***
  - Re-sampling, color correction, sharpening, softening, adding text/graphics
  - Tools for selecting very specific image areas for enhancement, much more
- ***Third Party PhotoShop Enhancements***
  - New tools can be added
  - PhotoShop Plug-ins
- ***PhotoShop Elements (PhotoShop on a Budget)***
  - Most of the features of PhotoShop
  - 8 Bit images

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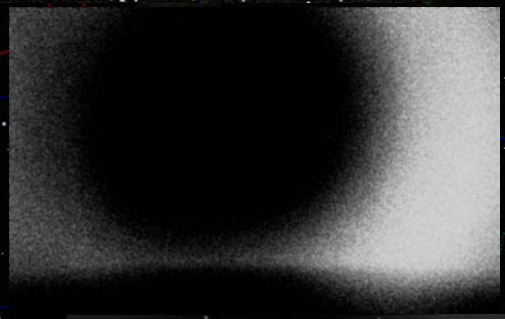
Astro-Imaging & PhotoShop

- ***AstroImaging To-Do List***

- Acquisition



- Processing

- Sharpen/soften as appropriate
- Final color corrections
- Add text, camera, optics, times, central meridian, conditions

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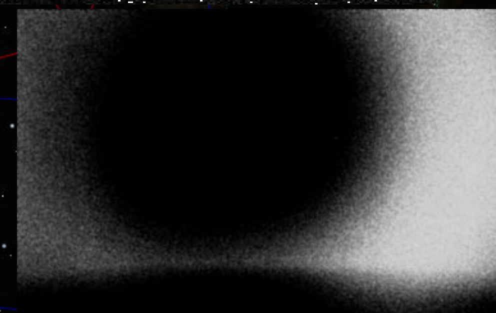
- ***AstroImaging To-Do List***
  - Acquisition
    - Flat fields
    - Autoguiding
    - Dark frames
    - Light frames (L, RGB)
    - Acquire .avi's (Lunar/Planetary)
  - Processing
    - Sharpen/soften specific areas
    - Final color corrections
    - Add text, camera, optics, times, central meridian, conditions



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  - Acquisition
    - Flat fields
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  - Processing
    - Calibrate with flats and darks
    - Align & stack
    - Color combine
    - Refine the final image
      - Some areas too bright or dim
      - Imperfections in the image (noise)
      - Sharpen/soften specific areas
      - Final color corrections
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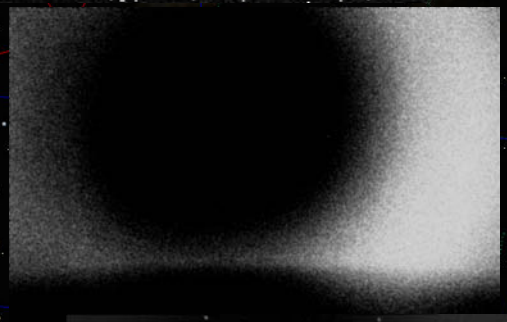

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- ***Pick the Right Tool for the Job***
  - MaximDL, CCD Stack, Registax, CCD Soft
  - PhotoShop CS, PhotoShop Elements

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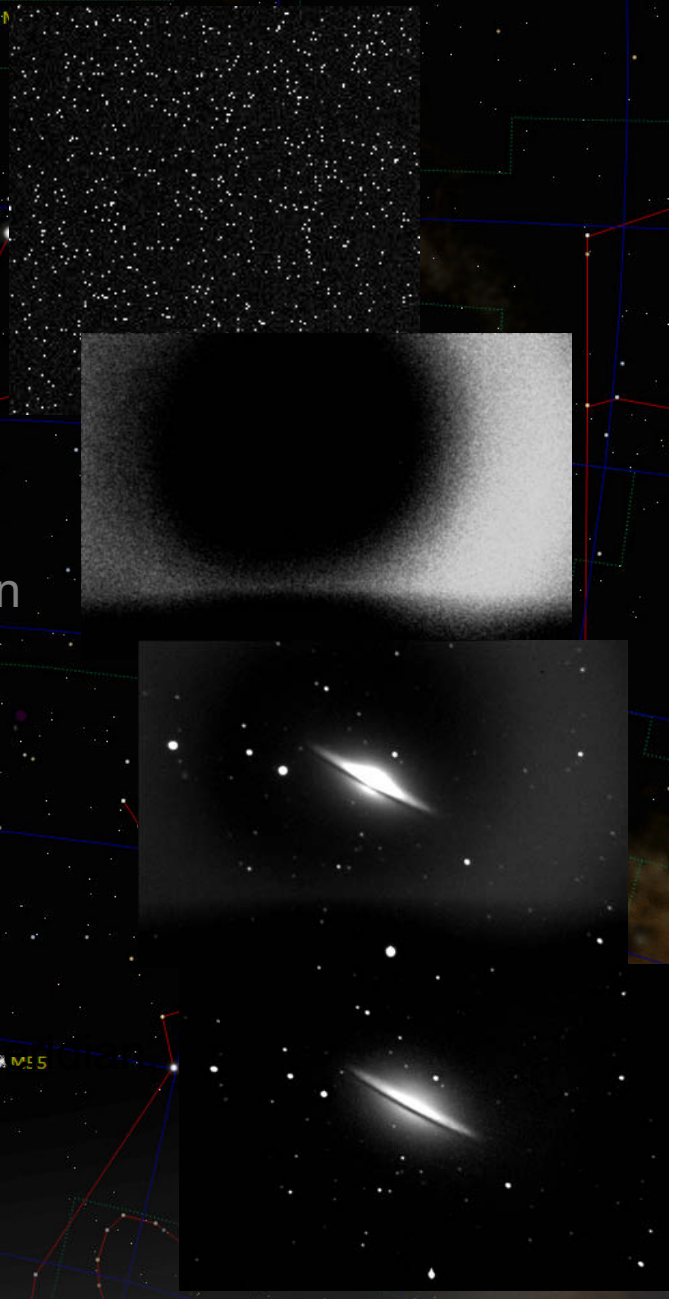

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      - Luminance Layering (the L in LRGB)
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- ***Color Basics***
  - RGB (additive)
    - Red, Green, Blue
  - LRGB
    - Luminance, Red, Green, Blue
  - CYMK (subtractive)
    - Cyan, Magenta, Yellow, Black
  - Color Correction
    - If an image is too YELLOW, what's the problem?

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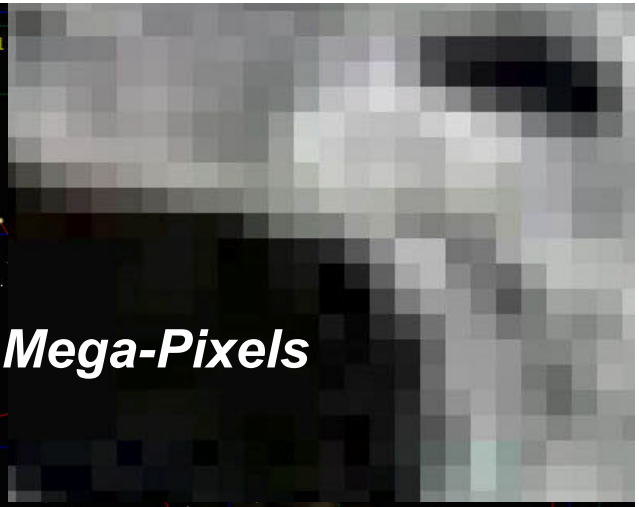

- ***A bit about Bits, Bytes, Pixels, Mega-Bytes and Mega-Pixels***
  - What is a digital image composed of?
  - The modest little Bit and its immediate family, the Byte (8 bits)

2 bits: 8 bits (Byte): 16 bits:

10 – 2

11 – 3

11111111 – 65535

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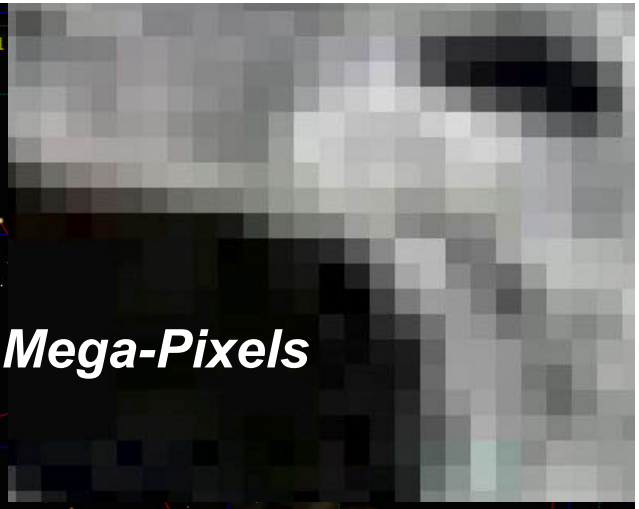

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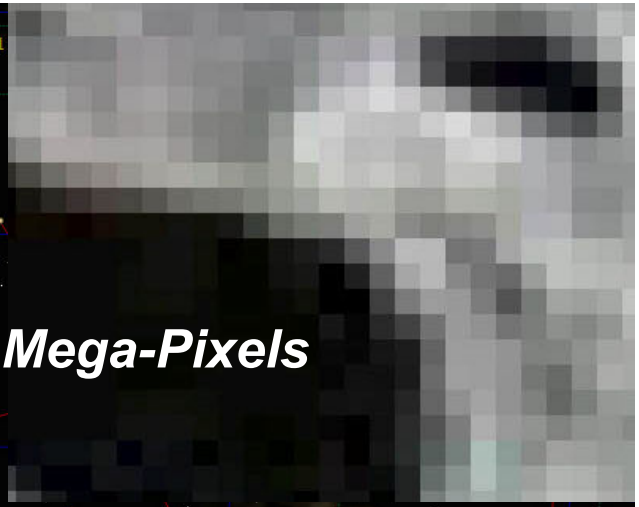

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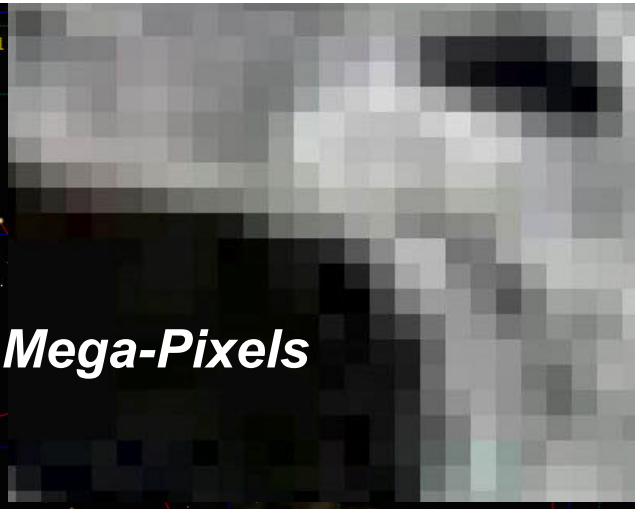

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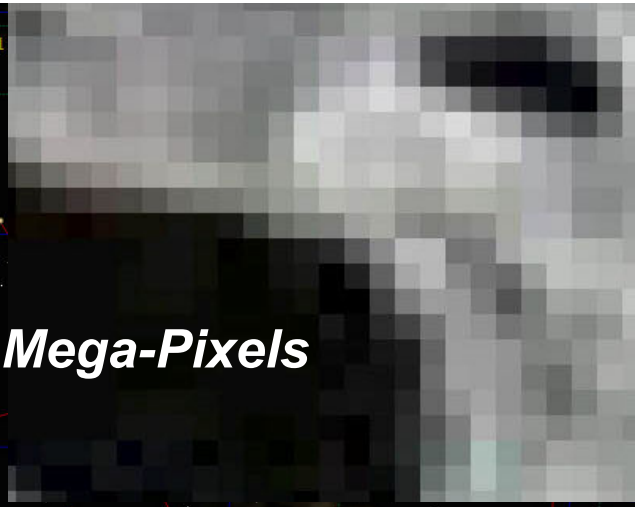

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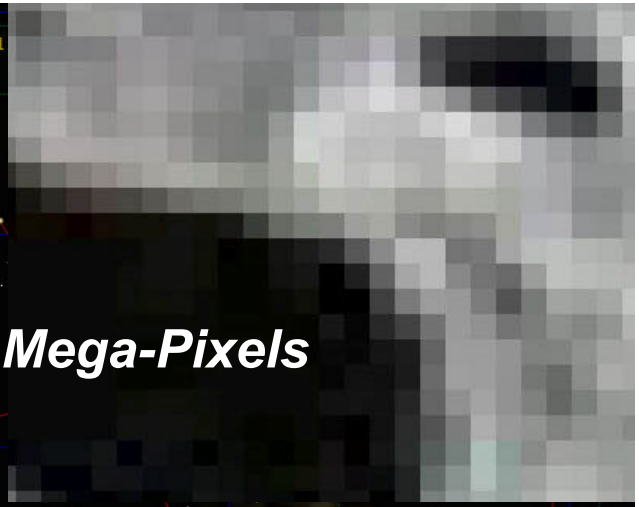

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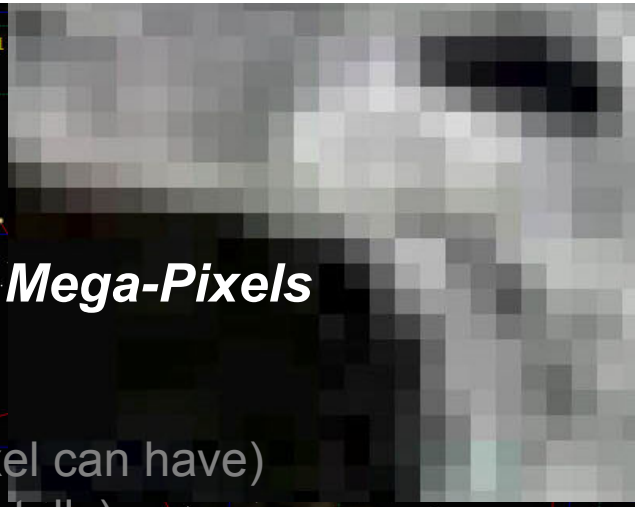

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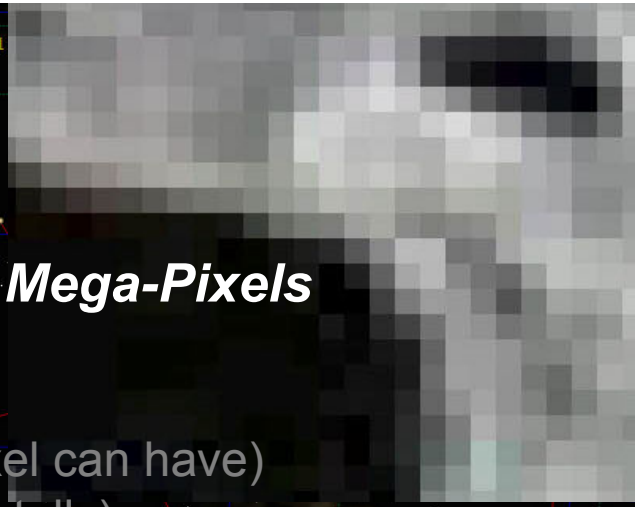

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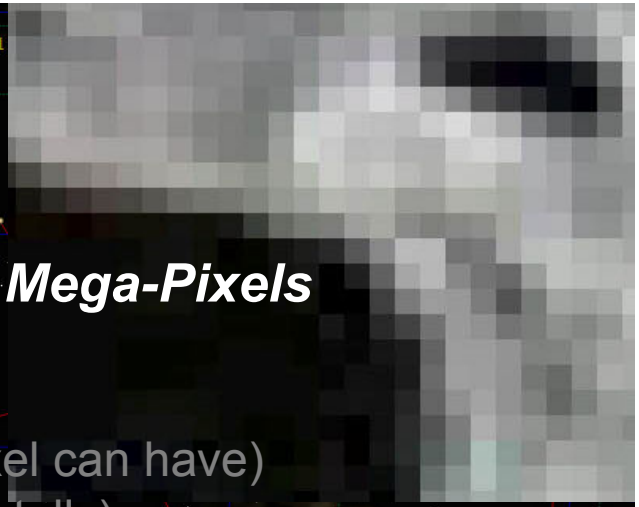

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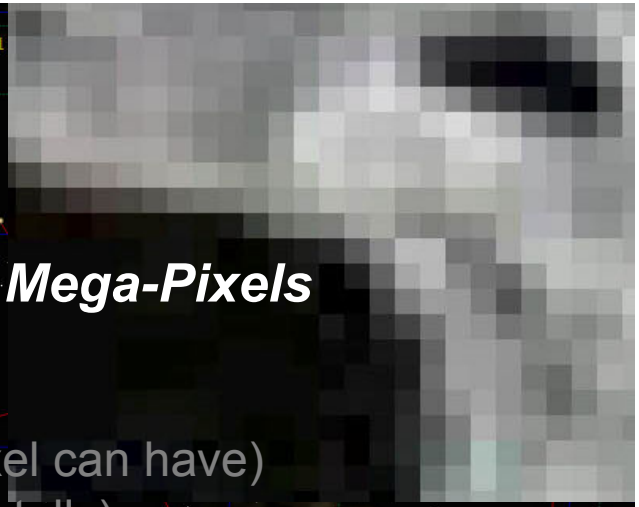

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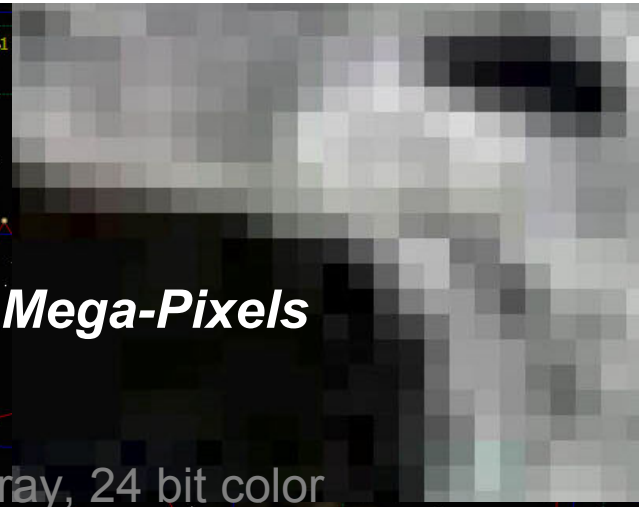
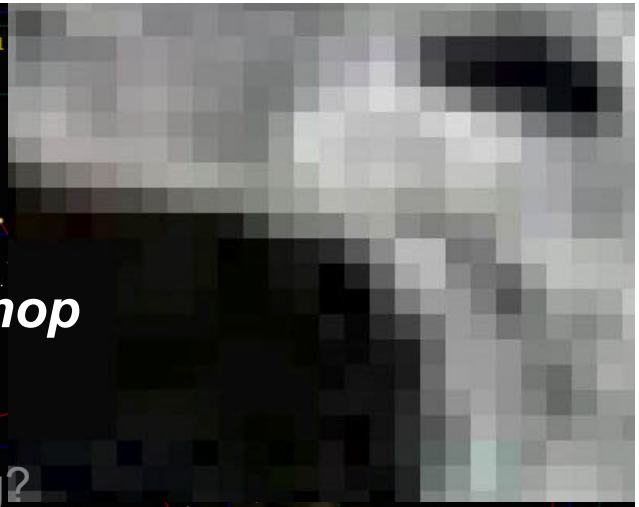


- ***A bit about Bits, Bytes, Pixels, Mega-Bytes and Mega-Pixels***

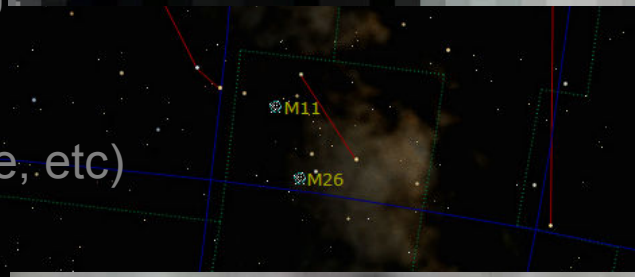
  - Image file formats
    - Jpeg – Joint Photographic Expert Group, 8 bit gray, 24 bit color
    - Tiff – Tagged Image File Format, 8, 16, 32 gray, 64 bit color
    - Bmp – Bit Map, 8 bit gray, 24 bit color
    - Gif – Graphics Interchange Format, 8 bit gray, 24 bit color
    - Png – Portable Network Graphics, 8, 16 gray, 48 bit color
    - Fits – Flexible Image Transport System, 8, 16, 32, 64 bit gray + data

  - FITS format used by NASA and professional astronomy community
    - Format used with most serious CCD systems & software
    - Requires a plug-in for use by PhotoShop
      - FITS Liberator – Free

Astro-Imaging & PhotoShop



- ***Commonly used Features and Tools of PhotoShop***
  - Basic image manipulation
    - Image Size (Resampling) – What is Resampling?
    - Rotate Canvas
    - Crop
    - Image Mode (8 bit, 16 bit, RGB Color, Grayscale, etc)
  - Image Refinement
    - Levels
    - Curves
    - Color Balance
    - Brightness/Contrast
    - Hue/Saturation
    - Selective Color (modify specific colors only)



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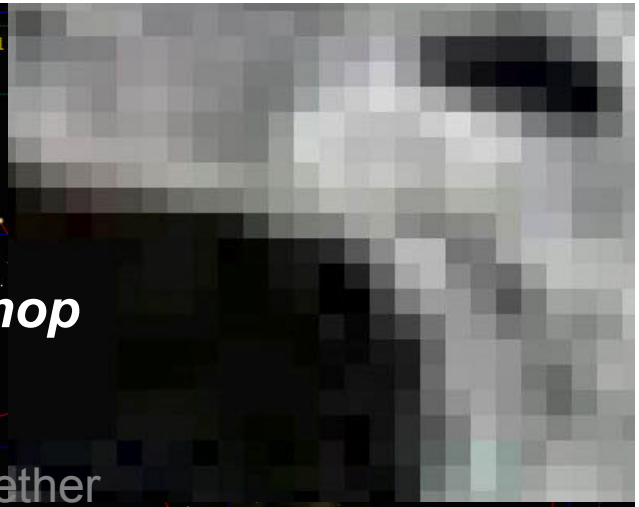

- ***Commonly used Features and Tools of PhotoShop***
  - Layers and Channels
    - Layers used to place several images or text together
    - Can move, rotate, resize, and refine Layers independently
    - Layers can have different modes (Luminance, Difference, etc)
    - Channels are layers for basic colors of image (RGB, CYMK)
    - Channels appear as grayscale (black/white)
    - Channels can be refined independently
  - Selections and Masks
    - Can select circular, rectangular, polygon or free form areas
    - When selection is active, only that area is refined
    - Selection area can be “Feathered”
    - Selected areas can be copied, placed in same or other images

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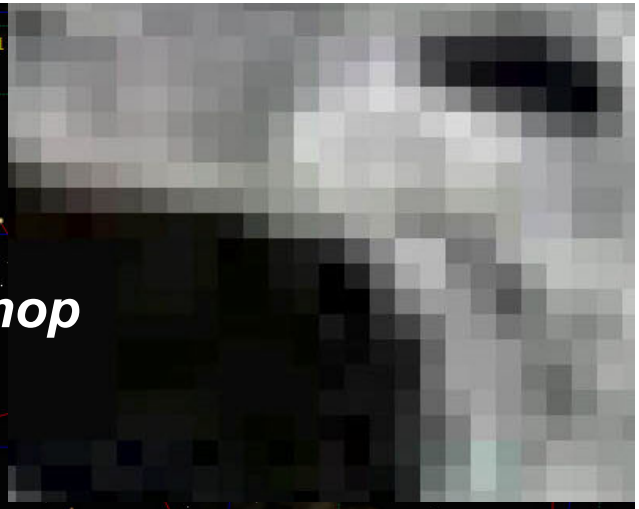

- ***Commonly used Features and Tools of PhotoShop***
  - Filters
    - Gaussian Blur
    - Noise, Despeckle, Median
    - Unsharp Mask (can sharpen and unsharpen – essential tool)
  - Selection Tools
    - Polygon Lasso
    - Rectangular Marquee
    - Elliptical Marquee
    - Move Tool
    - Remember, all selections can be “Feathered”

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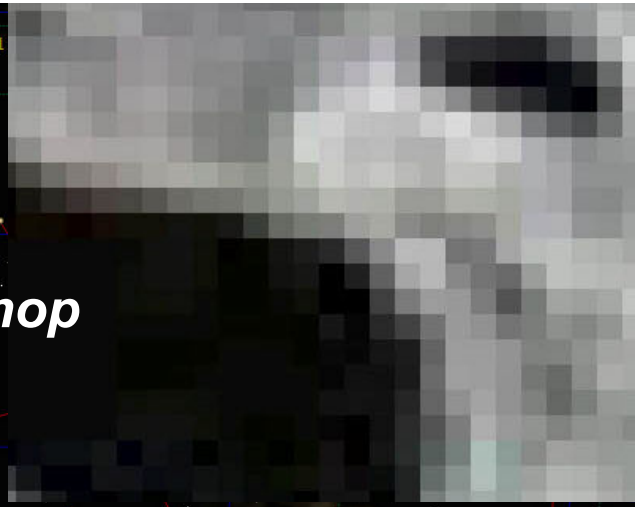

- ***Commonly used Features and Tools of PhotoShop***
  - Text, Lines and Arrows
    - Use the Horizontal Type Tool for Text
    - Line Tool, allows control over color, width, arrows
    - Selection tools allow rotation, resizing
  - Windows for Information, Access to Channels/Layers
    - Info Window
      - Shows pixel coordinate
      - Size of selection area
      - Important to judge how much to “feather” a selection
    - Channels window
      - Allows selection and refinement of individual color channels
    - Layers window
      - Allows selections of layers and how they affect other layers
      - Use this window to Luminance Layer astro-images

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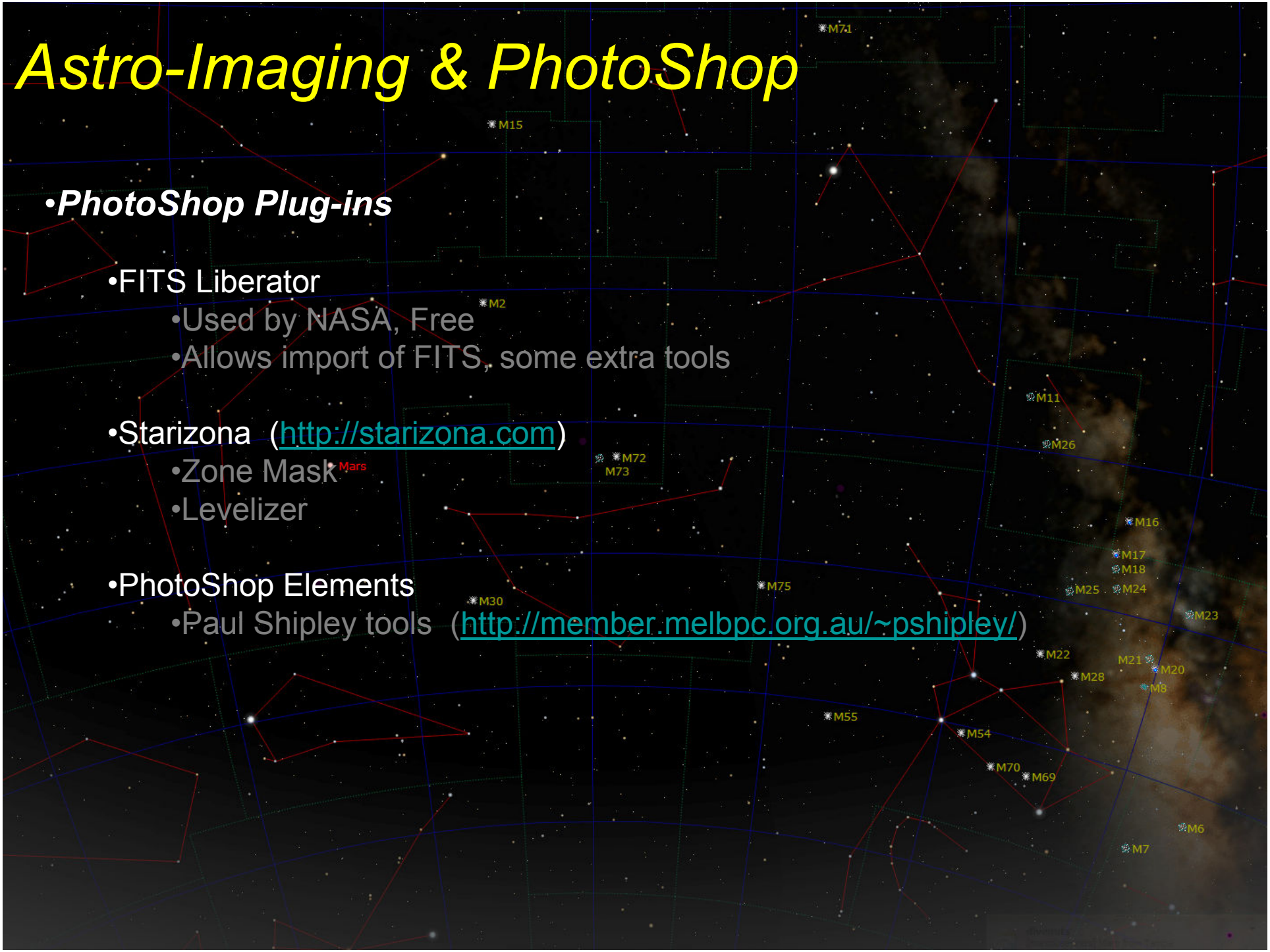

- ***PhotoShop Plug-ins***
  - FITS Liberator
    - Used by NASA, Free
    - Allows import of FITS, some extra tools
  - Starizona (http://starizona.com)
    - Zone Mask
    - Levelizer
  - PhotoShop Elements
    - Paul Shipley tools (http://member.melbpc.org.au/~pshipley/)

Processing Examples

SUNSET ALERT: 8:34 PM