We shall not cease from exploration, and the end of all our exploring will be to arrive where we started and know the place for the first time.

T.S. Eliot

Coyote Graphics System

- Device and color independent graphics
- Well-known command syntax
- Duplicates IDL 8 graphics functionality
- Can be used to create *new* graphics routines
- Can be used in widget programs
- Works in *any* version of IDL

What is a Command?

- Procedure or object method
- No more than three positional parameters
- Unlimited number of keywords
- Defined with _Extra
- Works in PostScript as well as on the display
- Doesn't open a graphics window.

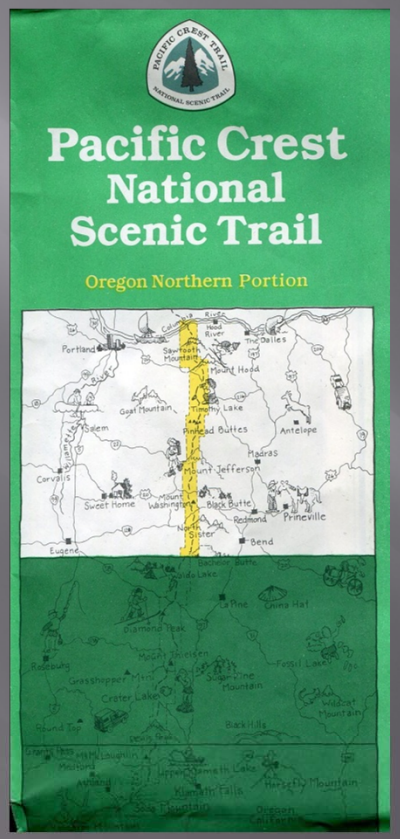
COYOTE GRAPHICS

A Journey Backward and Forward in Time

David Fanning
david@idlcoyote.com

http://www.idlcoyote.com/graphics_tips/coyote_graphics.php

Long Ago and Far Away…



Naïve
Clueless
Inexperienced
No plan
Weeks worth of food
$20 in his pocket
JC Penney equipment

Not an Adventure Unless…

Adversity…

Blisters
Leaky Shelter
Lack of Food
Snow, Sleet, Hail

But…

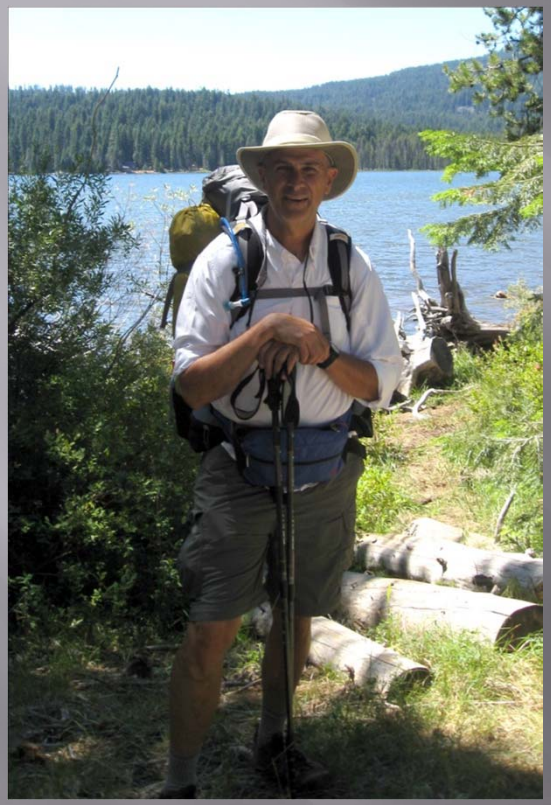
Our hero learns…

- Perseverance
- Trust and faith in himself
- How to take risks
- Distrust of authority
- Willfulness

Qualities that will give him…

- Trouble
- Turmoil
- Adventure

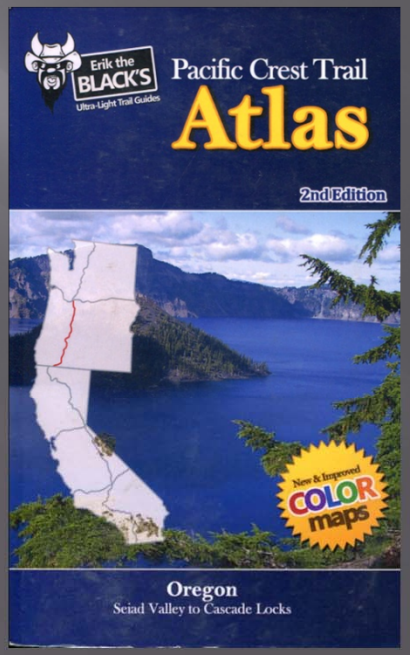
40 Years Later…A Big Idea!



- Recreate the hike
- Deal with IDL ennui
- Experience another epiphany
- Find direction in life!

Preparation…

- Listen to music from the 1960s and 70s
- Set aside time for contemplation
- Walk several hours a day
- Stretch
- Lose some weight
- Get a map!



There are two mistakes you can make along the path to truth…not going all the way, and not starting.

Buddha

On the trail…

- 20+ miles a day
- No thoughts
- Murderous thoughts!
- Zen walking meditation

Until…

- Disaster…

Big Lake Youth Camp

- Nurse
- Toilets
- Good food!

Finally…

- Quite contemplation

Epiphany Revealed!

Huh! Direct Graphics!?
You're kidding, right?

One's destination is never a place, but a new way of seeing things.

Henry Miller

~~Direct~~ Traditional IDL Graphics

- Plot, Surface, Contour, ~~TV~~
- Start-up files from graduate school (1970)
- Crippled graphics cards
- Inexplicable color behavior
- Magical incantations to get PostScript output
- Ugly fonts
- Embarrassing color tables
- Funky 1970s look and feel

But…

On the other hand…

- Everybody used them
- Three people (total!) asked me about iTools
- No one requested anything else in programs
- People who tried something else, always ended up back with traditional graphics
- Even scientists can write programs with them!

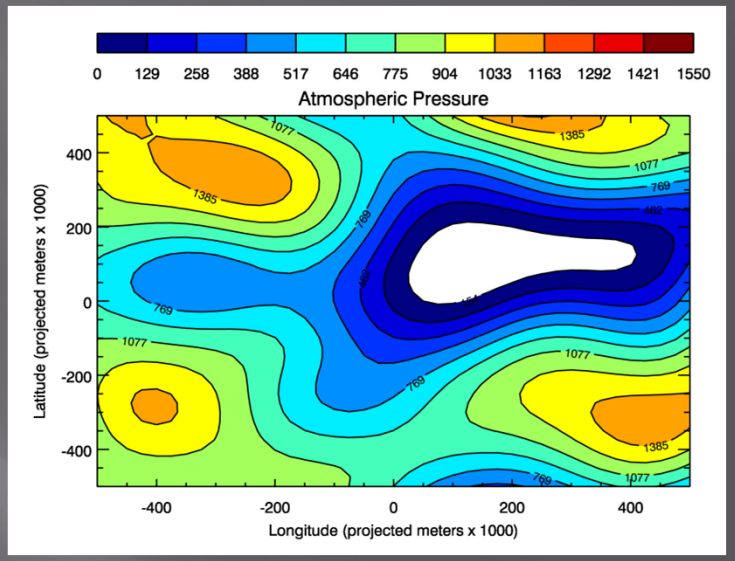
So…

Coyote Library Routines

- TVImage
- FSC_Color
- CTLoad
- FSC_Colorbar
- PSConfig
- TVRead
- XSurface
- FSC_Window
- PS_Start/PS_End

Contour Plot Frustration…

- NLevels gives ??? levels
- Colors don't match color bar
- Hole in the contour plot
- C_Labels = [0,1,1,1,0,1,1,1…]
- Colors always a problem



Idea…

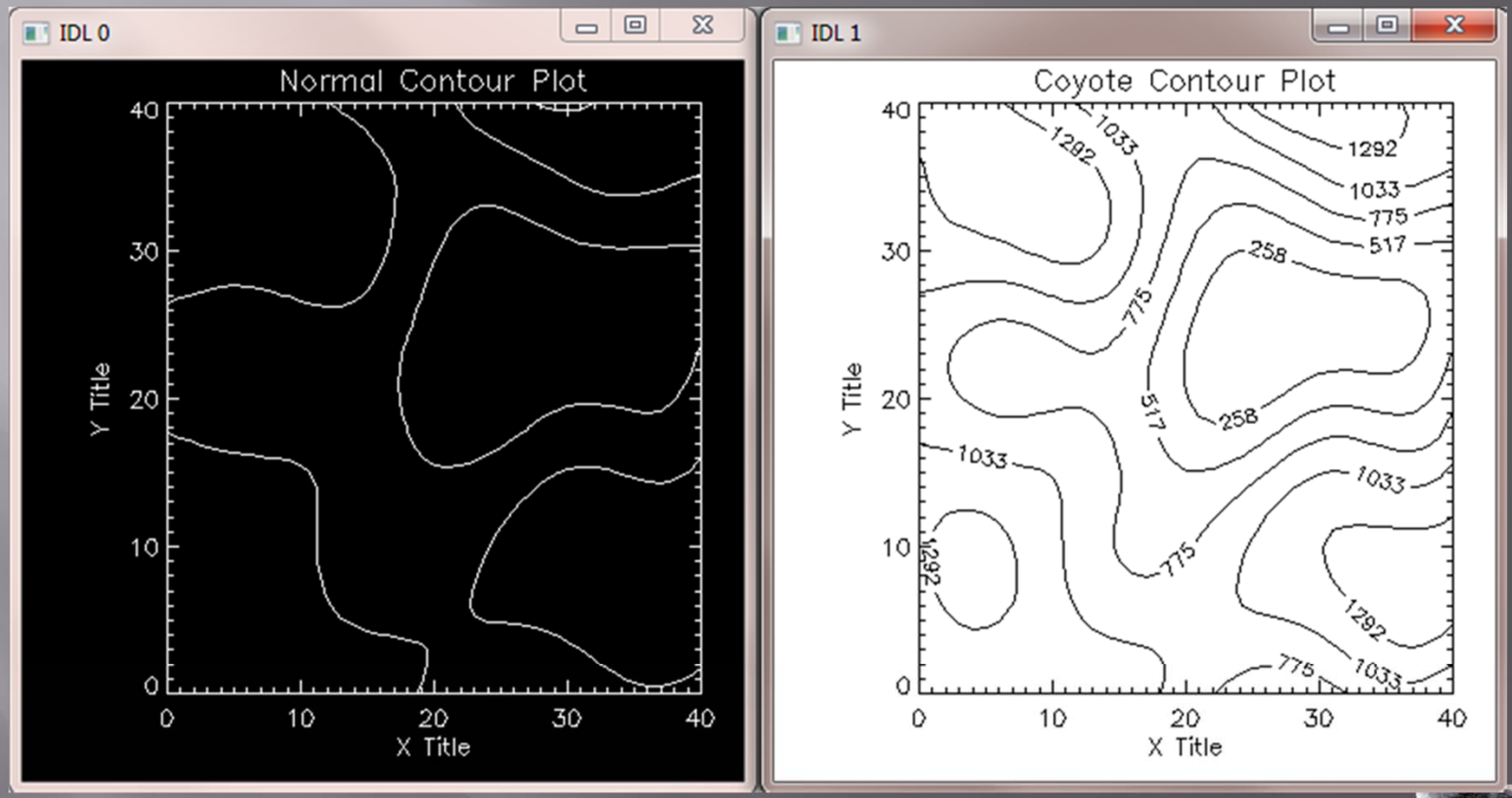
- Can I do for Contour, what TVImage did for TV?

FSC_Contour

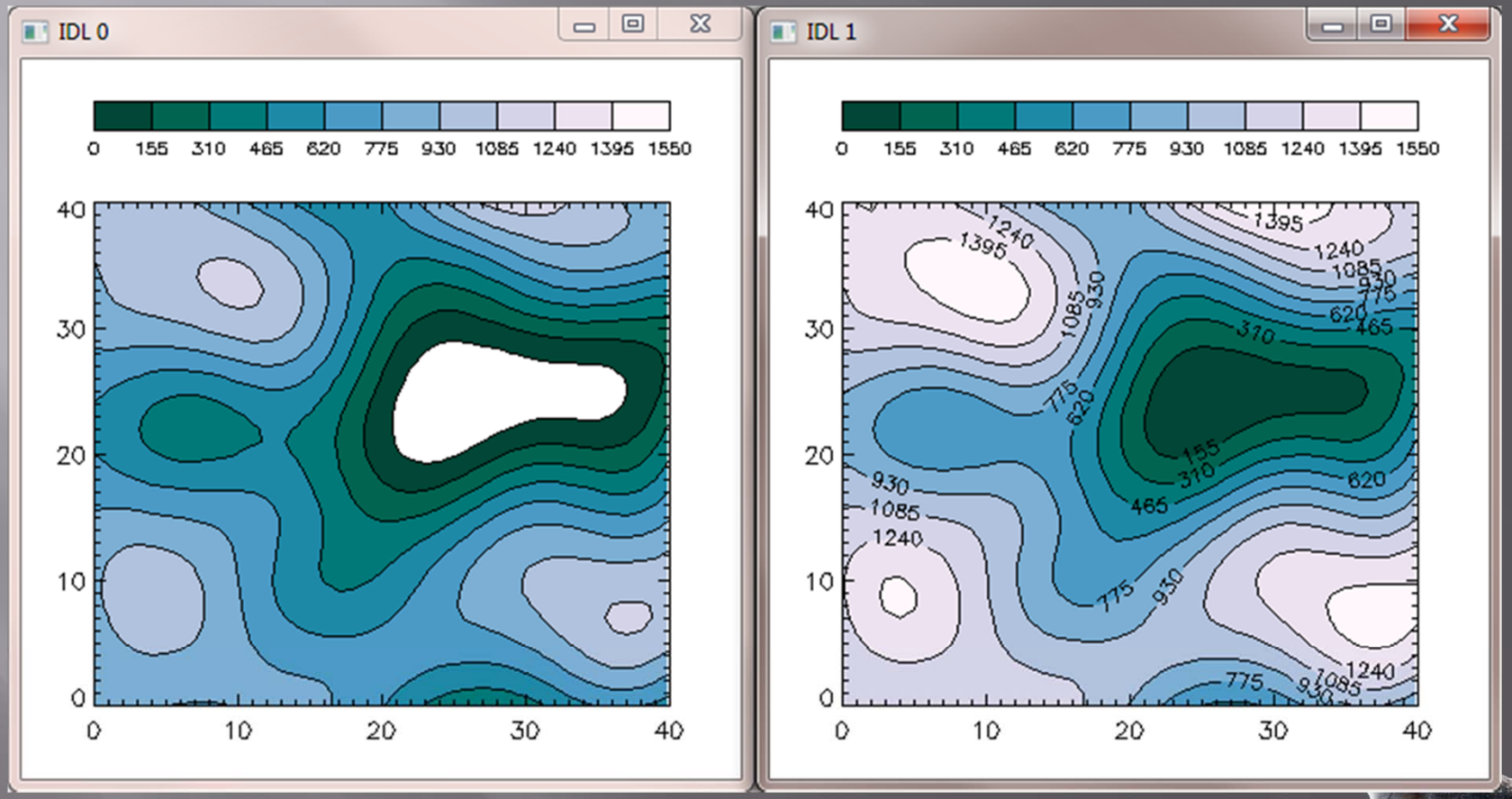
- Device independent (display and PostScript)
- Color model independent
- Identical calling signature
- NLevels produces N levels!
- No contour hole
- Better contour labeling
- Works in resizeable graphics window
- Proof of the pudding…

http://www.idlcoyote.com/graphics_tips/cgcontour.php

Contour vs. cgContour



Contour vs. cgContour



Final Program: FSC_Window!

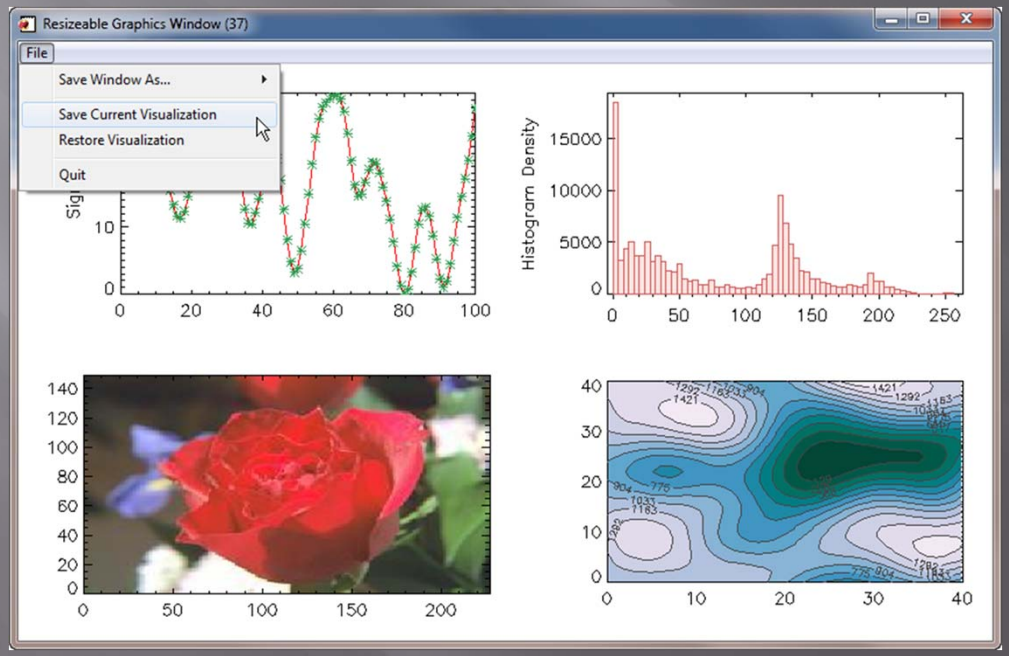
- Dude! It's the 21st century!
- Resizeable graphics windows
- Simple widget program
- Ability to load "commands"
- Command manipulation with LinkedList object
- Commands executed with Call_Procedure
- Automatic PostScript output
- Automatic raster output
- Nice fonts! (with ImageMagick)

Finally, the Big Idea…

- A "window manager" is nothing more than singleton LinkedList object
- It manipulates windows the way the command list manipulates commands
- Yikes! I can use resizeable graphics windows *exactly* like I use normal graphics windows!!
- Woohoo! Your husband is a genus!

The Universe Falls into Place…

- Mihaly Csikszentmihalyi's notion of Flow
- A conspiracy of programs to build themselves into a "system"



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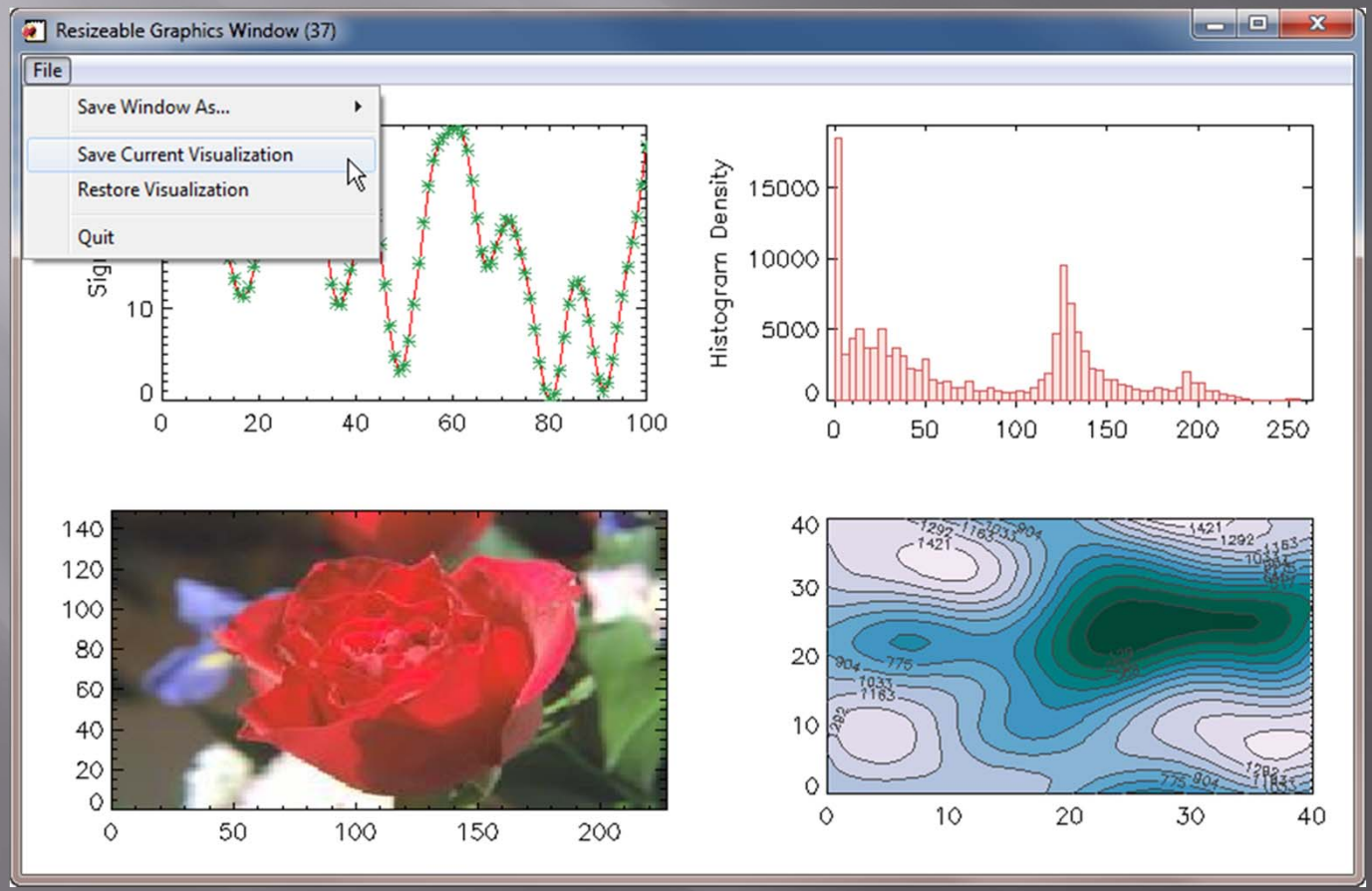
- Works in *any* version of IDL
- Saved visualizations
- Version 2.0 identical to “function” graphics

Coyote Graphics Features

- Black on white color scheme
- Resizeable fonts
- Natural color specification (“yellow”, “red”)
- Resizeable windows
- Automatic PostScript generation
- Automatic raster generation (ImageMagick)
- Fixed contour plots, image display
- New features (e.g., alpha channels, etc.)
- Saved visualizations

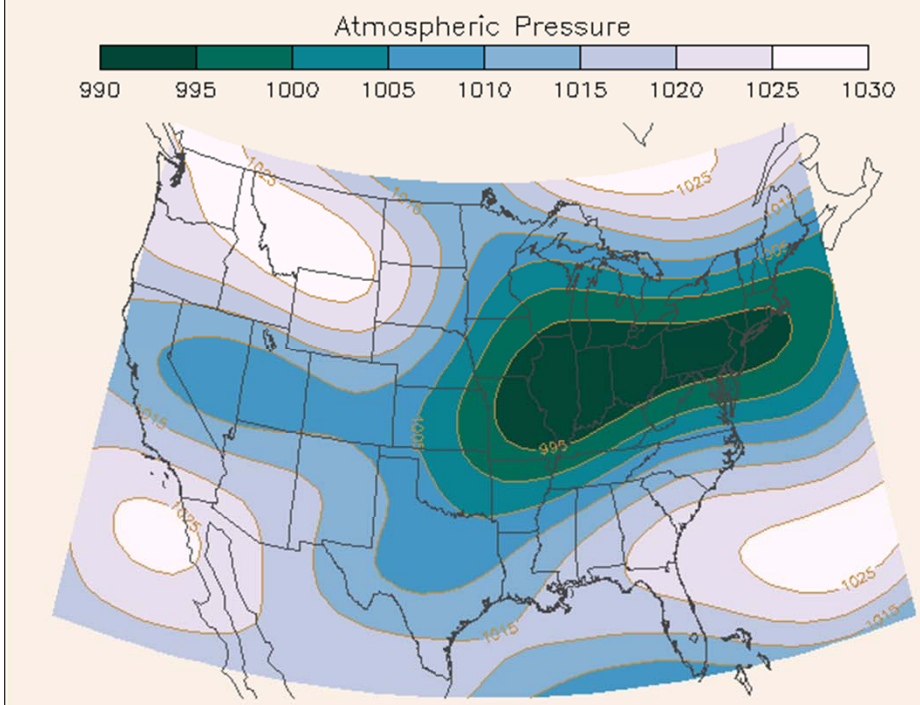
Coyote Graphics Visualizations

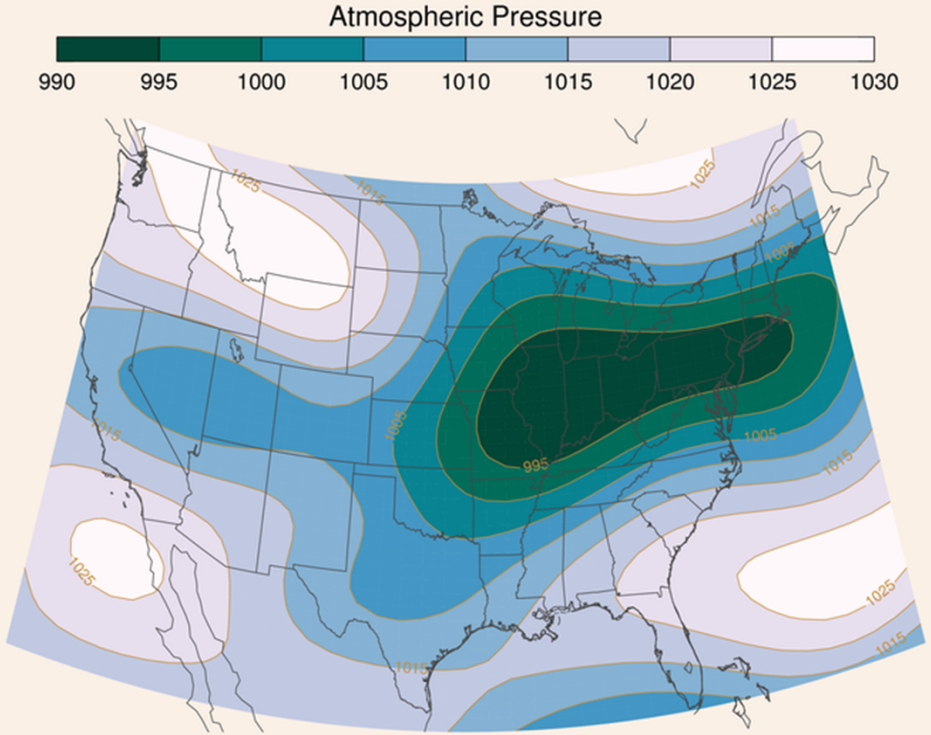
- Visualizations can be saved/restored/e-mailed



Coyote Graphics Raster Output

- Normal
- With ImageMagick

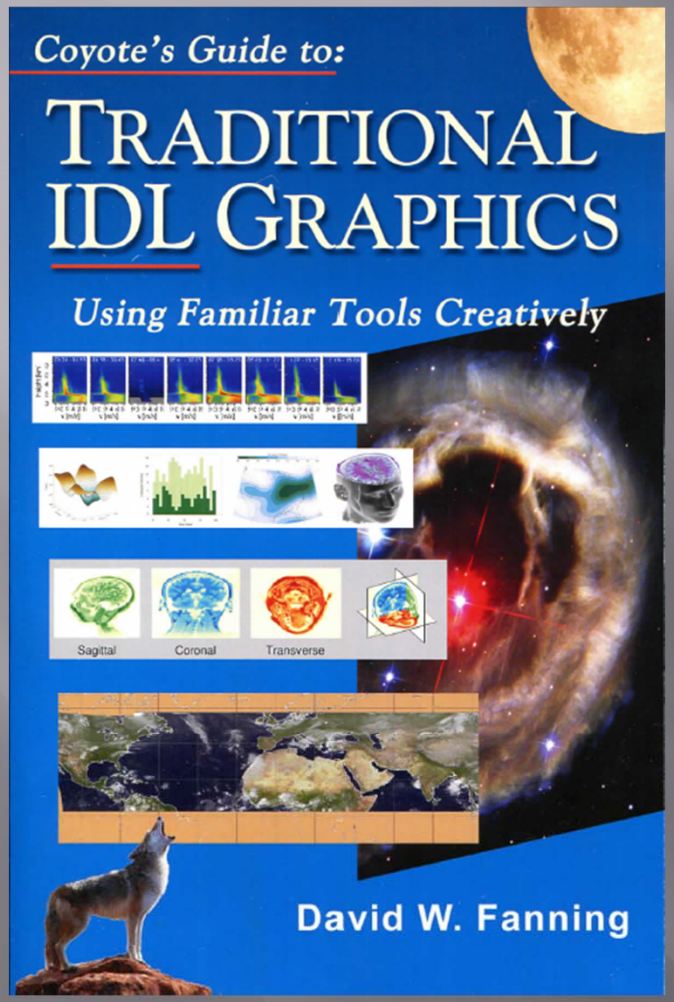




Coyote Graphics System Name Changes

- TVImage → cgImage
- FSC_Color → cgColor
- CTLoad → cgLoadCT
- FSC_Colorbar → cgColorbar
- PSConfig
- TVRead → cgSnapshot
- XSurface → cgSurface
- FSC_Window → cgWindow
- PS_Start/PS_End

Build Your Own Coyote Graphics Routines…



- Everything I know about IDL graphics!
- Device independent tools
- Color independent tools
- Image processing techniques
- Presentation quality output
- Simple, fast, easy

http://www.idlcoyote.com/books/