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Subject: semi-transparent IDLgrPolygon? alpha blending no good...

Posted by [Sean Dettrick](#) on Tue, 23 Apr 2002 08:19:43 GMT

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(apologies for the attachment)

Hi,

Does anyone have a way to make semi-transparent polygon objects with IDLgrPolygon?

I would like to use IDL's fancy object graphics, but in my attempts so far, alpha blending using a monochrome image only makes a polygon object transparent to ITSELF, not to other objects. This is pretty useless.

Here is my example code, where I have rearranged David Fanning's object\_shade\_surface.pro (thanks DF) to instead plot up four cylindrical IDLgrPolygon objects. You can run it with:

```
IDL> .r cylinder3
```

I would like the red cylinder to be semi-transparent, so that I can see the black cylinder through it.

I am away of Struan Gray's direct graphics tutorial, and guess one could do something similar with defining a z-buffer in the view object, but it is way above my head.

Any assistance/pointers greatly appreciated.

Thanks v much,

Sean Dettrick,  
Physics Dept,  
University of California, Irvine

```
;  
;+  
; NAME:  
;   OBJECT_SHADE_SURF  
;  
; PURPOSE:  
;  
;   This program shows you the correct way to write an  
;   elevation-shaded surface in object graphics. This would  
;   be the equivalent of these direct graphics commands:  
;  
;   Surface, data, Shades=BytScl(data)
```

```

;      Shade_Surf, data, Shades=BytScl(data)
;
;
; AUTHOR:
;
;      FANNING SOFTWARE CONSULTING
;      David Fanning, Ph.D.
;      2642 Bradbury Court
;      Fort Collins, CO 80521 USA
;      Phone: 970-221-0438
;      E-mail: davidf@dfanning.com
;      Coyote's Guide to IDL Programming: http://www.dfanning.com
;
; CATEGORY:
;
;      Object Graphics
;
; CALLING SEQUENCE:
;      OBJECT_SHADE_SURF, data, x, y
;
; INPUTS:
;      data: The 2D surface data.
;      x:   A vector of X values, corresponding to the X values of data.
;      y:   A vector of Y values, corresponding to the Y values of data.
;
; KEYWORD PARAMETERS:
;      STYLE: Set equal to 1 for a wire-frame surface. Set equal to 2 for
;             a solid surface (the default).
;
; COMMON BLOCKS:
;      None.
;
; EXAMPLE:
;      OBJECT_SHADE_SURF
;
; MODIFICATION HISTORY:
;      Written by: David Fanning, November 1998.
;-

```

FUNCTION Normalize, range, Position=position

```

; This is a utility routine to calculate the scaling vector
; required to position a vector of specified range at a
; specific position given in normalized coordinates. The
; scaling vector is given as a two-element array like this:
;
;      scalingVector = [translationFactor, scalingFactor]
;
; The scaling vector should be used with the [XYZ]COORD_CONV

```

```

; keywords of a graphics object or model. For example, if you
; wanted to scale an X axis into the data range of -0.5 to 0.5,
; you might type something like this:
;
; xAxis->GetProperty, Range=xRange
; xScale = Normalize(xRange, Position=[-0.5, 0.5])
; xAxis, XCoord_Conv=xScale

```

```
On_Error, 1
```

```
IF N_Params() EQ 0 THEN Message, 'Please pass range vector as argument.'
```

```
IF (N_Elements(position) EQ 0) THEN position = [0.0, 1.0] ELSE $
  position=Float(position)
range = Float(range)
```

```
scale = [((position[0]*range[1])-(position[1]*range[0])) / $
  (range[1]-range[0]), (position[1]-position[0])/(range[1]-range[0])]

```

```
RETURN, scale
END
```

```
;-----
```

```
Pro Object_Shade_Surf_Cleanup, tlb
```

```
; Come here when program dies. Free all created objects.
```

```
Widget_Control, tlb, Get_UValue=info
IF N_Elements(info) NE 0 THEN Obj_Destroy, info.thisContainer
END
```

```
;-----
```

```
PRO Object_Shade_Surf_Draw_Events, event
```

```
; Draw widget events handled here: expose events and trackball
; events. The trackball uses RSI-supplied TRACKBALL_DEFINE.PRO
; from the IDL50/examples/object directory.
```

```
Widget_Control, event.top, Get_UValue=info, /No_Copy
```

```
drawTypes = ['PRESS', 'RELEASE', 'MOTION', 'SCROLL', 'EXPOSE']
thisEvent = drawTypes(event.type)
dragQuality = 0
CASE thisEvent OF
```

```

'EXPOSE': ; Nothing required except to draw the view.
'PRESS': BEGIN
  Widget_Control, event.id, Draw_Motion_Events=1 ; Motion events ON.
  info.thisWindow->SetProperty, Quality=dragQuality ; Drag Quality to Low.
  needUpdate = info.thisTrackball->Update(event, Transform=thisTransform)
  IF needUpdate THEN BEGIN
    info.thisModel->GetProperty, Transform=modelTransform
    info.thisModel->SetProperty, Transform=modelTransform # thisTransform
  ENDIF
END
'RELEASE': BEGIN
  Widget_Control, event.id, Draw_Motion_Events=0 ; Motion events OFF.
  info.thisWindow->SetProperty, Quality=2 ; Drag Quality to High.
  needUpdate = info.thisTrackball->Update(event, Transform=thisTransform)
  IF needUpdate THEN BEGIN
    info.thisModel->GetProperty, Transform=modelTransform
    info.thisModel->SetProperty, Transform=modelTransform # thisTransform
  ENDIF
END
'MOTION': BEGIN ; Trackball events
  needUpdate = info.thisTrackball->Update(event, Transform=thisTransform)
  IF needUpdate THEN BEGIN
    info.thisModel->GetProperty, Transform=modelTransform
    info.thisModel->SetProperty, Transform=modelTransform # thisTransform
  ENDIF
END
ELSE:

ENDCASE

; Draw the view.

info.thisWindow->Draw, info.thisView

;Put the info structure back.

Widget_Control, event.top, Set_UValue=info, /No_Copy
END
;-----

```

PRO Object\_Shade\_Surf\_Resize, event

```

; The only events generated by this simple program are resize
; events, which are handled here.

```

```

; Get the info structure.

Widget_Control, event.top, Get_UValue=info, /No_Copy

; Resize the draw widget.

info.thisWindow->SetProperty, Dimension=[event.x, event.y]

; Redisplay the graphic.

info.thisWindow->Draw, info.thisView

; Update the trackball objects location in the center of the
; window.

info.thisTrackball->Reset, [event.x/2, event.y/2], $
(event.y/2) < (event.x/2)

;Put the info structure back.

Widget_Control, event.top, Set_UValue=info, /No_Copy
END
;-----

```

```

PRO Object_Shade_Surf_Style, event

; Change the style of the surface

Widget_Control, event.top, Get_UValue=info, /No_Copy
Widget_Control, event.id, Get_Value=thisButton

CASE thisButton OF

'Wire Frame': info.thisSurface->SetProperty, Style=1
'Solid': info.thisSurface->SetProperty, Style=2

ENDCASE

; Draw the view.

info.thisWindow->Draw, info.thisView

;Put the info structure back.

Widget_Control, event.top, Set_UValue=info, /No_Copy
END

```

```
;-----
```

```
PRO Object_Shade_Surf_Exit, event
```

```
; Exit the program. This will cause the CLEANUP  
; routine to be called automatically.
```

```
Widget_Control, event.top, /Destroy  
END
```

```
;-----
```

```
PRO Object_Shade_Surf, thisSurface=thisSurface,surface2=surface2,$  
    surface3=surface3,surface4=surface4,light=light
```

```
; Check for parameters.
```

```
;IF N_Elements(style) EQ 0 THEN style = 2
```

```
; Create a view. Use RGB color. Charcoal background.
```

```
thisView = OBJ_NEW('IDLgrView', Color=[80,80,80], $  
    Viewplane_Rect=[-1.0,-1.0,2.0,2.0])
```

```
; Create a model for the surface and axes and add it to the view.  
; This model will rotate under the direction of the trackball object.
```

```
thisModel = OBJ_NEW('IDLgrModel')  
thisView->Add, thisModel
```

```
; Create an surface object shaded by elevation. Use Color Table 5.  
; Turn Gouraud shading on, but DON'T use a light source, as this will  
; modulate the shading parameters. Notice that adding a Palette object  
; to a surface object is NOT documented.
```

```
;numVerts = s[0]*s[1]  
;thisPalette=Obj_New('IDLgrPalette')  
;thisPalette->LoadCT, 5
```

```
;thisSurface = OBJ_NEW('IDLgrSurface', data, x, y, Style=style, Shading=1, $  
; Vert_Colors=Reform(ByteScl(data), numVerts), Palette=thisPalette)  
; Create axes objects for the surface. Color them green.
```

```
xAxis = Obj_New("IDLgrAxis", 0, Color=[0,255,0], Ticklen=0.1, $  
    Minor=4, /Exact)
```

```
yAxis = Obj_New("IDLgrAxis", 1, Color=[0,255,0], Ticklen=0.1, $
  Minor=4, /Exact)
```

```
zAxis = Obj_New("IDLgrAxis", 2, Color=[0,255,0], Ticklen=0.1, $
  Minor=4)
```

```
; Add the original surface and axes objects to the model.
```

```
thisModel->Add, thisSurface
;thisModel->Add, xAxis
;thisModel->Add, yAxis
;thisModel->Add, zAxis
```

```
;add other surfaces and the light source
```

```
if keyword_set(light) then thisModel->Add, light
if keyword_set(surface2) then thisModel->Add, surface2
if keyword_set(surface3) then thisModel->Add, surface3
if keyword_set(surface4) then thisModel->Add, surface4
```

```
; Create a trackball for surface rotations. Center it in
; the window.
```

```
thisTrackball = OBJ_NEW('Trackball', [200, 200], 200)
```

```
; Get the data ranges for the surface.
```

```
thisSurface->GetProperty, XRange=xrange, YRange=yrange, ZRange=zrange
```

```
; Set scaling parameters for the surface and axes so that everything
; is scaled into the range -0.5 to 0.5. We do this so that when the
; surface is rotated we don't have to worry about translations. In
; other words, the rotations occur about the point (0,0,0).
```

```
xs = Normalize(xrange, Position=[-0.5,0.5])
ys = Normalize(yrange, Position=[-0.5,0.5])
zs = Normalize(zrange, Position=[-0.5,0.5])
```

```
; Set the range, location, and scaling factors for the axes.
; Note that not all values in the Location keyword are
; used. (I've put really large values into the positions
; that are not being used to demonstrate this.) For
; example, with the X axis only the Y and Z locations are used.
```

```
xAxis->SetProperty, Range=xrange, Location=[9999.0, -0.5, -0.5], $
  XCoord_Conv=xs
```

```
yAxis->SetProperty, Range=yrange, Location=[-0.5, 9999.0, -0.5], $
  YCoord_Conv=ys
zAxis->SetProperty, Range=zrange, Location=[-0.5, 0.5, 9999.0], $
  ZCoord_Conv=zs
```

```
; Scale the surfaces.
```

```
thisSurface->SetProperty,XCoord_Conv=xs, YCoord_Conv=ys, ZCoord_Conv=zs
```

```
;if keyword_set(light) then $
;light->SetProperty,XCoord_Conv=xs, YCoord_Conv=ys, ZCoord_Conv=zs
if keyword_set(surface2) then $
surface2->SetProperty,XCoord_Conv=xs, YCoord_Conv=ys, ZCoord_Conv=zs
if keyword_set(surface3) then $
surface3->SetProperty,XCoord_Conv=xs, YCoord_Conv=ys, ZCoord_Conv=zs
if keyword_set(surface4) then $
surface4->SetProperty,XCoord_Conv=xs, YCoord_Conv=ys, ZCoord_Conv=zs
```

```
; Rotate the surface model to the standard surface view.
```

```
;thisModel->Rotate,[1,0,0], -90 ; To get the Z-axis vertical.
thisModel->Rotate,[0,0,1], -90 ; Rotate it slightly to the right.
thisModel->Rotate,[0,1,0], 60 ; Rotate it slightly to the right.
;thisModel->Rotate,[1,0,0], 30 ; Rotate it down slightly.
```

```
; Create the widgets to view the surface. Set expose events
; on the draw widget so that it refreshes itself whenever necessary.
; Button events are on to enable trackball movement.
```

```
tlb = Widget_Base(Title='Elevation-Shaded Surface: Objects', Column=1, $
  MBar=menubase, TLB_Size_Events=1)
drawID = Widget_Draw(tlb, XSize=400, YSize=400, Graphics_Level=2, Retain=0, $
  Expose_Events=1, Event_Pro='Object_Shade_Surf_Draw_Events', Button_Events=1)
```

```
; Create FILE menu.
```

```
filer = Widget_Button(menubase, Value='File', /Menu)
quitter = Widget_Button(filer, Value='Exit', $
  Event_Pro='Object_Shade_Surf_Exit')
```

```
; Create STYLE menu.
```

```
styleID = Widget_Button(menubase, Value='Style', /Menu, $
  Event_Pro='Object_Shade_Surf_Style')
button = Widget_Button(styleID, Value='Wire Frame')
button = Widget_Button(styleID, Value='Solid')
```

```
Widget_Control, tlb, /Realize
```

```
; Get the window destination object. The view will  
; be drawn when the window is exposed.
```

```
Widget_Control, drawID, Get_Value=thisWindow
```

```
; Create a container object to hold all the other  
; objects. This will make it easy to free all the  
; objects when we are finished with the program.
```

```
thisContainer = Obj_New('IDL_Container')
```

```
; Add created objects to the container.
```

```
thisContainer->Add, thisView  
thisContainer->Add, thisTrackball  
thisContainer->Add, xAxis  
thisContainer->Add, yAxis  
thisContainer->Add, zAxis  
thisContainer->Add, thisSurface  
if keyword_set(surface2) then thisContainer->Add, surface2  
if keyword_set(surface3) then thisContainer->Add, surface3  
if keyword_set(surface4) then thisContainer->Add, surface4  
if keyword_set(light) then thisContainer->Add, light
```

```
thisContainer->Add, thisModel  
;thisContainer->Add, thisPalette
```

```
; Get the current transformation matrix, so it can be restored.
```

```
thisModel->GetProperty, Transform=origTransform
```

```
; Create an INFO structure to hold needed program information.
```

```
info = { origTransform:origTransform, $ ; The transformation matrix.  
        thisContainer:thisContainer, $ ; The object container.  
        thisWindow:thisWindow, $ ; The window object.  
        thisSurface:thisSurface, $ ; The surface object.  
        thisTrackball:thisTrackball, $ ; The trackball object.  
        thisModel:thisModel, $ ; The model object.  
        xAxis:xAxis, $ ; The X Axis object.  
        yAxis:yAxis, $ ; The Y Axis object.  
        zAxis:zAxis, $ ; The Z Axis object.  
        thisView:thisView } ; The view object.
```

```
; Store the info structure in the UValue of the TLB.
```

```
Widget_Control, tlb, Set_UValue=info, /No_Copy
```

```
; Call XManager. Set a cleanup routine so the objects
; can be freed upon exit from this program.
```

```
XManager, 'Object_Shade_Surf', tlb, $
  Cleanup='Object_Shade_Surf_Cleanup', $
  Group_Leader=groupLeader, /No_Block, $
  Event_Handler='Object_Shade_Surf_Resize'
```

```
END
```

```
;-----
```

```
; NB need to decide - is L=nz or L=nz-1? (cf mirrorfield.pro)
;pro cylinder2
```

```
;common grid ,nz,nr
;common mirror, b,B1
nz=30
nr=10
```

```
;-----
```

```
; inner and outer cylinders built in same way:
```

```
; build x,y,z arrays
ntheta=20
```

```
z=findgen(nz) # replicate(1,ntheta)
th=replicate(1,nz) # findgen(ntheta)
```

```
TEXTURE_COORD = [[[z/(nz-1)],[[th/(ntheta-1)]]]
texture_coord = reform(texture_coord,2,nz*ntheta,/overwrite)
th = th/(ntheta-1)*2*PI
```

```
x=nr*cos(th)
y=nr*sin(th)
```

```
; first set of vertices
vert = [0,1,nz+1,nz]
polygon=intarr(5*nz*ntheta)
iv=0
; build list of vertices
for k=0,ntheta-2 do begin
  for j=0,nz-2 do begin
    polygon(iv:iv+4) = [4,vert]
    iv = iv+5
    vert=vert+1
  endfor
  vert=vert+1
```

endfor

```
;-----  
; make plain image to drape over main cylinder so can use alpha channel;
```

```
alpha=50  
; red = replicate(200,nz) # replicate(1,ntheta)  
; green = replicate(20,nz) # replicate(1,ntheta)  
; blue = replicate(20,nz) # replicate(1,ntheta)  
; alpha = replicate(alpha,nz) # replicate(1,ntheta)  
red = replicate(20,2) # replicate(1,2)  
green = replicate(200,2) # replicate(1,2)  
blue = replicate(20,2) # replicate(1,2)  
alpha2 = replicate(alpha,2) # replicate(1,2)  
; planar interleaving for image (interleave=2)  
drape = [[[red]],[[green]],[[blue]],[[alpha2]]]  
drape2 = [[[red]],[[blue]],[[green]],[[alpha2]]]  
help,red,drape
```

```
;texture_coord =
```

```
;-----  
; mirror coils:  
; inner radius rin, outer radius rout  
rin=nr*1.45  
rout=nr*1.5  
width=1  
; build x,y,z arrays  
ntheta=20
```

```
z2 = replicate(1,ntheta) # [0,width,width,0,0]  
th2 = findgen(ntheta)/(ntheta-1)*2*PI # replicate(1,5)  
r2 = replicate(1,ntheta) # [rout,rout,rin,rin,rout]
```

```
x2=r2*cos(th2)  
y2=r2*sin(th2)
```

```
; first set of vertices  
vert = [0,1,ntheta+1,ntheta]  
polygon2=intarr(5*5*ntheta)  
iv=0  
; build list of vertices  
for k=0,3 do begin  
  for j=0,ntheta-2 do begin  
    polygon2(iv:iv+4) = [4,vert]  
    iv = iv+5  
    vert=vert+1  
  endfor
```

```

    vert=vert+1
endfor

;-----
; now make some object arguments for the main drawing routine:

; Create a plain, semitransparent image to drape over the main
; cylinder:

image = OBJ_NEW('IDLgrImage', drape, INTERLEAVE=2, blend_function=[3,1-alpha])

; Create a light source (an argument for object_shade_surf)

light = Obj_New("IDLgrLight",color=lightcolor,type=1,$
                direction=[1,1,0], location=[-2*nr,-2*nr,0] )

; Create a cylinder, polygon object:

thisSurface = OBJ_NEW('IDLgrPolygon', x, y, z, Style=2, Shading=1, $
                      polygon=polygon, color=[200,20,20] )
;          texture_coord= texture_coord,$
;          texture_map=image )

; an inner cylinder, with the same polygon ordering:

surface2 = OBJ_NEW('IDLgrPolygon', x*0.2, y*0.2, z, Style=2, Shading=1, $
                  polygon=polygon )

; a mirror coil

surface3 = OBJ_NEW('IDLgrPolygon', x2, y2, z2, Style=2, Shading=1, $
                  polygon=polygon2, color=[20,200,20] )

; 2nd mirror coil

surface4 = OBJ_NEW('IDLgrPolygon', x2, y2, z2+nz-width, Style=2, Shading=1, $
                  polygon=polygon2, color=[20,200,20] )

Object_Shade_Surf, thisSurface=thisSurface,light=light,surface2=surface2,$
                  surface3=surface3,surface4=surface4

end

```

## File Attachments

1) [cylinder3.pro](#), downloaded 96 times

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