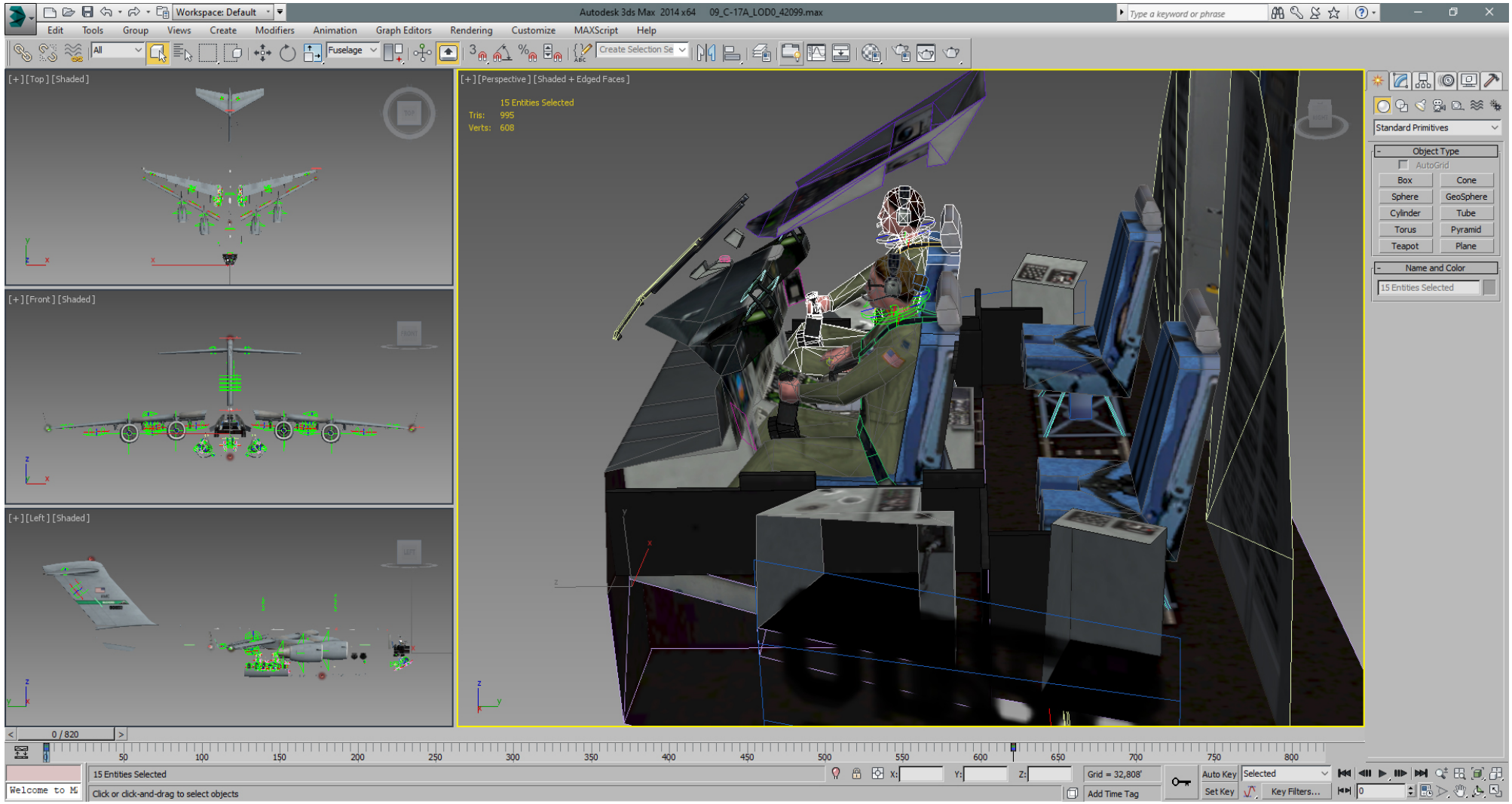
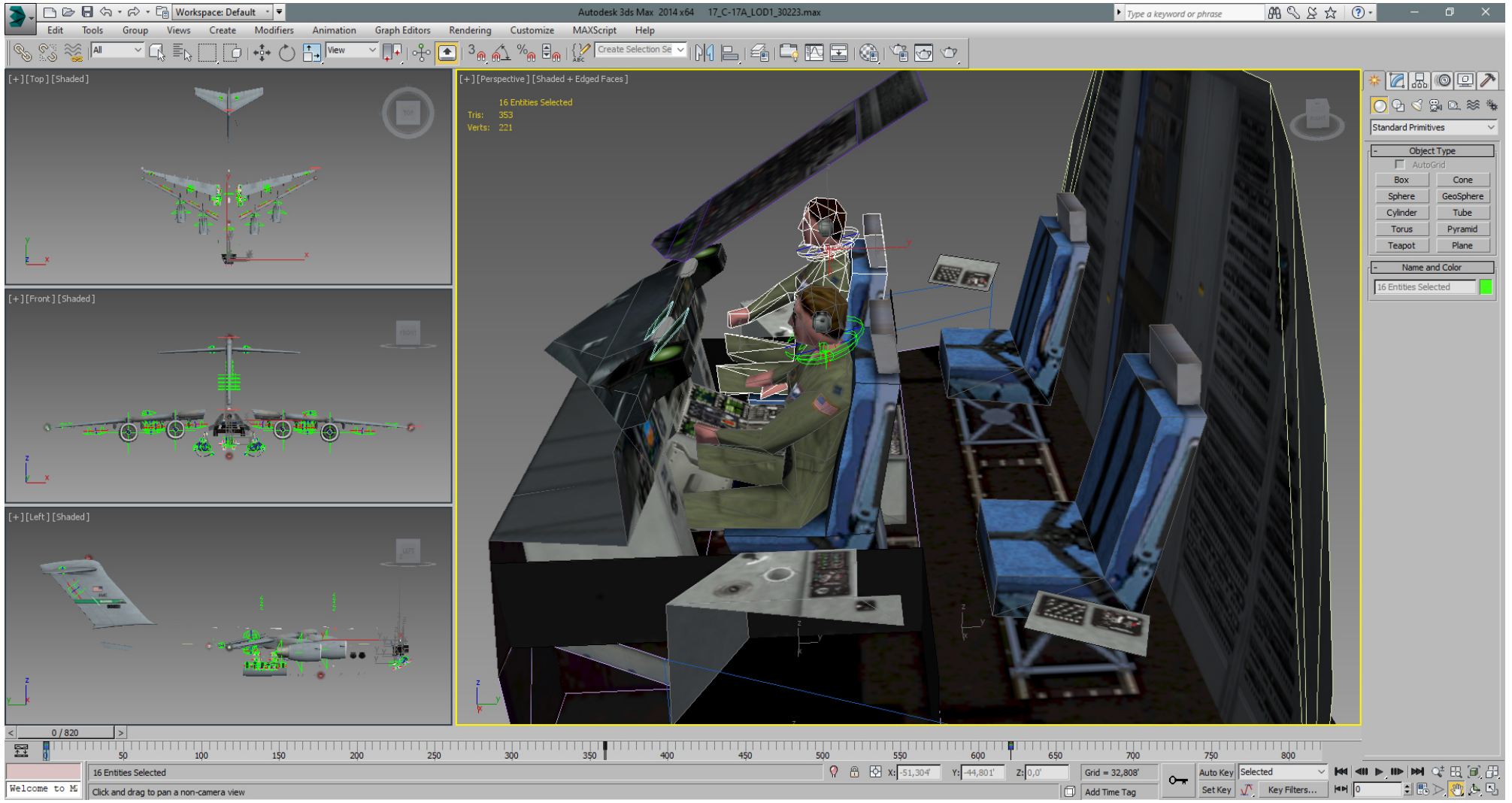
For LOD 1, we want to keep the outer shape again nice as possible, but we can get rid of some stuff which will be hardly noticed from ~150 ft distance.
We start with the cockpit, the front gear, gear doors and wheels.

Some objects have been deleted. Well I personally prefer to hide instead delete (select and right click, then use "Hide selected"), and some objects have been simplified, using an "Edit Poly" modifier on top of the "Stack".

Before:

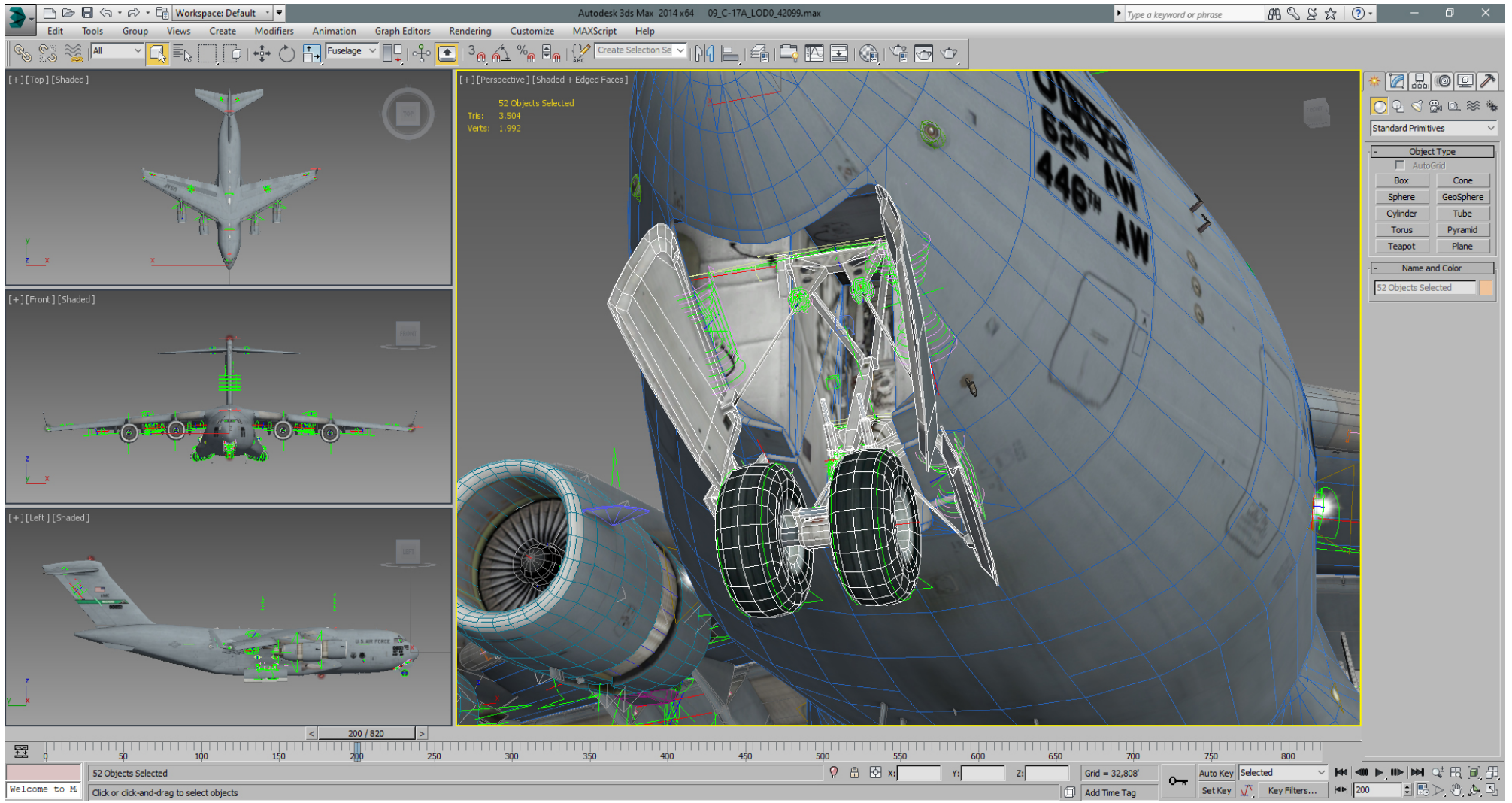


After:

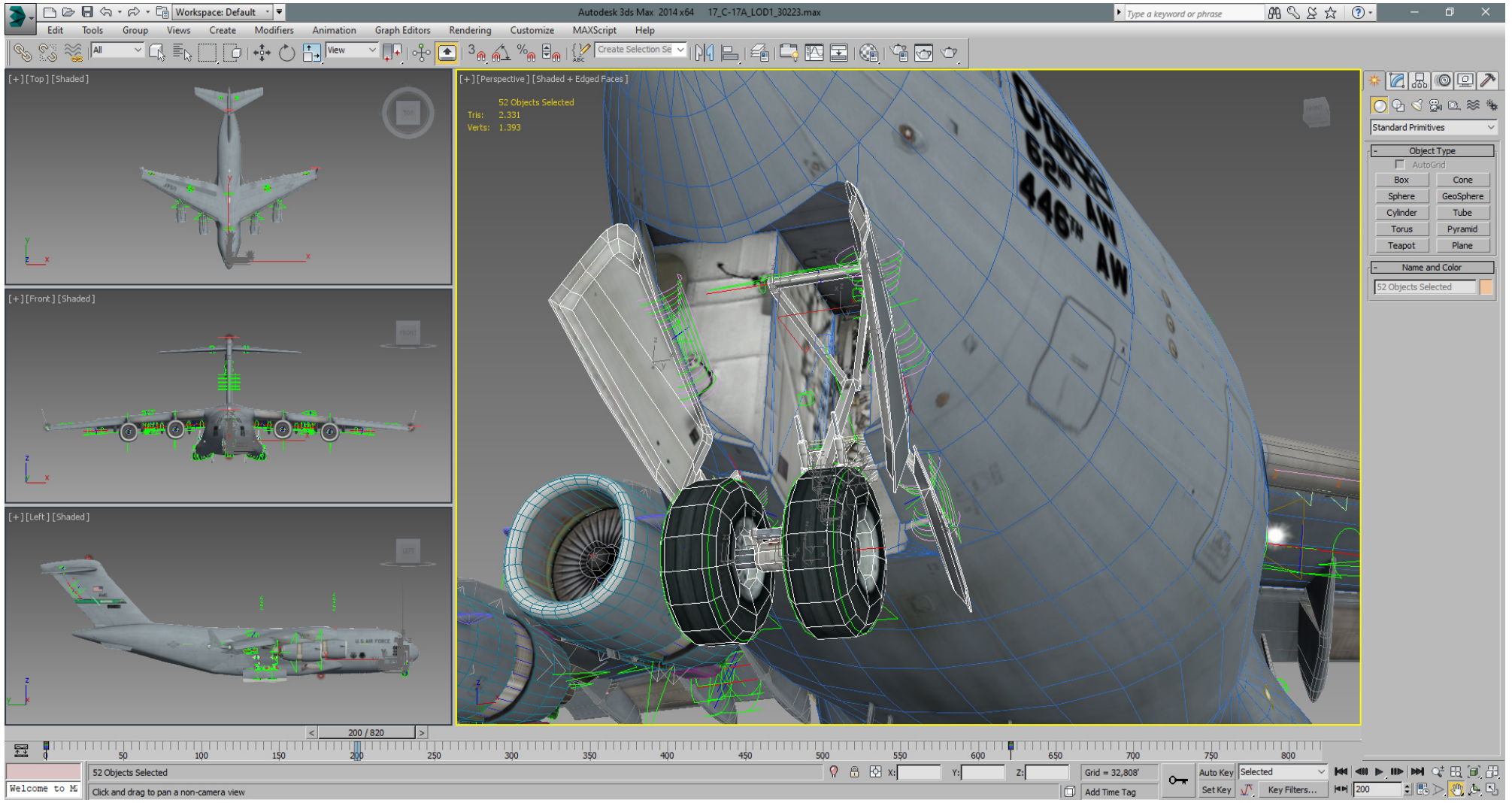

Autodesk 3ds Max 2014 x64 17_C-17A_LOD1_30223.max
Workspace: Default
Edit Tools Group Views Create Modifiers Animation Graph Editors Rendering Customize MAXScript Help
[+][Top][Shaded]
[+][Front][Shaded]
[+][Left][Shaded]
[+][Perspective][Shaded + Edged Faces]
16 Entities Selected
Tris: 353
Verts: 221
Standard Primitives
Object Type
AutoGrid
Box Cone
Sphere GeoSphere
Cylinder Tube
Torus Pyramid
Teapot Plane
Name and Color
16 Entities Selected
0 / 820
16 Entities Selected
Click and drag to pan a non-camera view
Add Time Tag
Auto Key
Set Key
Key Filters...

The gear door rods are also removed, including their nested DOF helpers.
Remember: a DOF or Switch without any object linked to the end of the chain will crash when exported to .LOD.

Before:

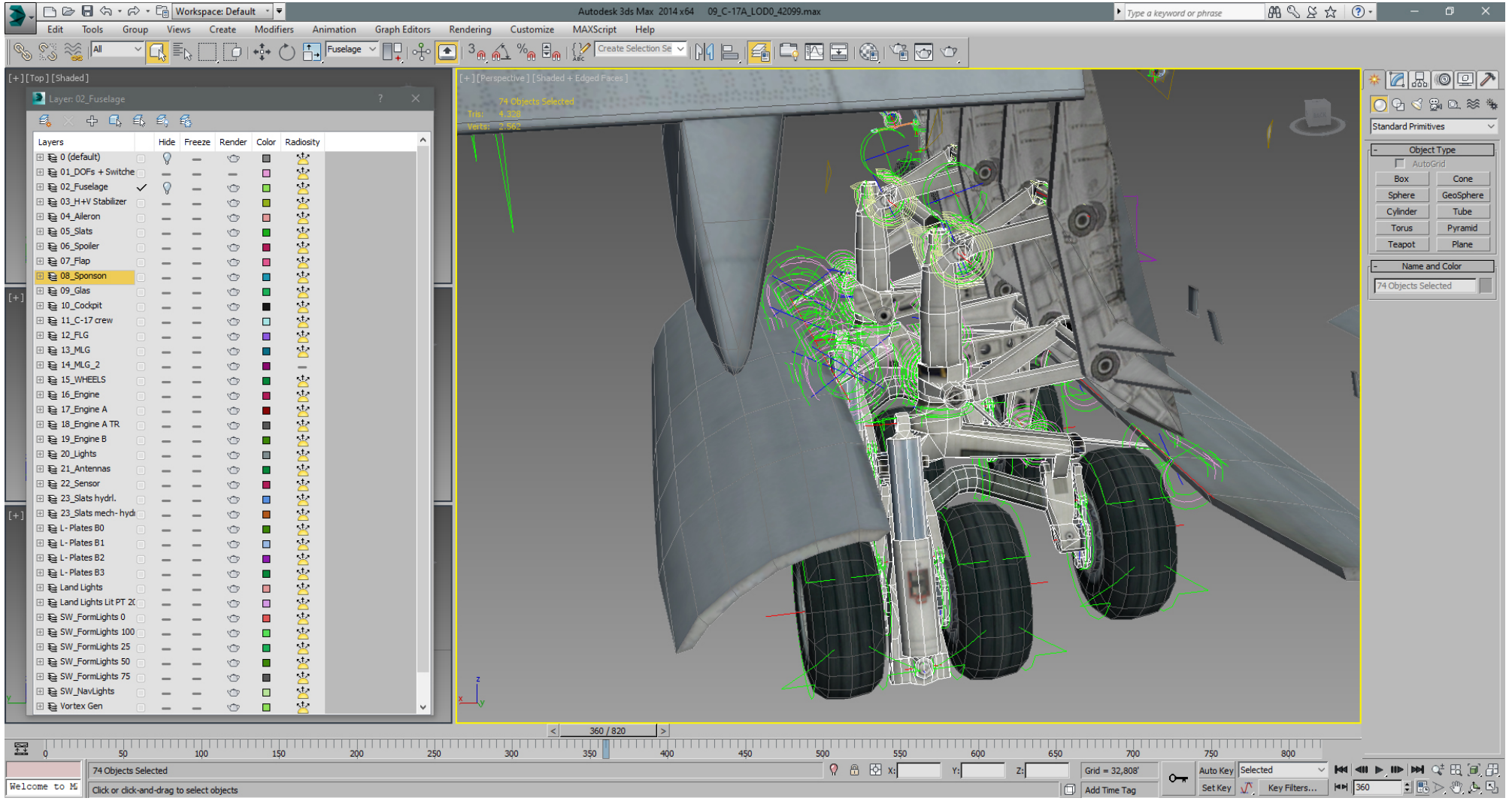


After:

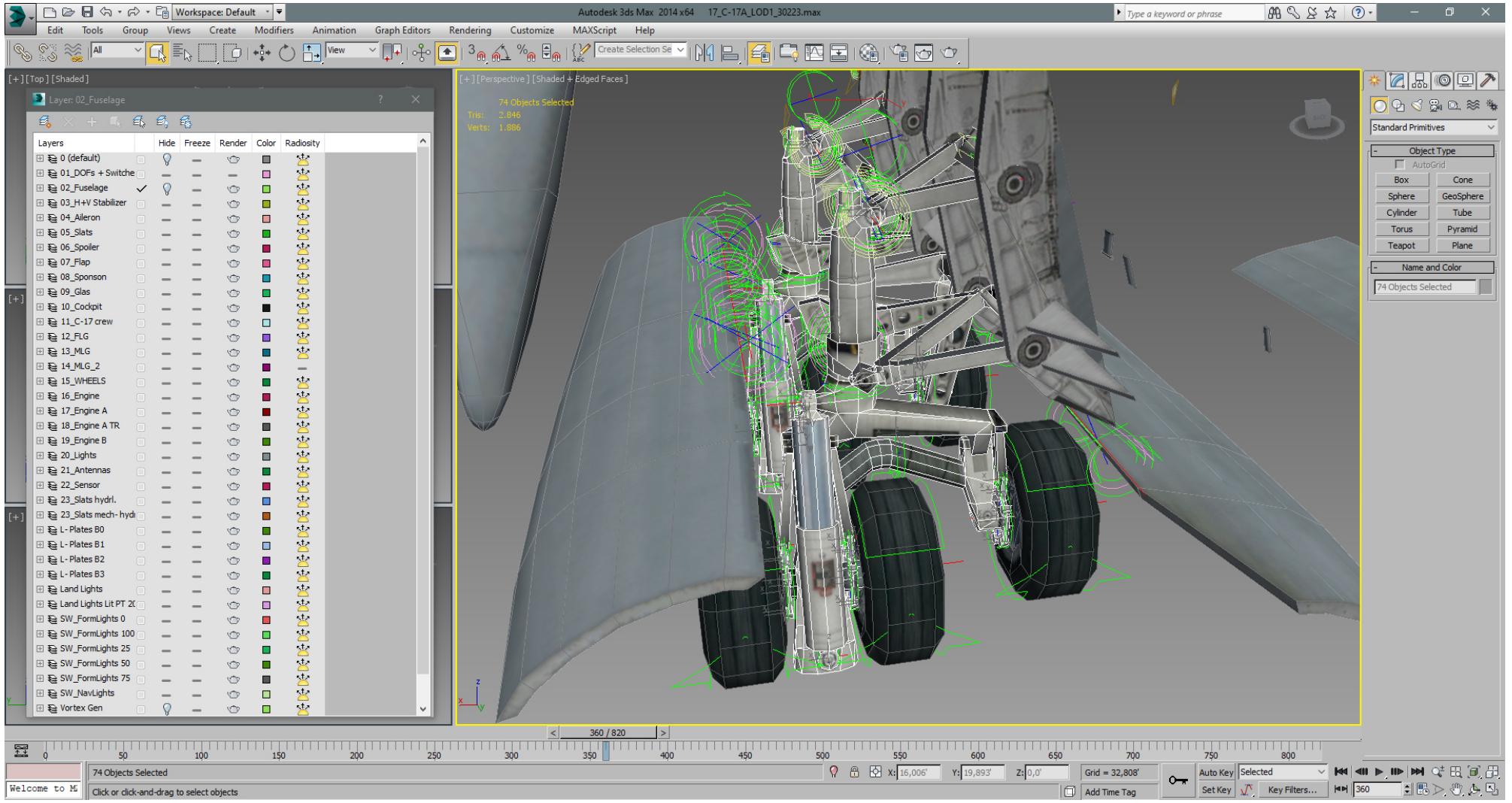

Autodesk 3ds Max 2014 x64 17_C-17A_LOD1_30223.max
Workspace: Default
Edit Tools Group Views Create Modifiers Animation Graph Editors Rendering Customize MAXScript Help
[+][Top][Shaded]
[+][Front][Shaded]
[+][Left][Shaded]
[+][Perspective][Shaded + Edged Faces]
52 Objects Selected
Tris: 2.331
Verts: 1.393
Standard Primitives
Object Type
AutoGrid
Box Cone
Sphere GeoSphere
Cylinder Tube
Torus Pyramid
Teapot Plane
Name and Color
52 Objects Selected
200 / 820
52 Objects Selected
Click and drag to pan a non-camera view
Grid = 32,808'
Add Time Tag
Auto Key
Set Key
Key Filters...
Selected

Some simplifying on the main landing gear, wheels and wheel brakes has been done.
This time, some top polys of the gear has been deleted. Those will be not seen from distance.

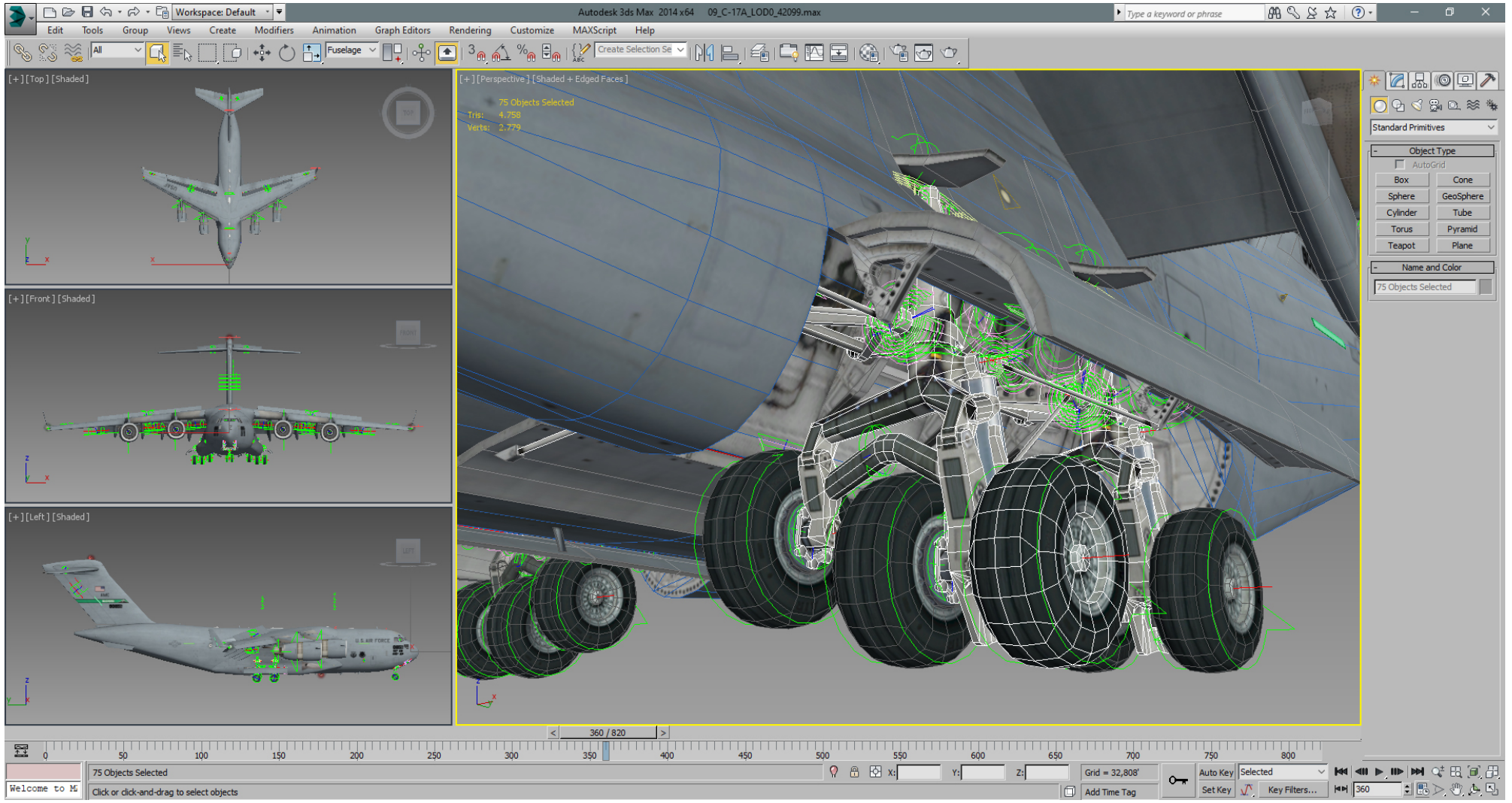
Before:



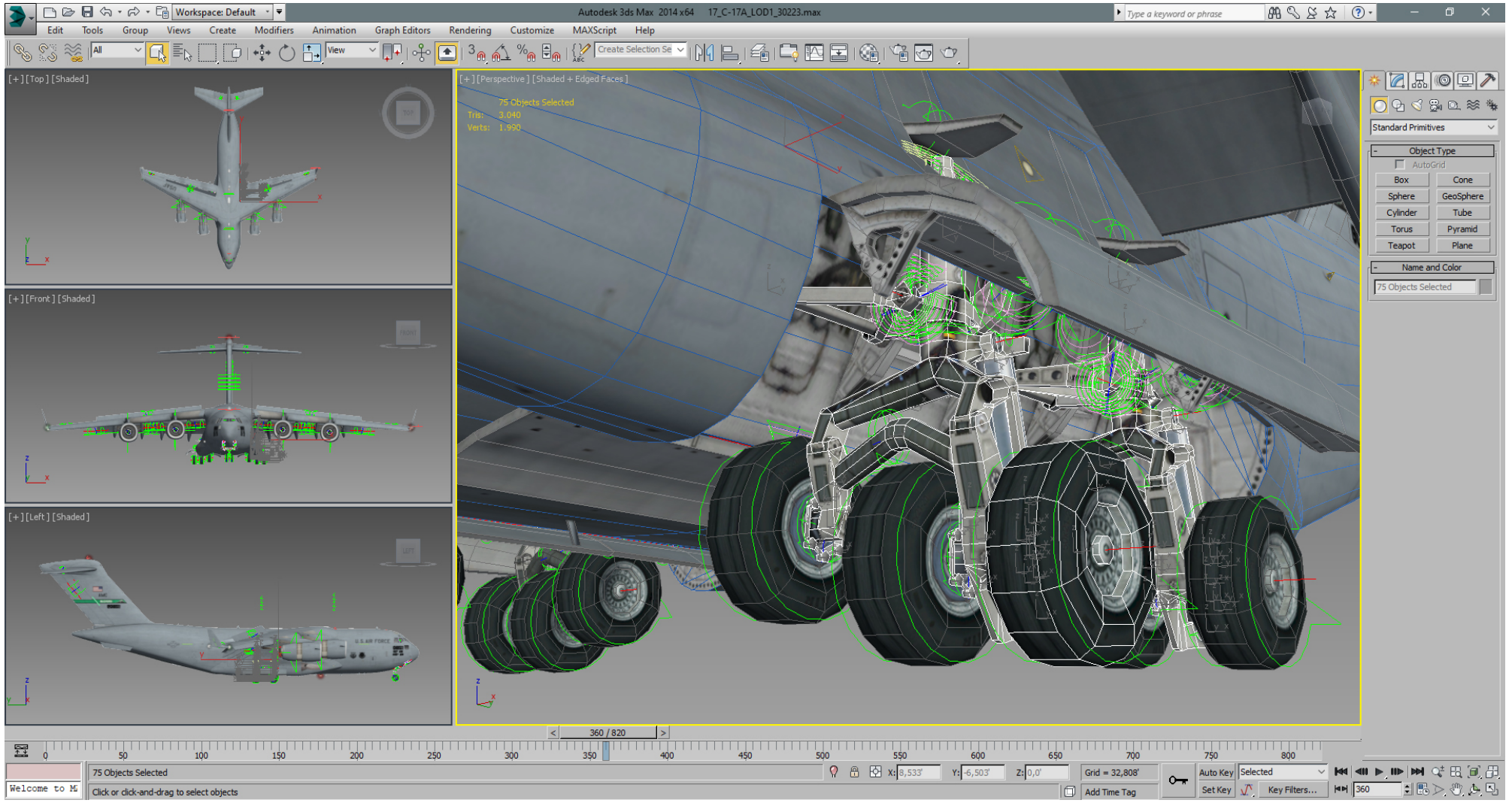
After:


Autodesk 3ds Max 2014 x64 17_C-17A_LOD1_30223.max
Workspace: Default
Edit Tools Group Views Create Modifiers Animation Graph Editors Rendering Customize MAXScript Help
[+] [Top] [Shaded]
Layer: 02_Fuselage
Layers Hide Freeze Render Color Radiosity
0 (default)
01_DOFs + Switche
02_Fuselage
03_H+V Stabilizer
04_Aileron
05_Slats
06_Spoiler
07_Flap
08_Sponson
09_Glas
10_Cockpit
11_C-17 crew
12_FLG
13_MLG
14_MLG_2
15_WHEELS
16_Engine
17_Engine A
18_Engine A TR
19_Engine B
20_Lights
21_Antennas
22_Sensor
23_Slats hydrl.
23_Slats mech- hydr
L- Plates B0
L- Plates B1
L- Plates B2
L- Plates B3
Land Lights
Land Lights Lit PT 2(
SW_FormLights 0
SW_FormLights 100
SW_FormLights 25
SW_FormLights 50
SW_FormLights 75
SW_NavLights
Vortex Gen
[+] [Perspective] [Shaded + Edged Faces]
74 Objects Selected
Tris: 2.846
Verts: 1.886
Standard Primitives
Object Type
AutoGrid
Box Cone
Sphere GeoSphere
Cylinder Tube
Torus Pyramid
Teapot Plane
Name and Color
74 Objects Selected
360 / 820
74 Objects Selected
Click or click-and-drag to select objects
Add Time Tag
Auto Key
Set Key
Key Filters...

Before:

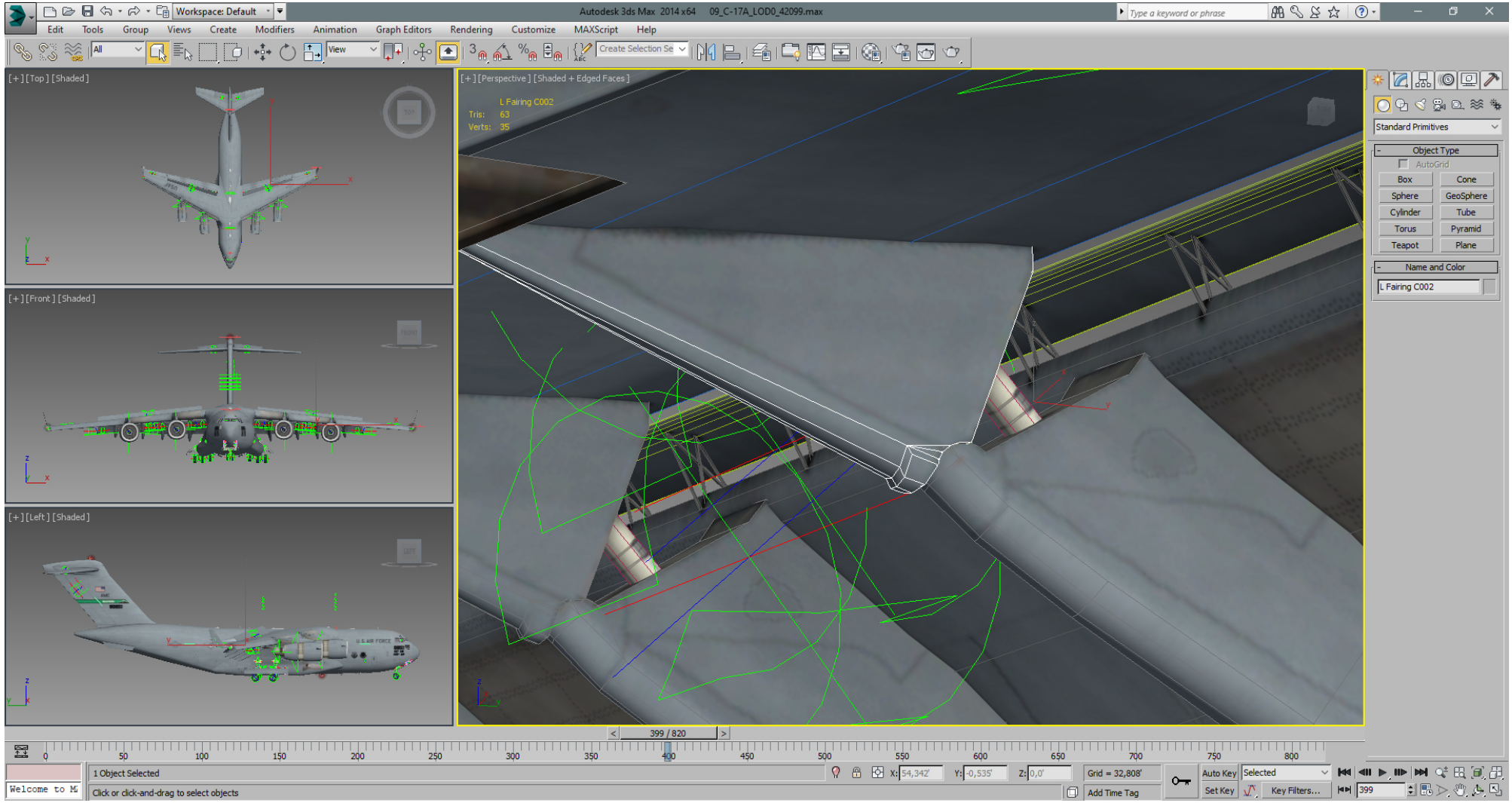

Autodesk 3ds Max 2014 x64 09_C-17A_LOD0_42099.max
Workspace: Default
Edit Tools Group Views Create Modifiers Animation Graph Editors Rendering Customize MAXScript Help
[+][Top][Shaded]
[+][Front][Shaded]
[+][Left][Shaded]
[+][Perspective][Shaded + Edged Faces]
75 Objects Selected
Tris: 4,758
Verts: 2,779
Standard Primitives
Object Type
AutoGrid
Box Cone
Sphere GeoSphere
Cylinder Tube
Torus Pyramid
Teapot Plane
Name and Color
75 Objects Selected
360 / 820
75 Objects Selected
Click or click-and-drag to select objects
Add Time Tag
Auto Key
Set Key
Key Filters...

After:

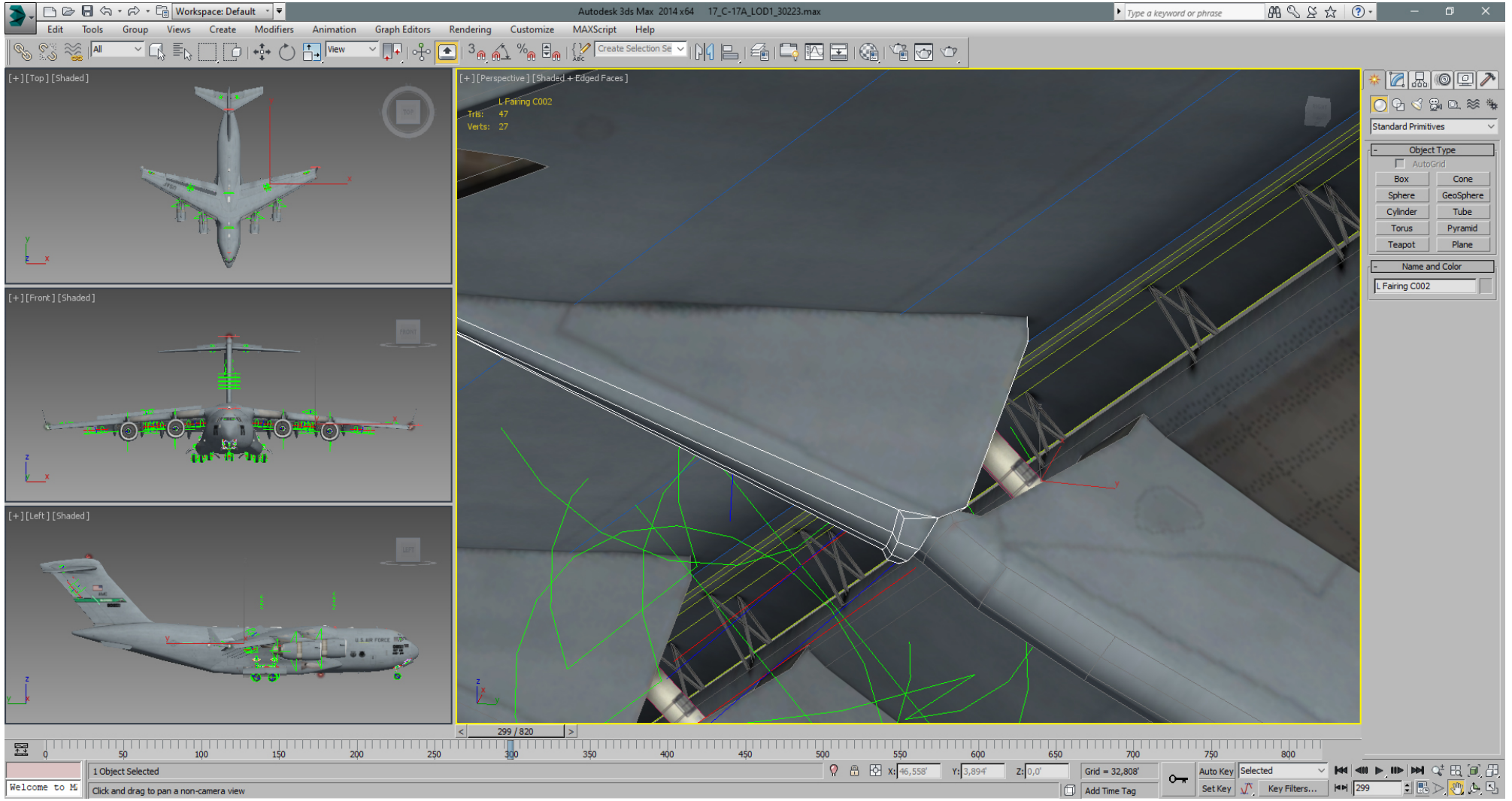

Autodesk 3ds Max 2014 x64 17_C-17A_LOD1_30223.max
Workspace: Default
Edit Tools Group Views Create Modifiers Animation Graph Editors Rendering Customize MAXScript Help
[+][Top][Shaded]
[+][Front][Shaded]
[+][Left][Shaded]
[+][Perspective][Shaded + Edged Faces]
75 Objects Selected
Tris: 3.040
Verts: 1.990
Standard Primitives
Object Type
AutoGrid
Box Cone
Sphere GeoSphere
Cylinder Tube
Torus Pyramid
Teapot Plane
Name and Color
75 Objects Selected
360 / 820
75 Objects Selected
Click or click-and-drag to select objects
Add Time Tag
Auto Key
Set Key
Key Filters...

While still trying to avoid touching the fuselage, the tris around the fairings hinge axis has been simplified.
Our 6- sided hydraulic cylinder to drive the fairings and flaps became a 3- sided cylinder.

Before:



After:

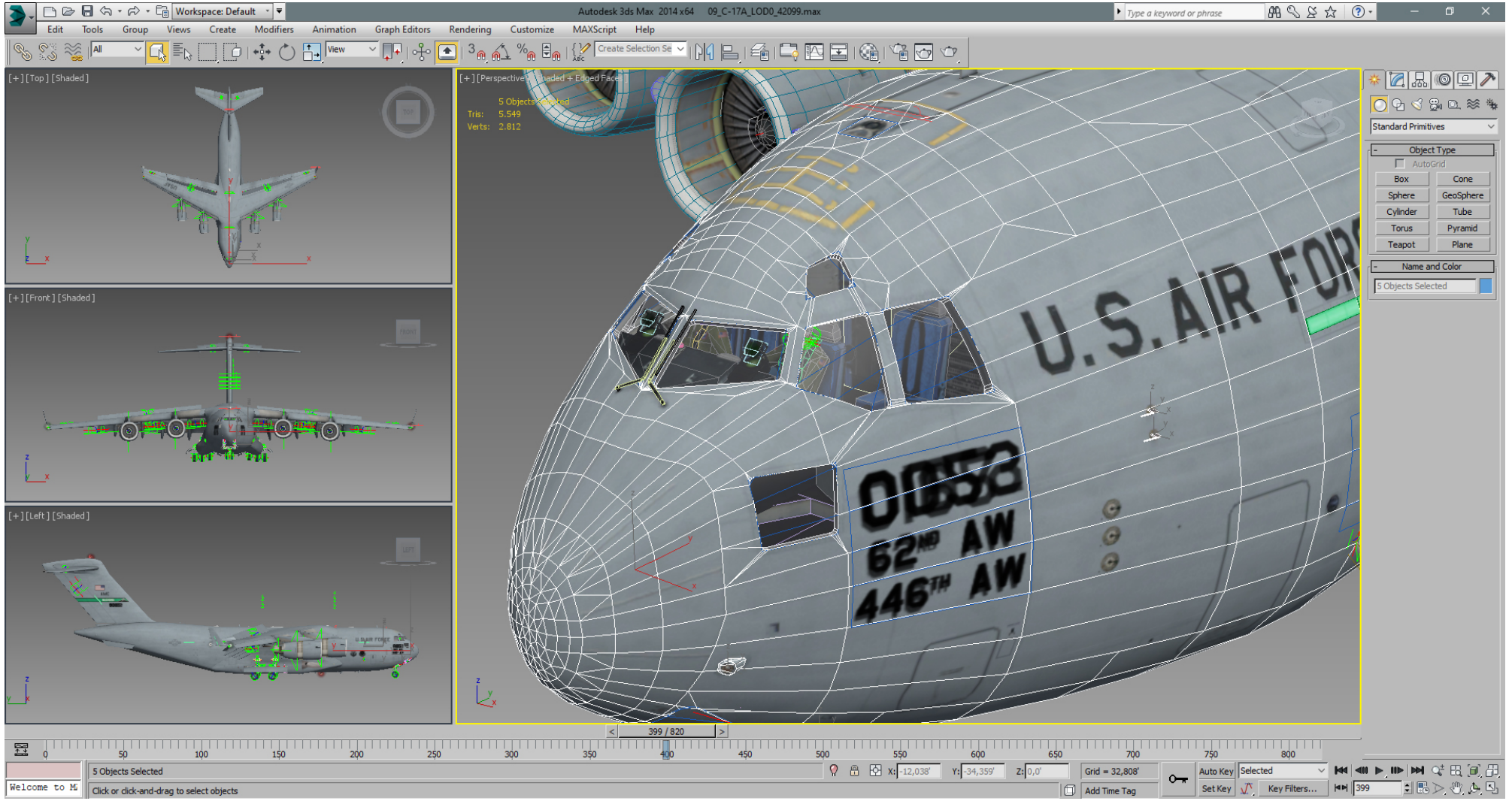


There has been done some more simplifying on various objects, like fan hub, antennas, etc., no need to mention them detailed here.

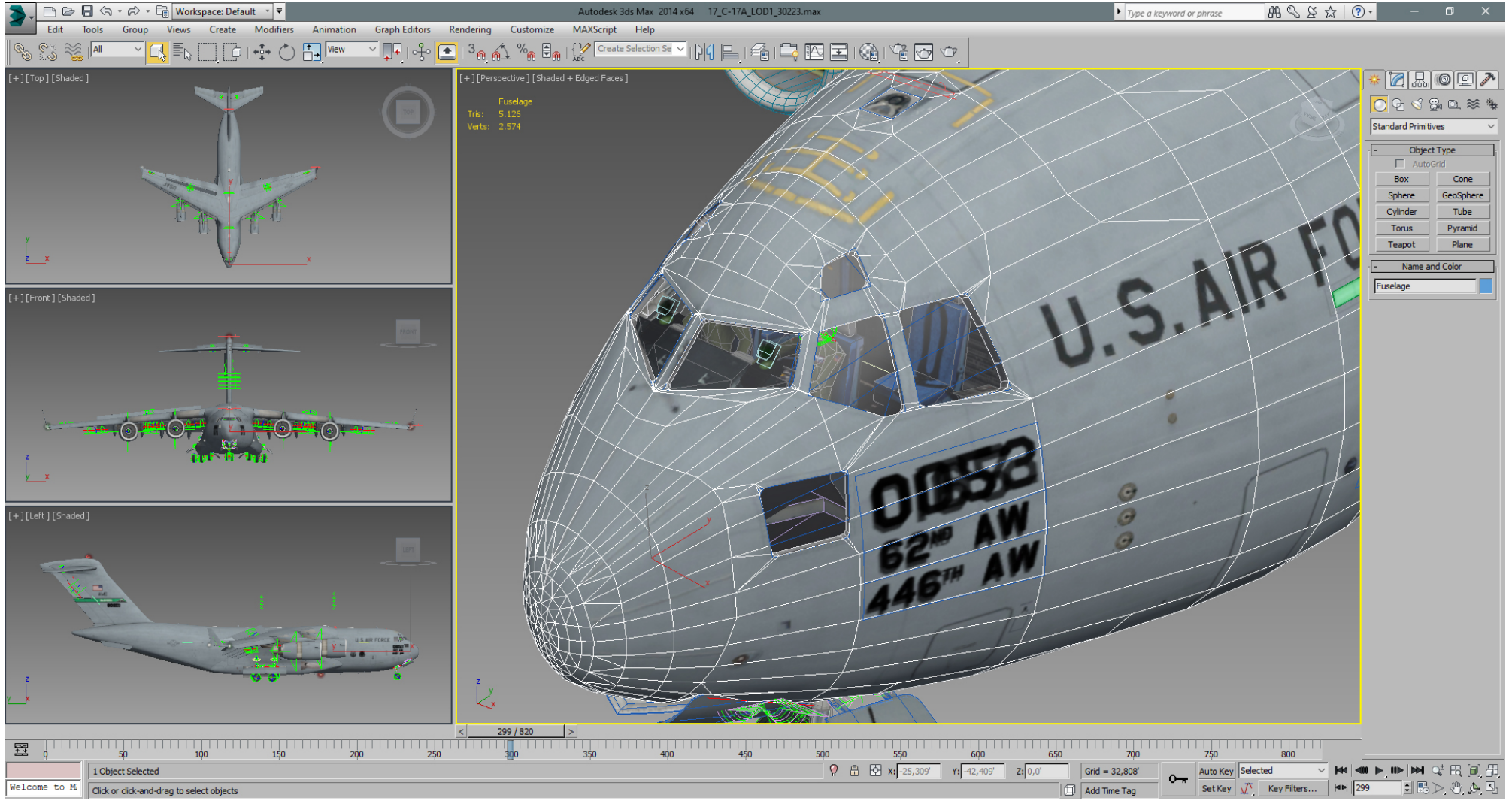
With the above work we have saved already many tris, so we can have a look at the fuselage finally.

All sensors and pitots are hidden/ removed, next some simplifying on the forehead was done.
And so the windows, which are not that round at their corners anymore.

Before:

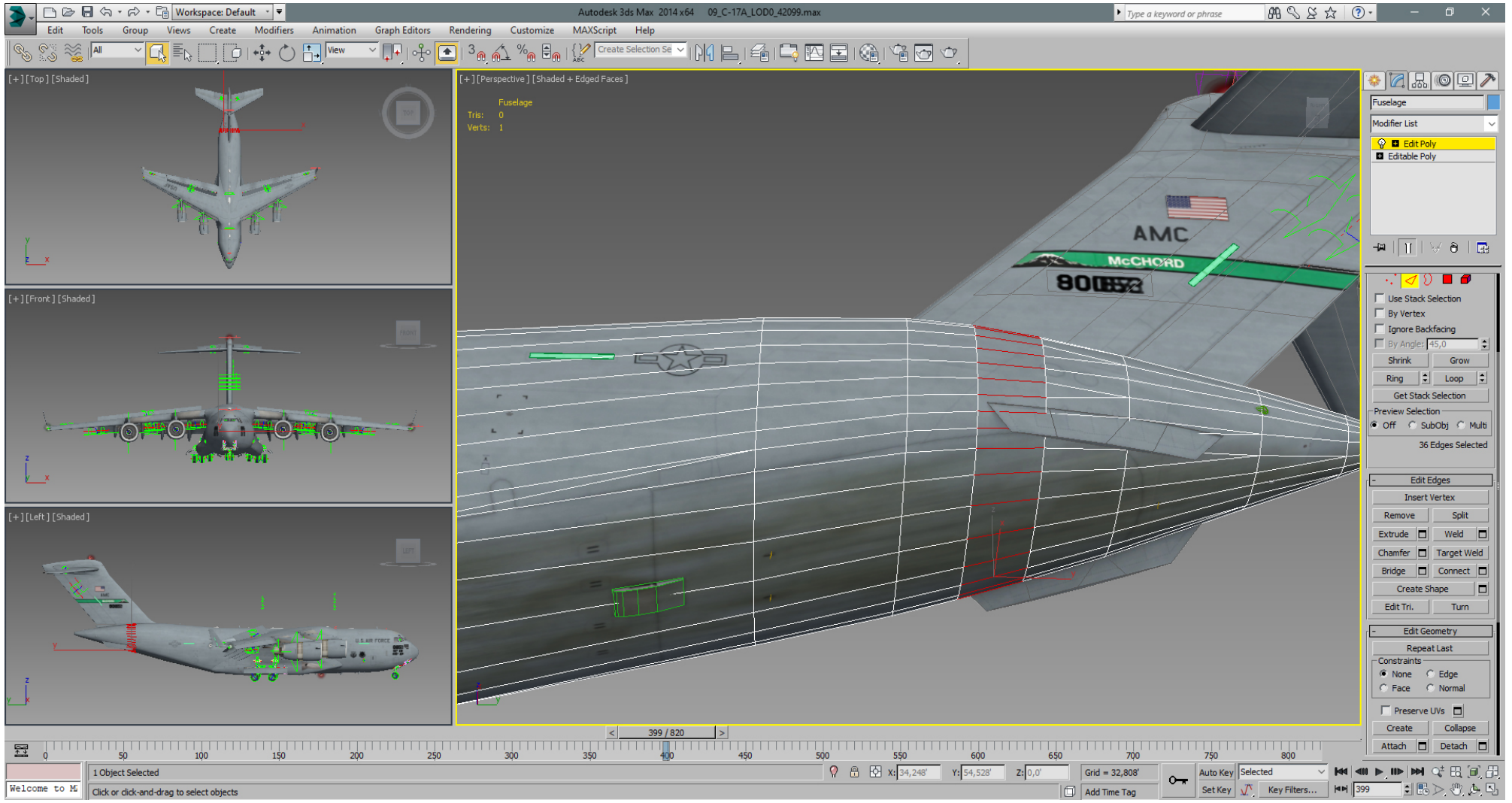


After:

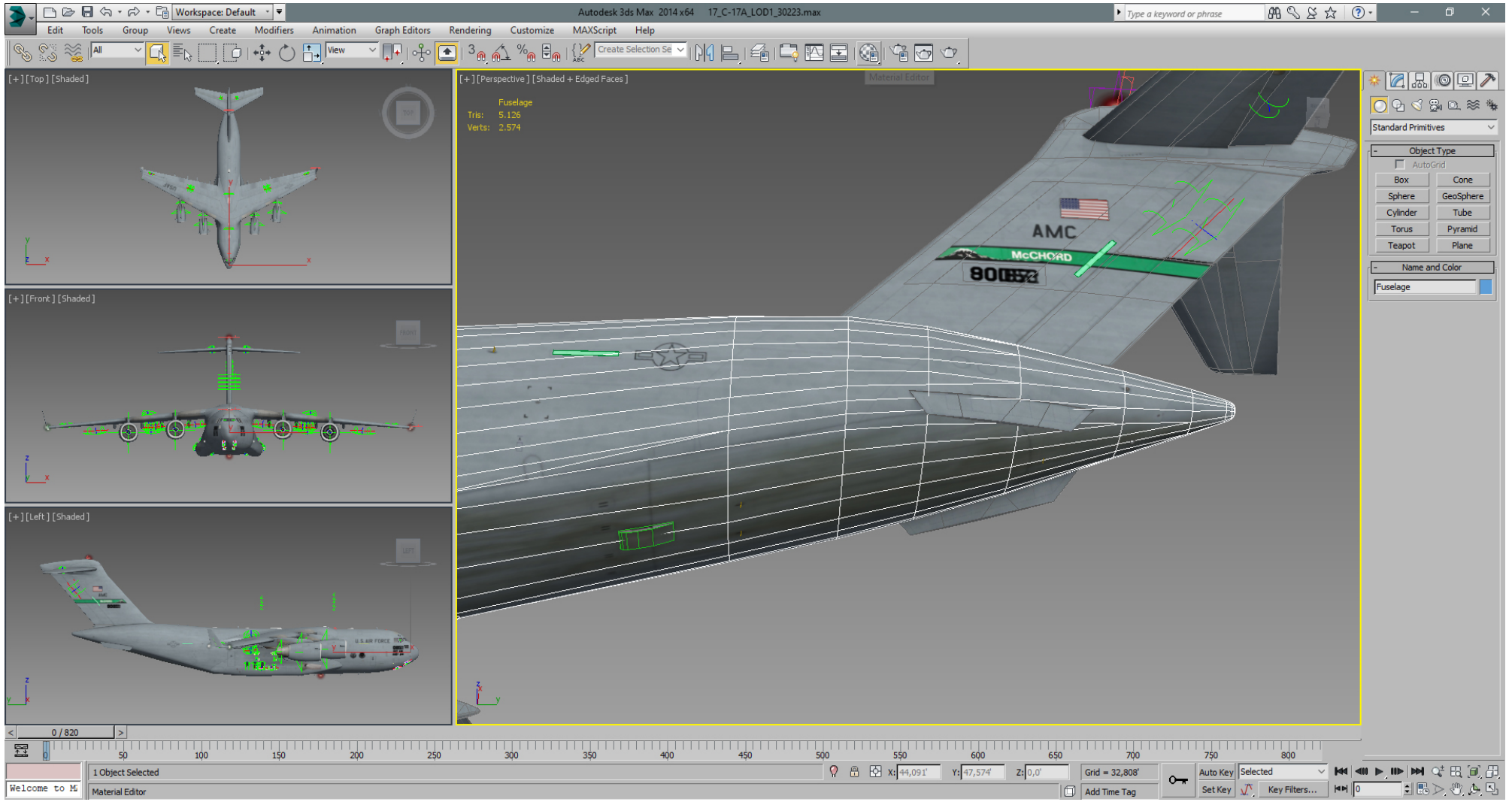

Autodesk 3ds Max 2014 x64 17_C-17A_LOD1_30223.max
[+][Top][Shaded]
[+][Front][Shaded]
[+][Left][Shaded]
[+][Perspective][Shaded + Edged Faces]
Fuselage
Tris: 5.126
Verts: 2.574
U.S. AIR FO
62ND AW
446TH AW
Standard Primitives
Object Type
Box
Cone
Sphere
GeoSphere
Cylinder
Tube
Torus
Pyramid
Teapot
Plane
Name and Color
Fuselage
1 Object Selected
Click or click-and-drag to select objects

And finally we got rid of some tris near the tail, using "Collapse" on those selected edges.

Before:



After:



Well, we are down to 30151 tris overall, incl. all switch states geometry for formation lights and license plates.
This is approximately 70% tris count of LOD 0 (42099 tris).

So I think this one shall be our LOD 1.

We can now select everything and export selected to "Model_1.LOD", to check results in OpenGLLOD viewer.

Actually our \Data\TerrData\Objects\Parents\1461\PARENT.DAT from our already extracted DB
looks like this:

Dimensions = 124.000000 -73.116997 87.394997 -12.500000 12.500000 -11.263000 9.737000
TextureSets = 1
Switches = 69
Dofs = 93
AddLOD = Model_0.LOD 1000.000000
AddLOD = Model_1.LOD 15000.000000

We can already adjust the LOD distances to lower values, because we want to do a more aggressive LODing.
That means LOD 1 should kick in at a way lower distance.

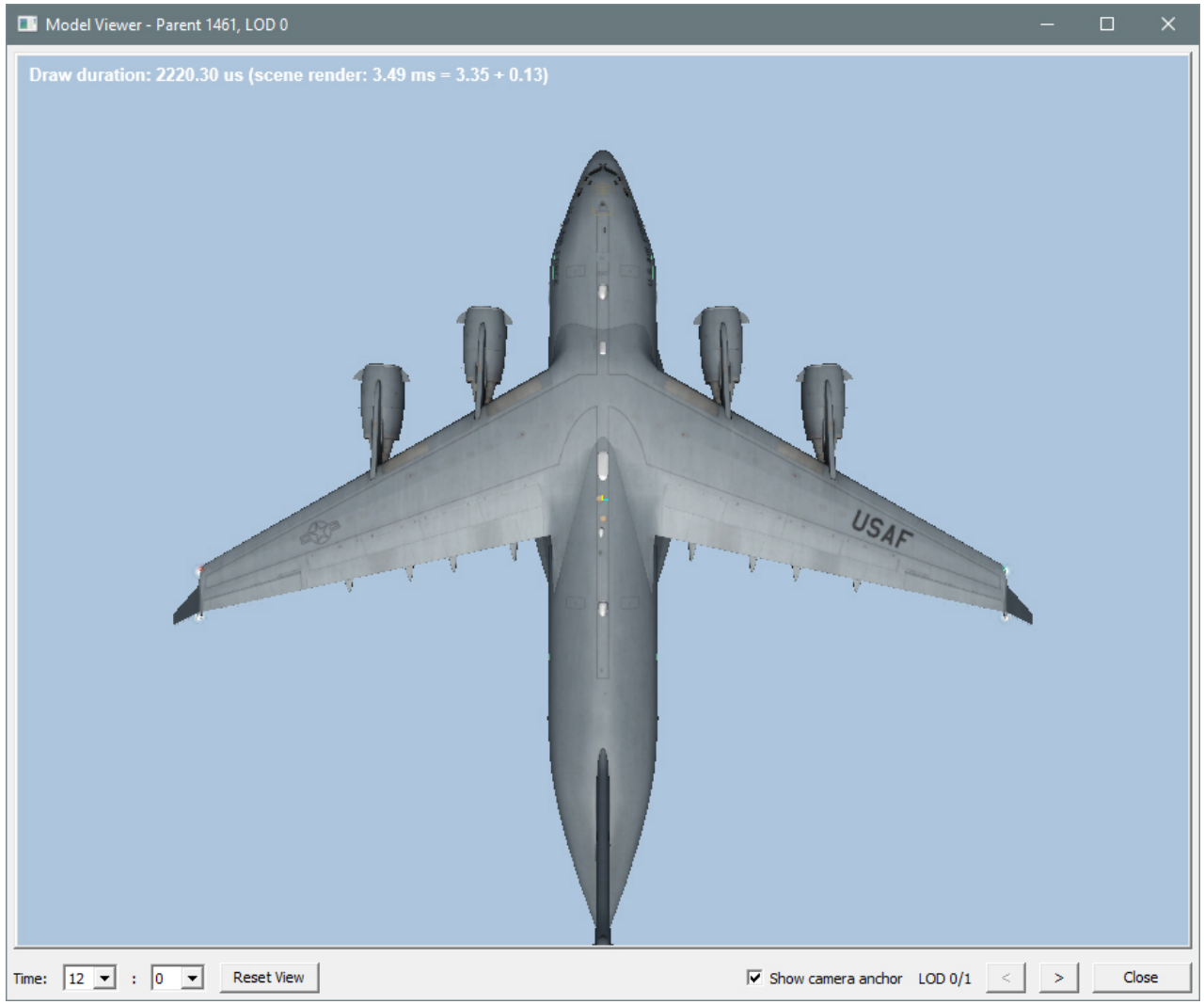
Dimensions = 124.000000 -73.116997 87.394997 -12.500000 12.500000 -11.263000 9.737000
TextureSets = 1
Switches = 69
Dofs = 93
AddLOD = Model_0.LOD 150.000000
AddLOD = Model_1.LOD 300.000000

With those values LOD 0 is used for 0 - 150 ft distance, then LOD 1 is used for the next 150 ft up to 300 ft.

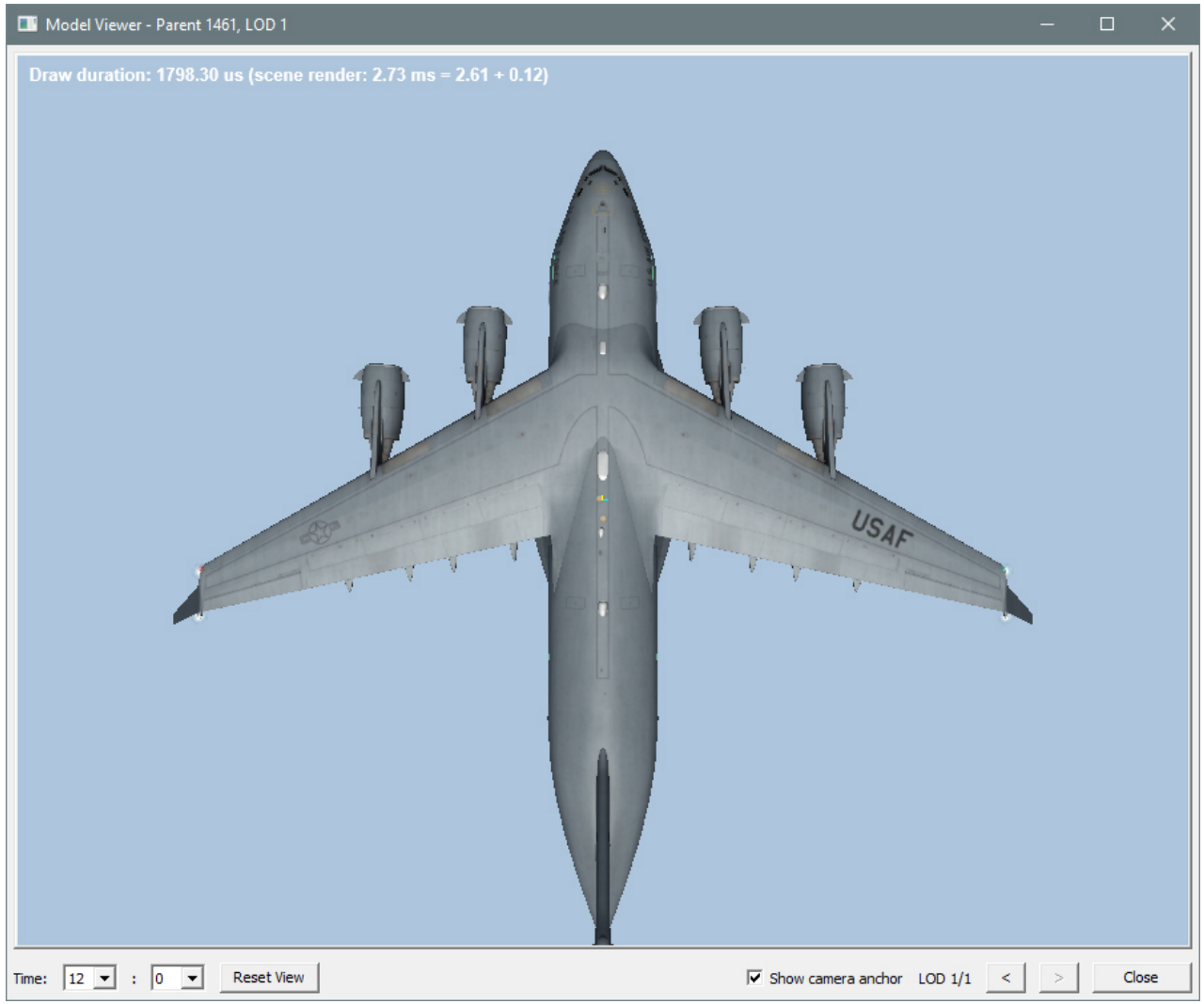
Anyway, "Model_0.LOD" is our LOD 0, but "Model_1.LOD" is still the old LOD 1.

So all we need to do is to copy our new "Model_1.LOD" into the \Data\TerrData\Objects\Parents\1461 folder
to overwrite the old one.
Now we can rebuild the DB and fire up the BMS editor/ Model viewer.

LOD 0 - 42099 tris



And we can switch to LOD 1 - 30151 tris, using the arrow buttons at the bottom right corner.



We can continue to build LOD 2 from our actually LOD 1 now.

And while we have been working on the PARENT.DAT and LOD distances lately, we can add the line for LOD 2 already.

Dimensions = 124.000000 -73.116997 87.394997 -12.500000 12.500000 -11.263000 9.737000
TextureSets = 1
Switches = 69
Dofs = 93
AddLOD = Model_0.LOD 150.000000
AddLOD = Model_1.LOD 300.000000
AddLOD = Model_2.LOD 600.000000

With that last line added, LOD 2 is used from 300 ft up to 600 ft distance.

So it just needs a "Model_2.LOD" file into the \Data\TerrData\Objects\Parents\1461 folder
before we can rebuild the DB and fire up the sim or BMS editor/ Model viewer.

Hint: To better see when and which LOD kicks in, we can use temporary "markers".
Simply add a primitive like a cylinder on top of the AC for LOD 1 in 3dsMax.
Make it huge (good visible) and with some distance to the AC.

Then export this as "Model_1.LOD", copy to our 1461 folder and overwrite existing.
For LOD 2 we create then 2 cylinders as "markers", for LOD 3 we create 3 cylinders ...

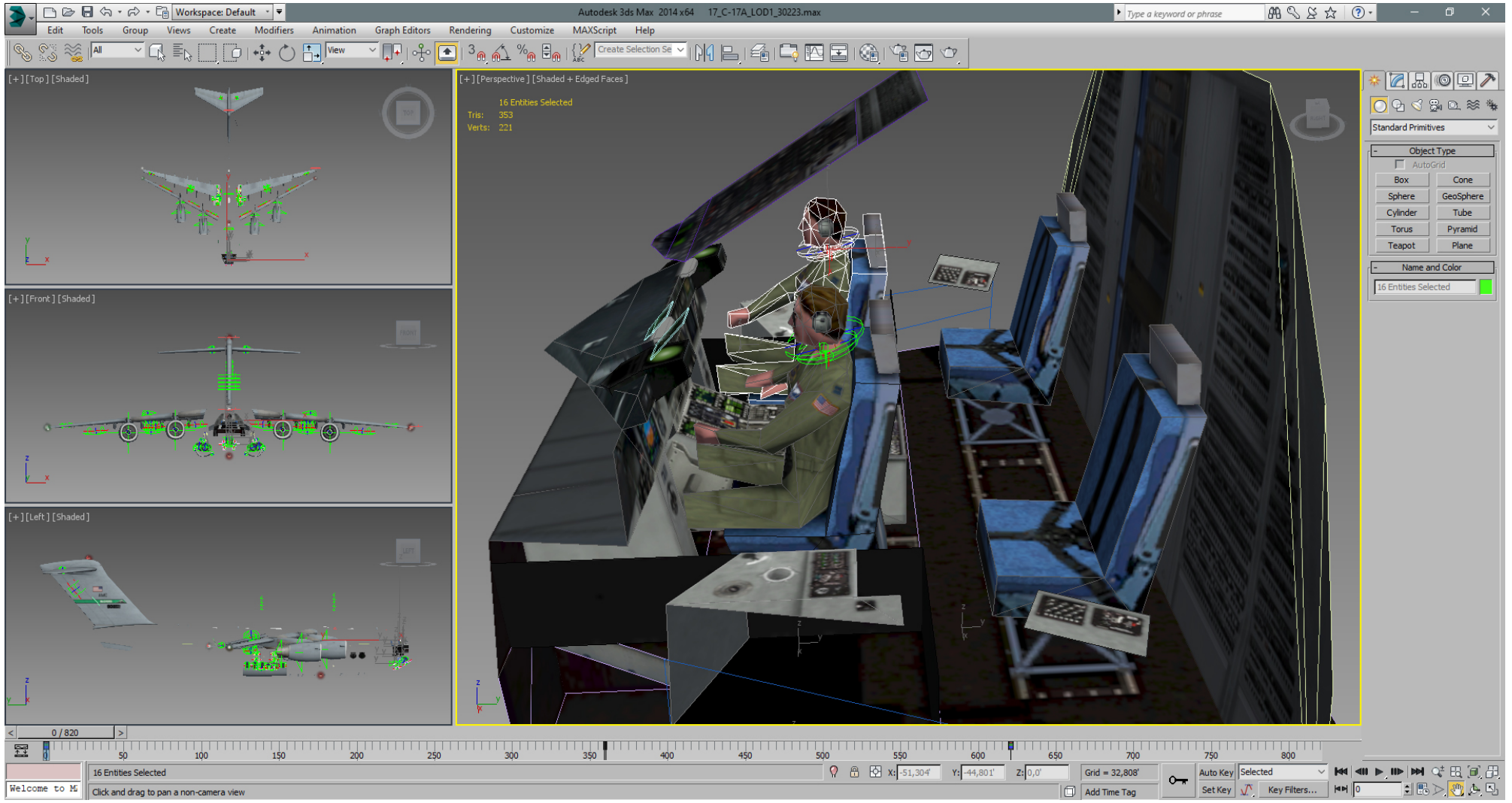
Then rebuild the DB and fire up the sim, checking the LOD distances in a simple TE insim.
This helps us also to decide where we can save more triangles.

Sure, for final we'll need to get rid of those "marker" cylinders and export our LODs again,
but that is no problem.

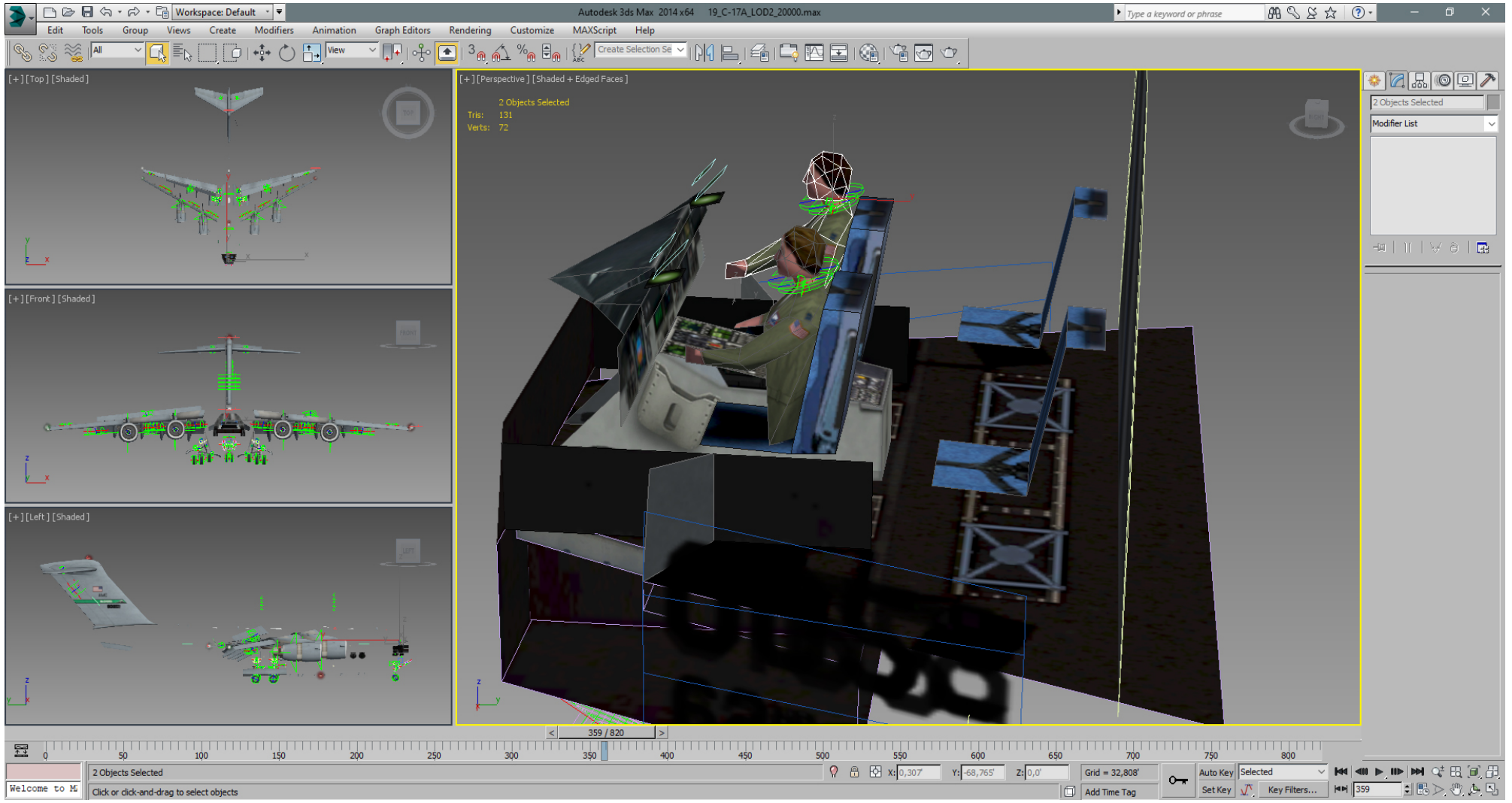
For LOD 2, we want to keep the outer shape once again nice as possible, but we can get rid of some stuff which will be hardly noticed from 300ft to 600 ft distance.

And like before, we start with the cockpit, the front gear, gear doors and wheels.
Some more objects have been deleted (are hidden), and some objects have been even more simplified,
using an "Edit Poly" modifier on top of the “Stack”.

Before (LOD 1):

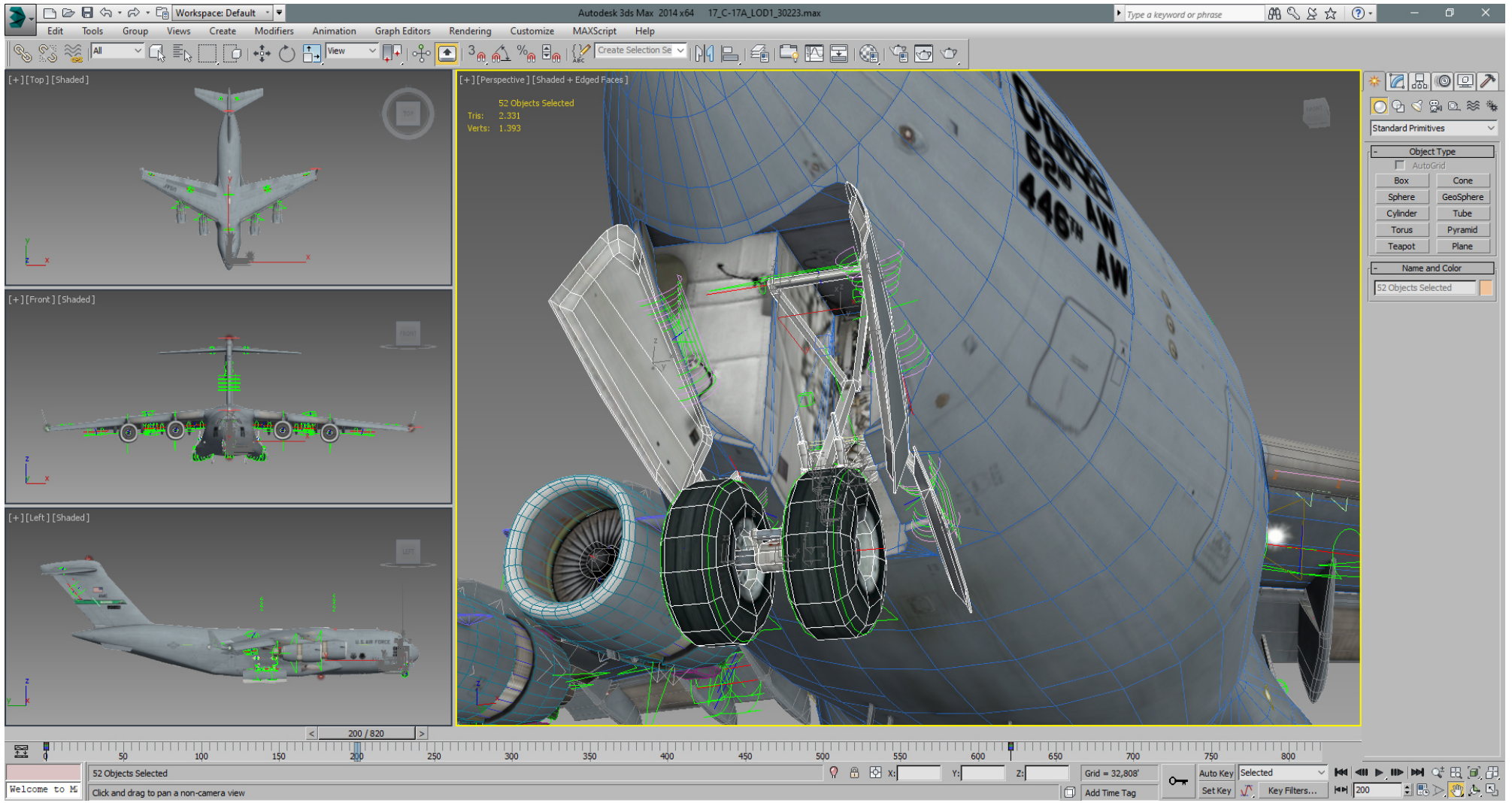

Autodesk 3ds Max 2014 x64 17_C-17A_LOD1_30223.max
[+][Top][Shaded]
[+][Front][Shaded]
[+][Left][Shaded]
[+][Perspective][Shaded + Edged Faces]
16 Entities Selected
Tris: 353
Verts: 221
Standard Primitives
Object Type
Box
Cone
Sphere
GeoSphere
Cylinder
Tube
Torus
Pyramid
Teapot
Plane
Name and Color
16 Entities Selected
Click and drag to pan a non-camera view

After (LOD 2):

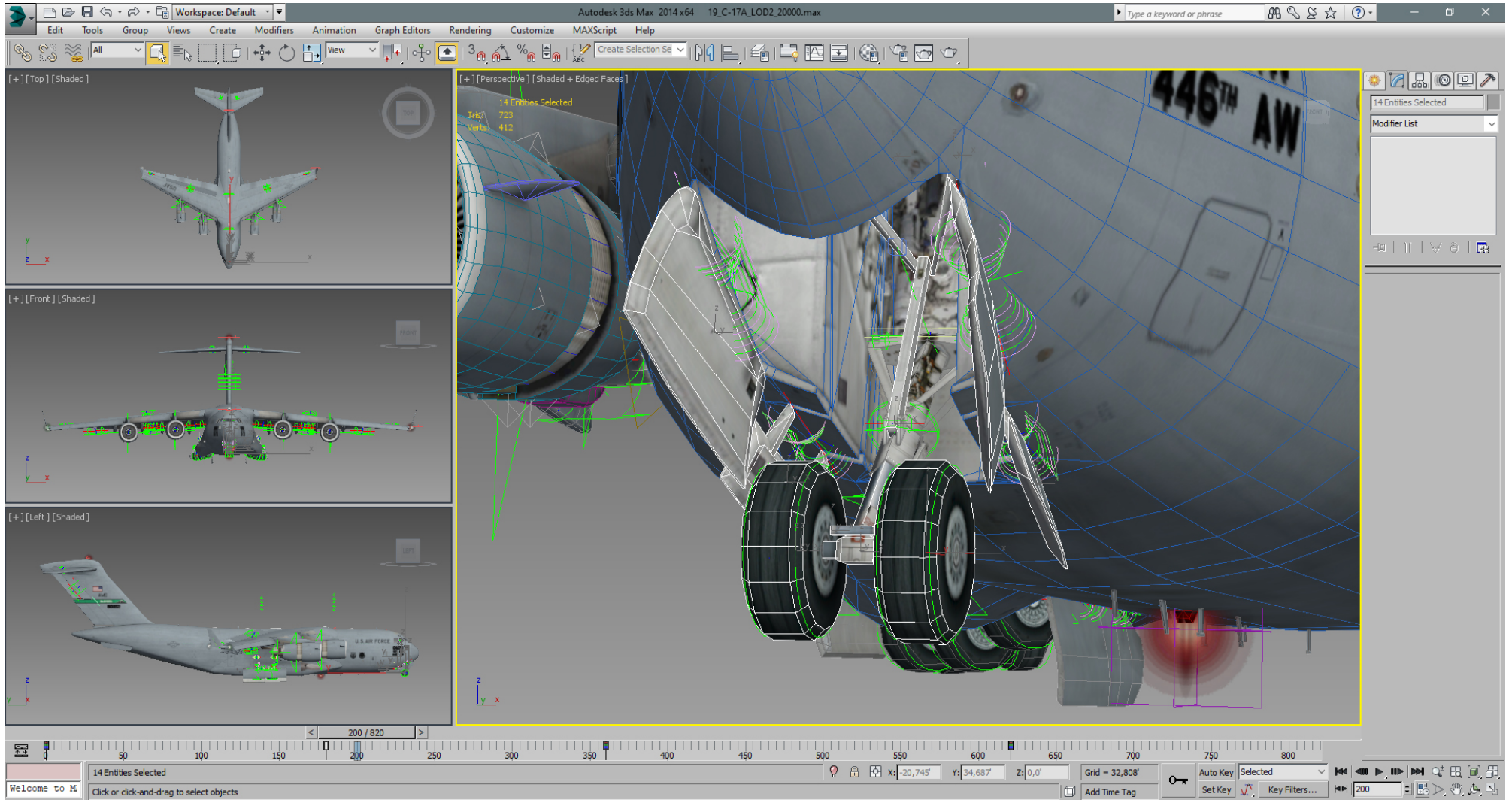

Autodesk 3ds Max 2014 x64 19_C-17A_LOD2_20000.max
Workspace: Default
Edit Tools Group Views Create Modifiers Animation Graph Editors Rendering Customize MAXScript Help
[+][Top][Shaded]
[+][Front][Shaded]
[+][Left][Shaded]
[+][Perspective][Shaded + Edged Faces]
2 Objects Selected
Tris: 131
Verts: 72
Modifier List
359 / 820
2 Objects Selected
Click or click-and-drag to select objects
Add Time Tag
Auto Key
Set Key
Key Filters...

Beside hidden stuff on the front gear, many 8- sided cylinders became 4- sided and the wheels got more tris deleted.

Before (LOD 1):

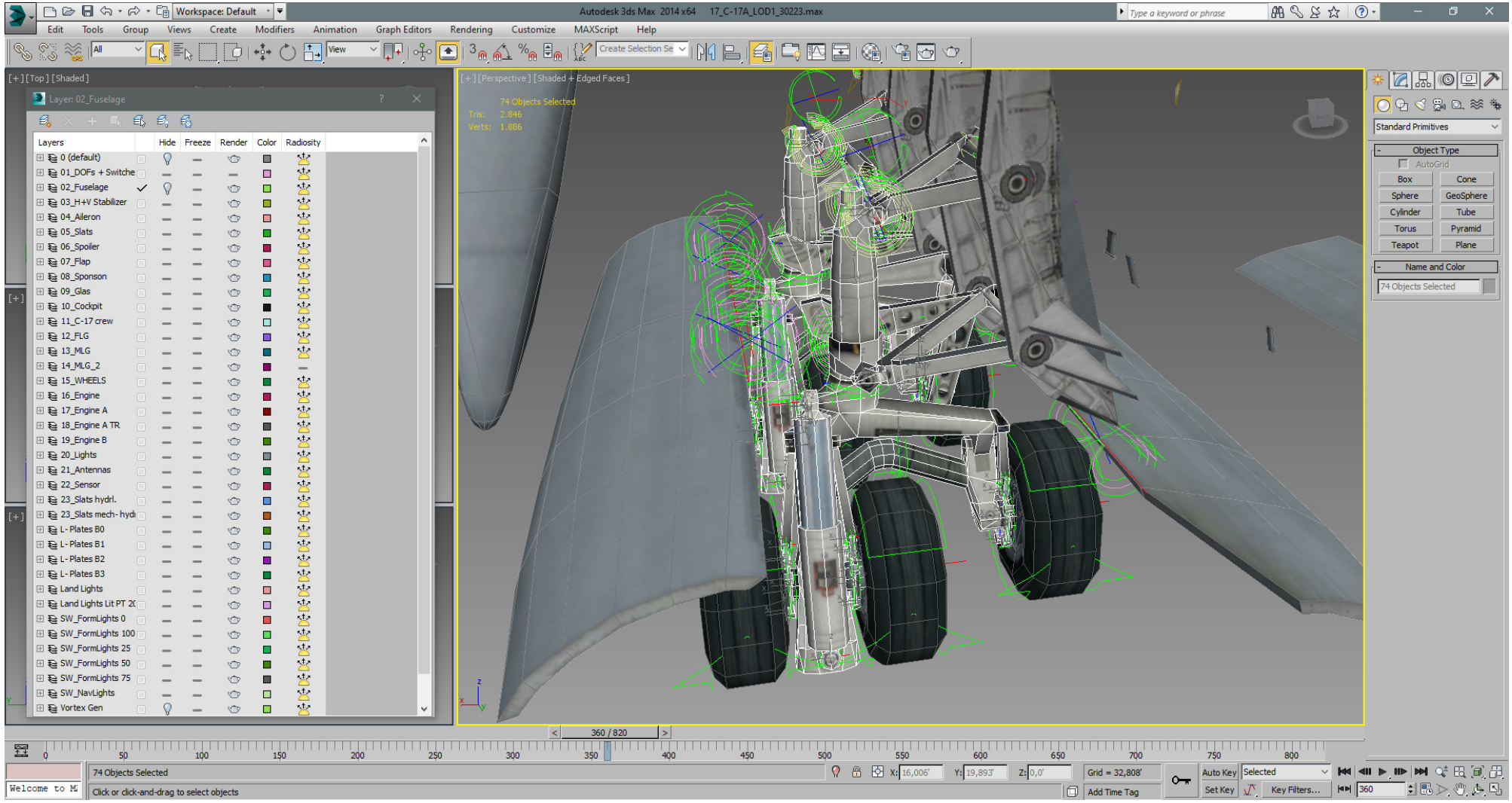


After (LOD 2):

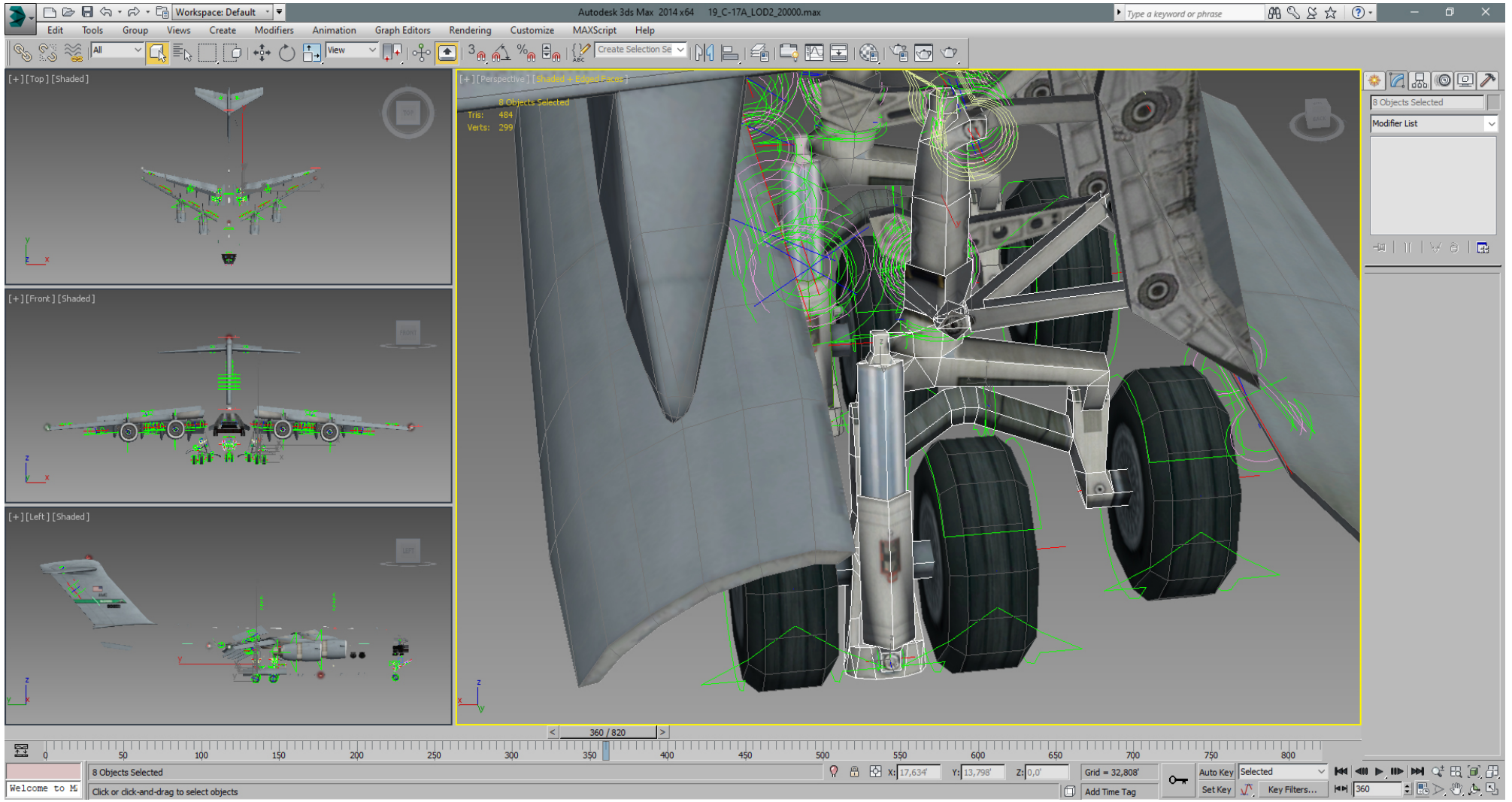

Autodesk 3ds Max 2014 x64 19_C-17A_LOD2_20000.max
Workspace: Default
Edit Tools Group Views Create Modifiers Animation Graph Editors Rendering Customize MAXScript Help
[+][Top][Shaded]
[+][Front][Shaded]
[+][Left][Shaded]
[+][Perspective][Shaded + Edged Faces]
14 Entities Selected
Tris: 723
Verts: 412
446TH AW
Modifier List
200 / 820
14 Entities Selected
Click or click-and-drag to select objects
Add Time Tag
Auto Key
Set Key
Key Filters...

Some further simplifying on the main landing gear and wheels and again, many 8- sided cylinders became 4- sided.
We got rid of the wheel brakes and some gear door mechanic, including their associated DOFs.

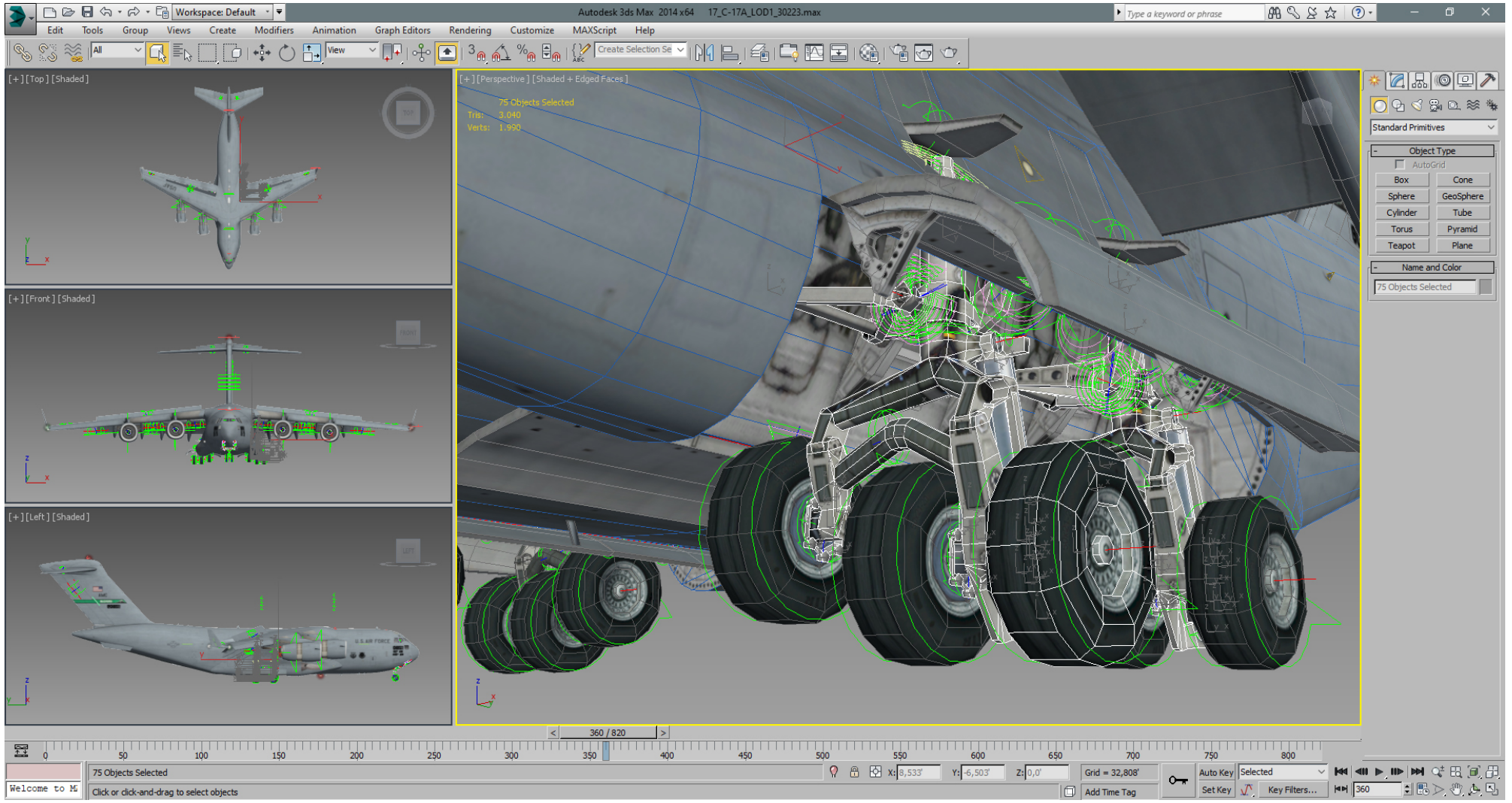
Before (LOD 1):



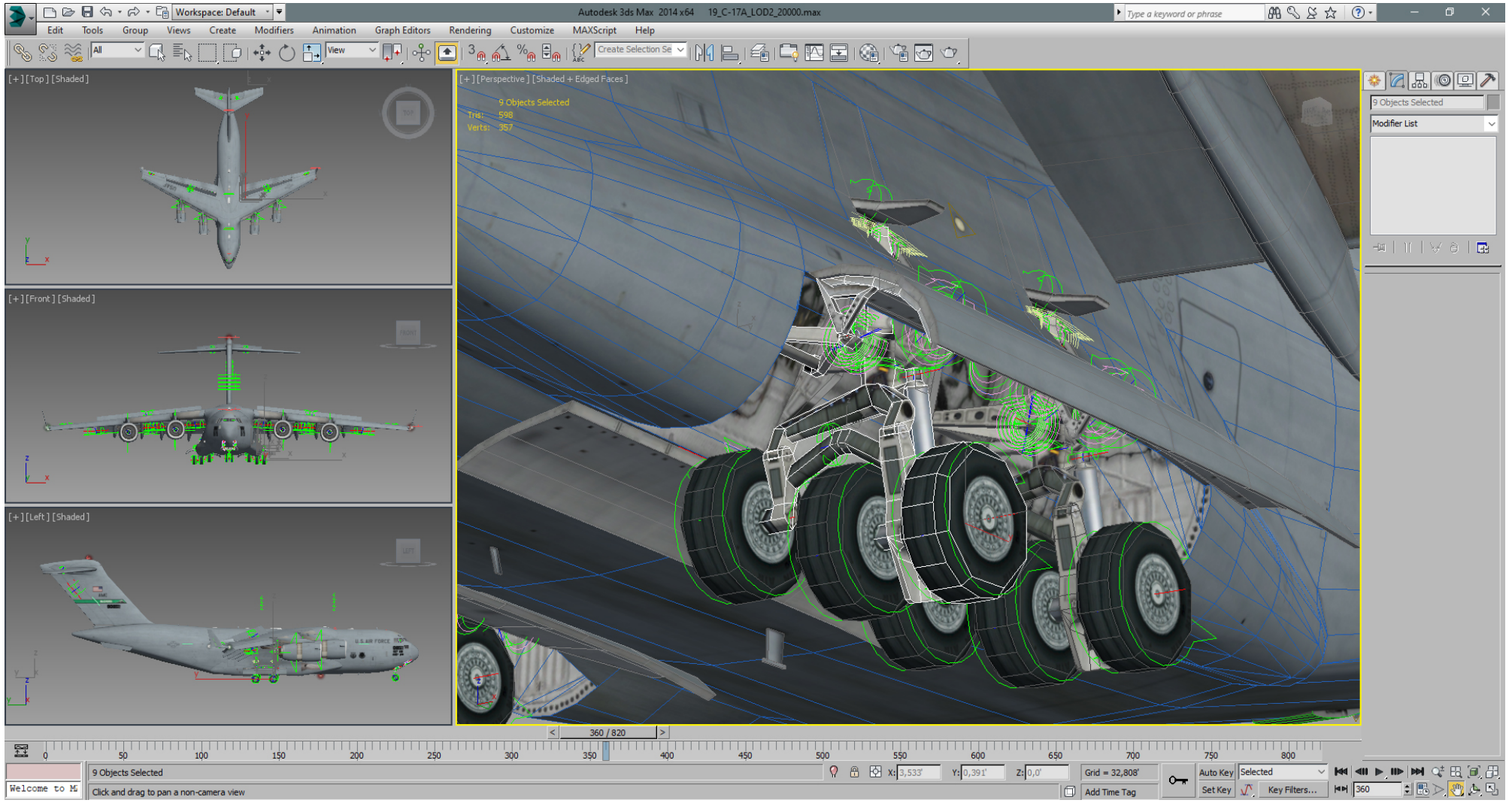
After (LOD 2):


Autodesk 3ds Max 2014 x64 19_C-17A_LOD2_20000.max
Workspace: Default
Edit Tools Group Views Create Modifiers Animation Graph Editors Rendering Customize MAXScript Help
[+][Top][Shaded]
[+][Front][Shaded]
[+][Left][Shaded]
[+][Perspective][Shaded + Edged Faces]
8 Objects Selected
Tris: 484
Verts: 299
Modifier List
360 / 820
8 Objects Selected
Click or click-and-drag to select objects
Add Time Tag
Auto Key
Set Key
Key Filters...

Before (LOD 1):


Autodesk 3ds Max 2014 x64 17_C-17A_LOD1_30223.max
Workspace: Default
Edit Tools Group Views Create Modifiers Animation Graph Editors Rendering Customize MAXScript Help
[+][Top][Shaded]
[+][Front][Shaded]
[+][Left][Shaded]
[+][Perspective][Shaded + Edged Faces]
75 Objects Selected
Tris: 3.040
Verts: 1.990
Standard Primitives
Object Type
AutoGrid
Box Cone
Sphere GeoSphere
Cylinder Tube
Torus Pyramid
Teapot Plane
Name and Color
75 Objects Selected
360 / 820
75 Objects Selected
Click or click-and-drag to select objects
Add Time Tag
Auto Key
Set Key
Key Filters...

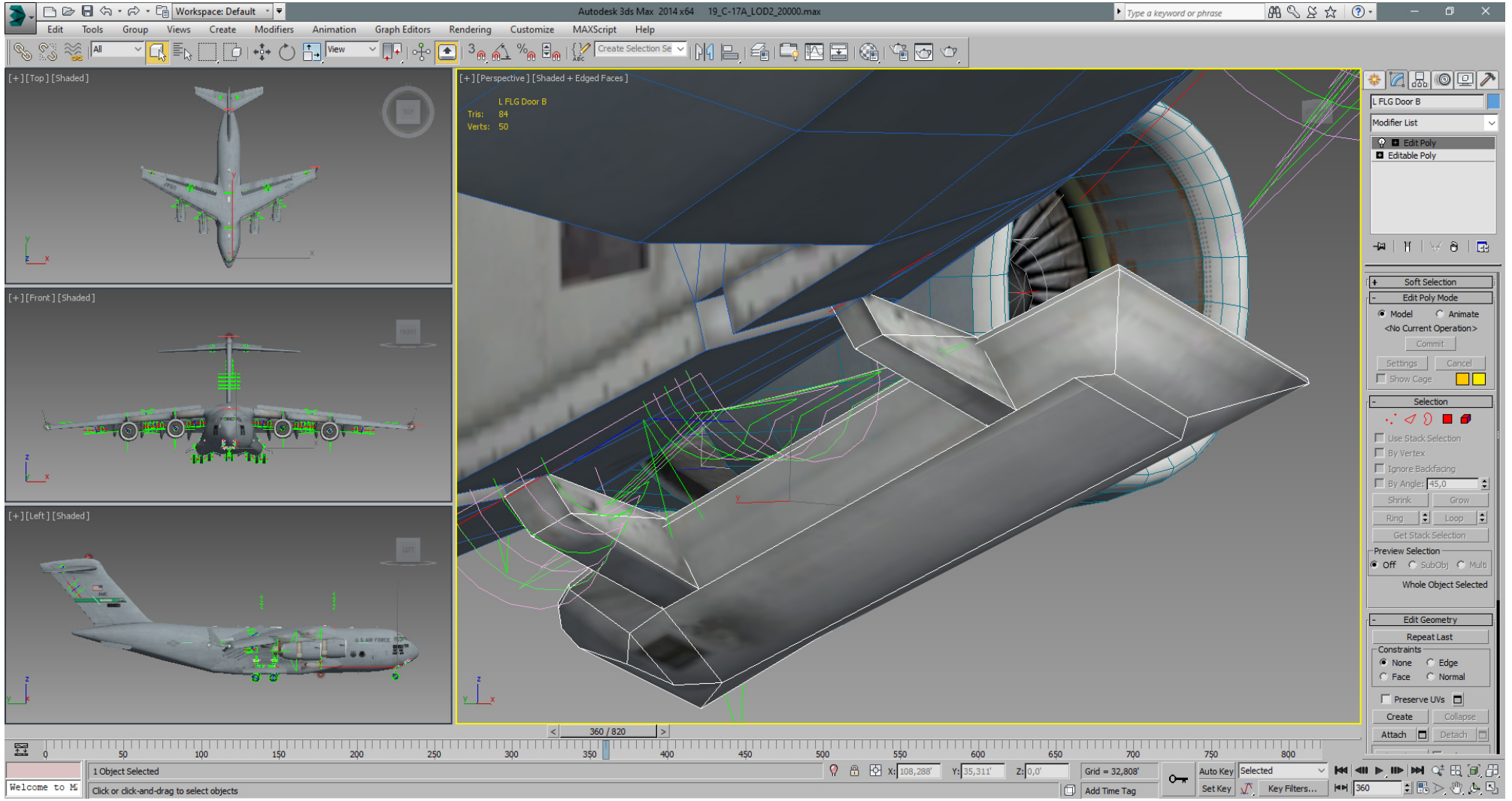
After (LOD 2):


Autodesk 3ds Max 2014 x64 19_C-17A_LOD2_20000.max
[+][Top][Shaded]
[+][Front][Shaded]
[+][Left][Shaded]
[+][Perspective][Shaded + Edged Faces]
9 Objects Selected
Tris: 598
Verts: 357
Modifier List
360 / 820
Welcome to M
Click and drag to pan a non-camera view
Add Time Tag
Auto Key
Set Key
Key Filters...

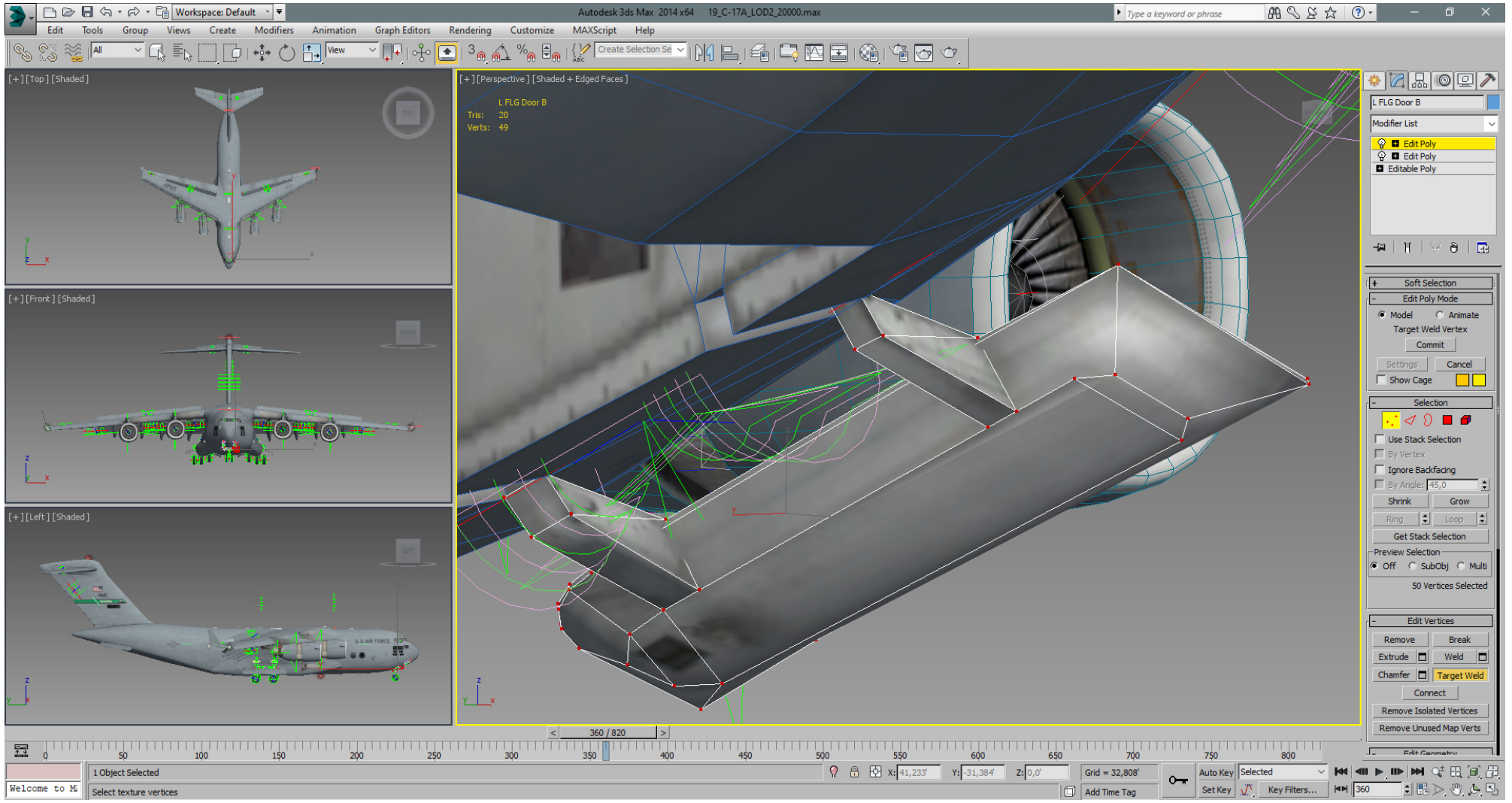
Beside a little more simplified fan hub and tailskid plus 2 tail hinges removed, nothing has been done on the outside as yet.

That optimizing saved us nearly 7000 tris (compared to LOD 1) and brings the tri- count down to 23214 tris actually.

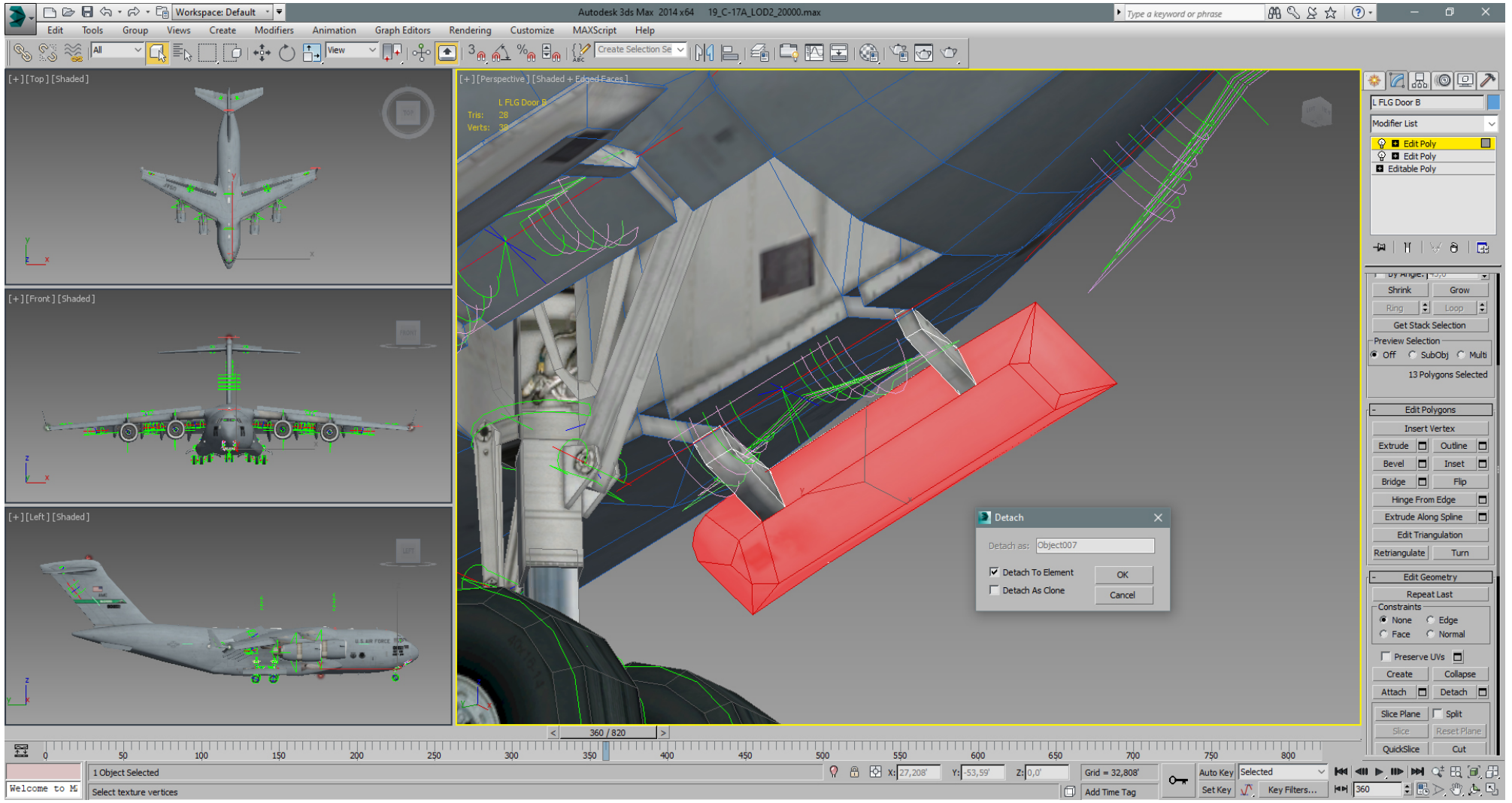
We can save more tris on the front gear doors by removing their thickness.
At a closer view, the gear doors look actually like this: (notice the outer frame)



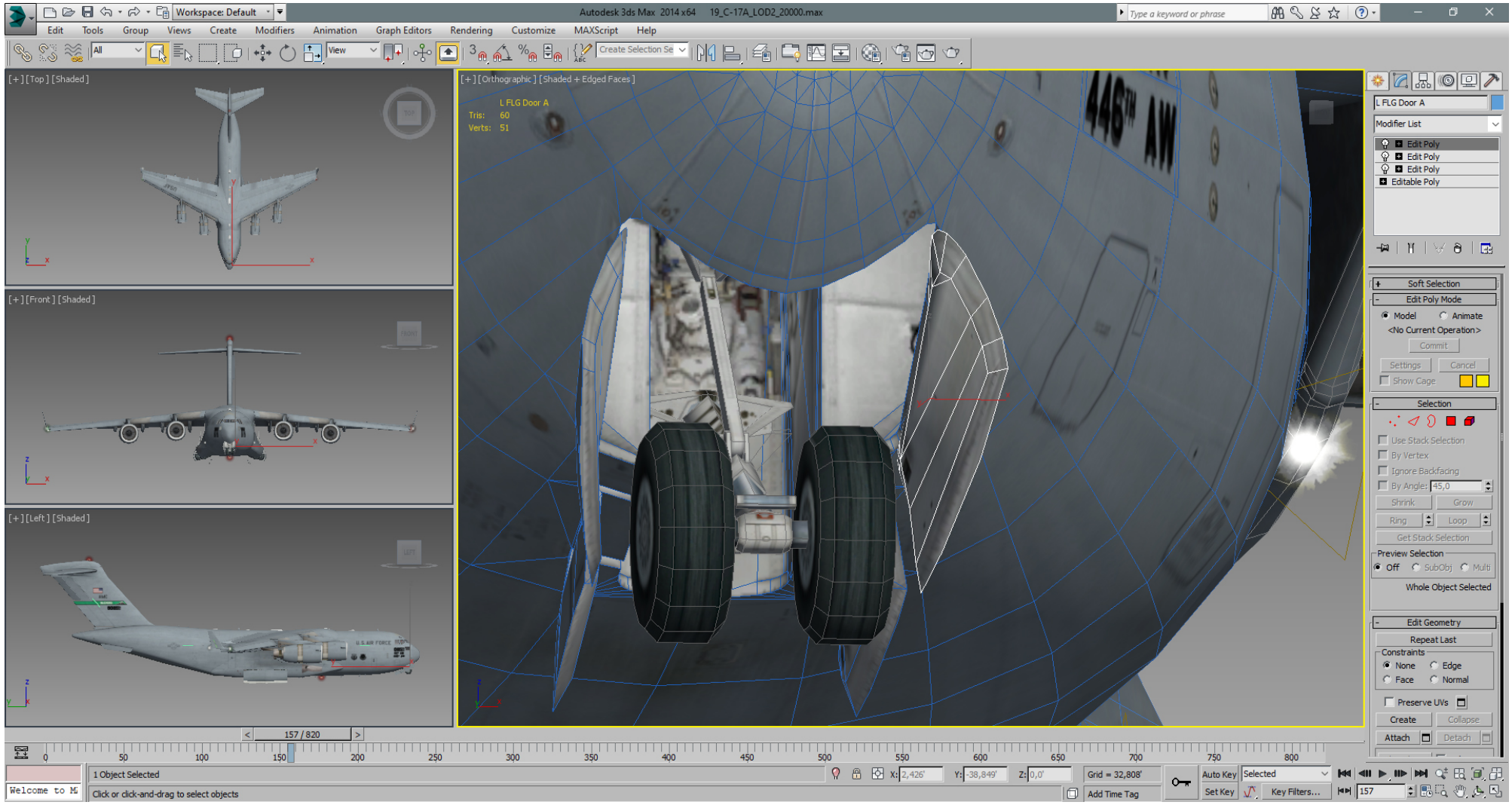
Then we use "Target weld" in "Vertex" sub mode to weld the inner vertex to the outer vertex.
See top right vertex here:



Doing so with those other vertices will result in bad shading, because the inner and outer tris use the same smoothing group.
We could change the inner tris to another smoothing group or select the inner tris and "Detach" them to an “Element”.

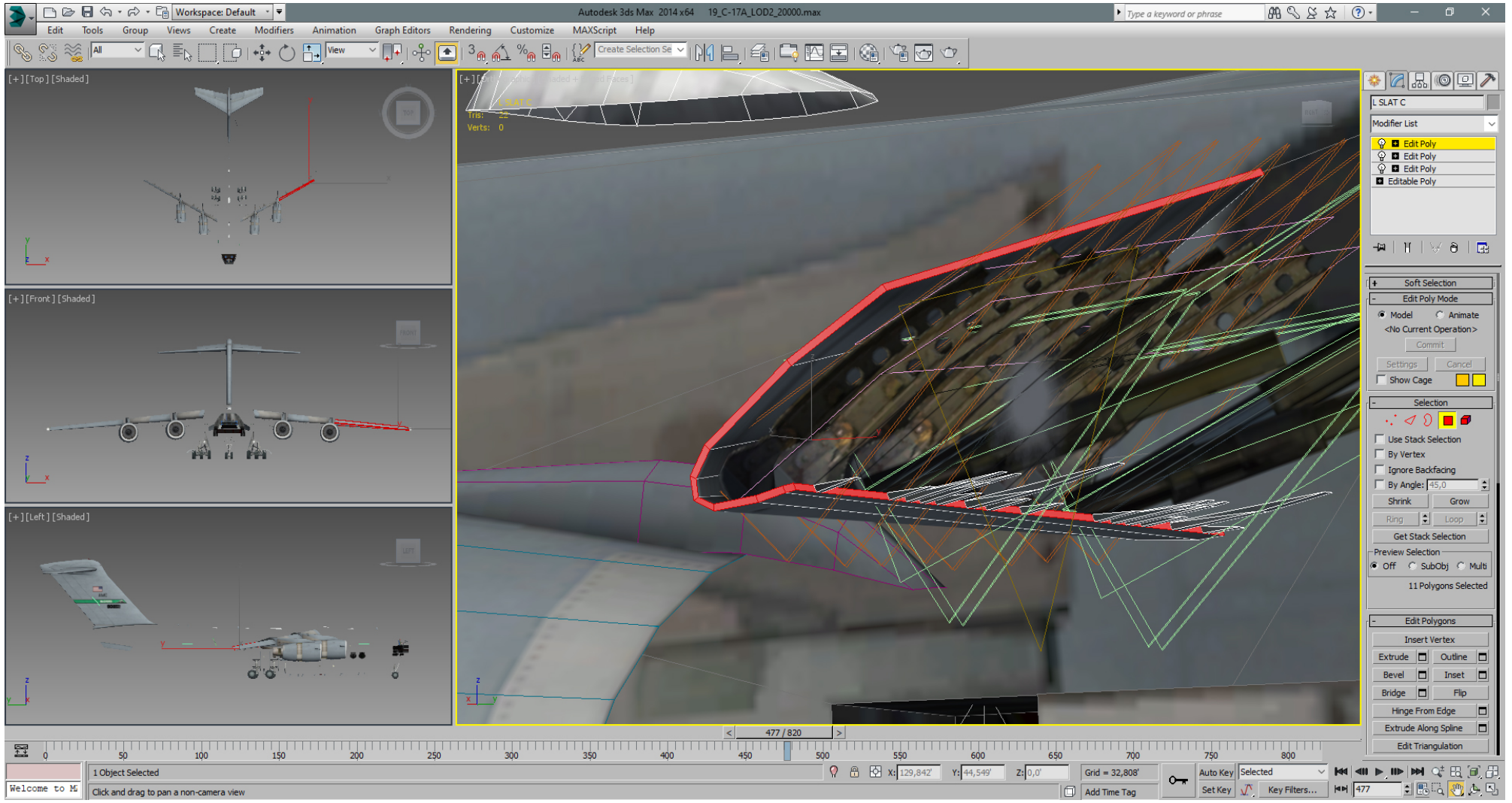


Doing similar on the 2 gear doors further in front result in a total tri- count of 23089 tris.



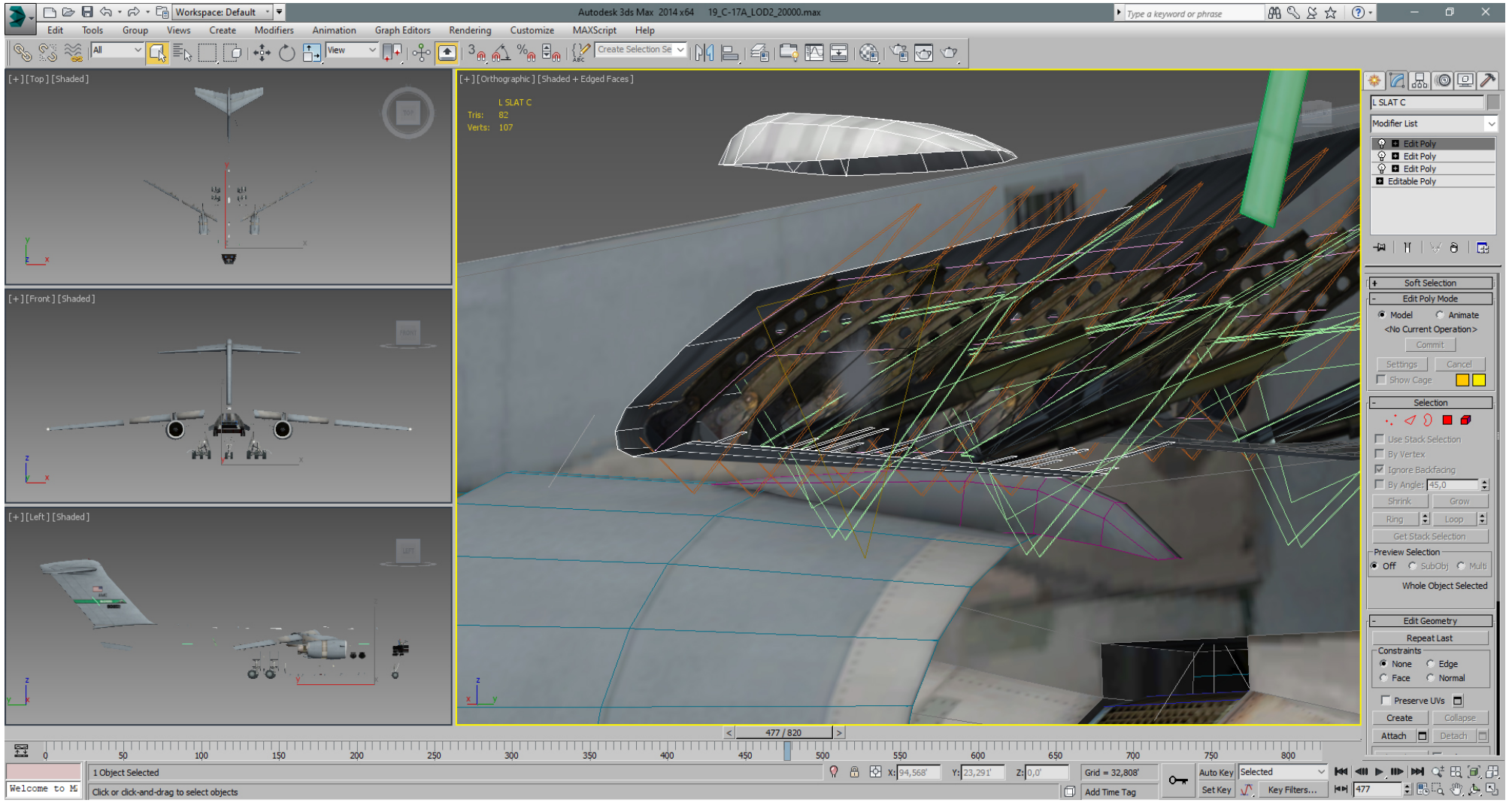
Let's get rid of the thickness of the slats with the same workflow we've used for the front gear doors.

Before (LOD 1):



Note that we keep (for now) all those little "noses" at the back of the slats, but just the bottom tris of them.

After (LOD 2):



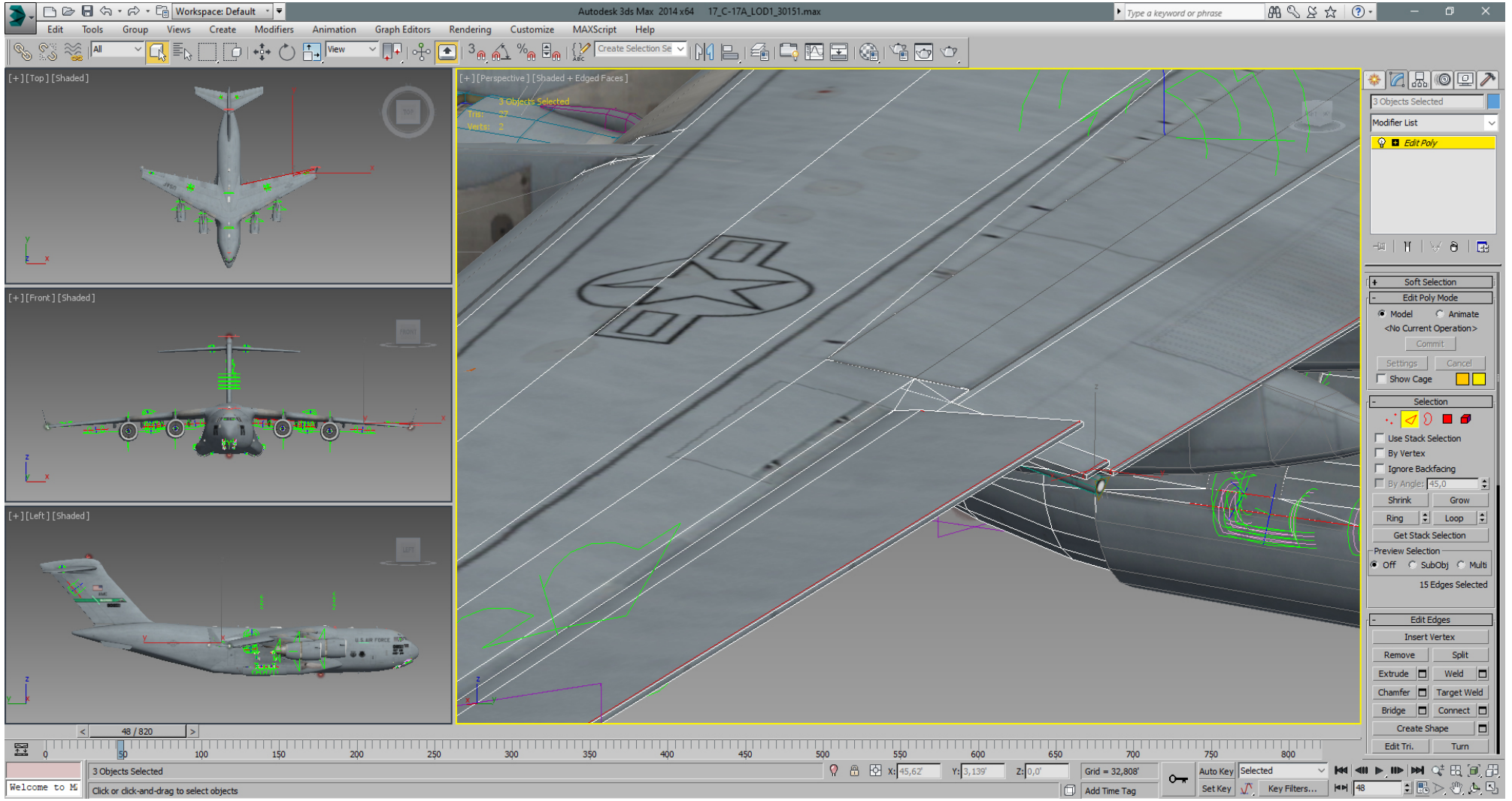
After doing this for all 6 slats the tri- count is 22709.

Although LOD 2 is not fully done as yet, we can select and export everything as "Model_2.LOD" anytime for a test.

Then copy the file into the \Data\TerrData\Objects\Parents\1461 folder, rebuild the DB and fire up the sim or BMS editor/ Model viewer.

We can get rid of more thickness and save some tris, but let me explain something first, which I've missed to explain during modeling LOD 0.
In the next picture we'll see a temporary "Edit Poly" modifier on the left wing, left flap and left aileron
to select all three objects together for show case and will be deleted before we get rid of more thickness tris.

At the back end we have thickness modeled, and close to the back end there exist another edges, here selected, which are "restricting" edges.



Now what do those selected edges restrict?
Well, the aileron for example use just 2 smoothing groups. SG 1 for everything except the sides, and SG 2 for the sides only.

While we have hard edges at the back end, we would get a bad shading because those tris share the same SG.

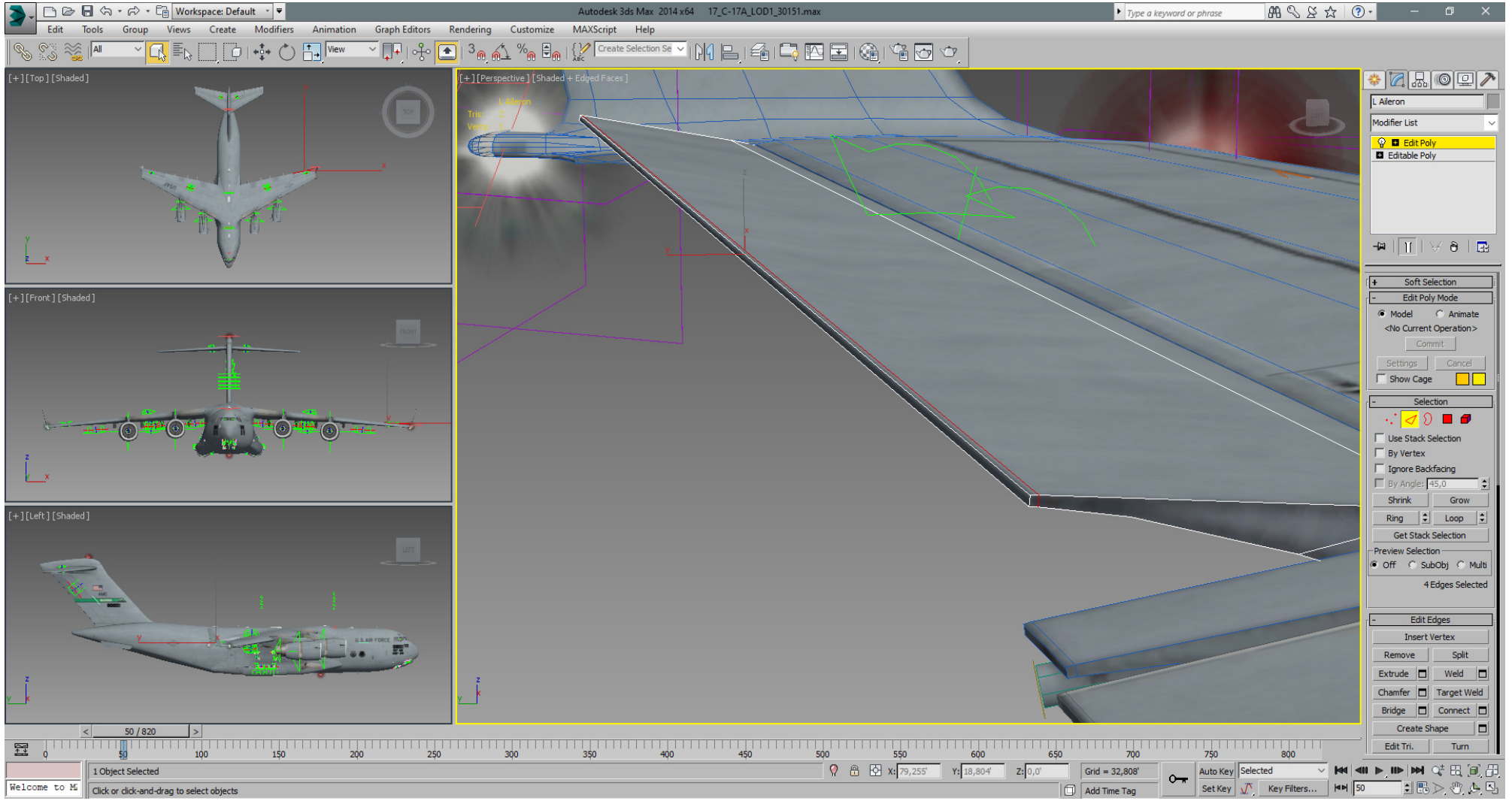
So those restricting edges restrict the bad shading, but IMHO also add to a more massive look of the back end.

Sure, we could have used just another SG 3 for the thickness tris to avoid bad shading there,
but the result would look differently and we wanted to save draw calls.

Although the restricting edges cost more tris and are used also on the back end of the stabilizers, rudders, elevators,
winglets, I think it was the right approach regarding performance and look.

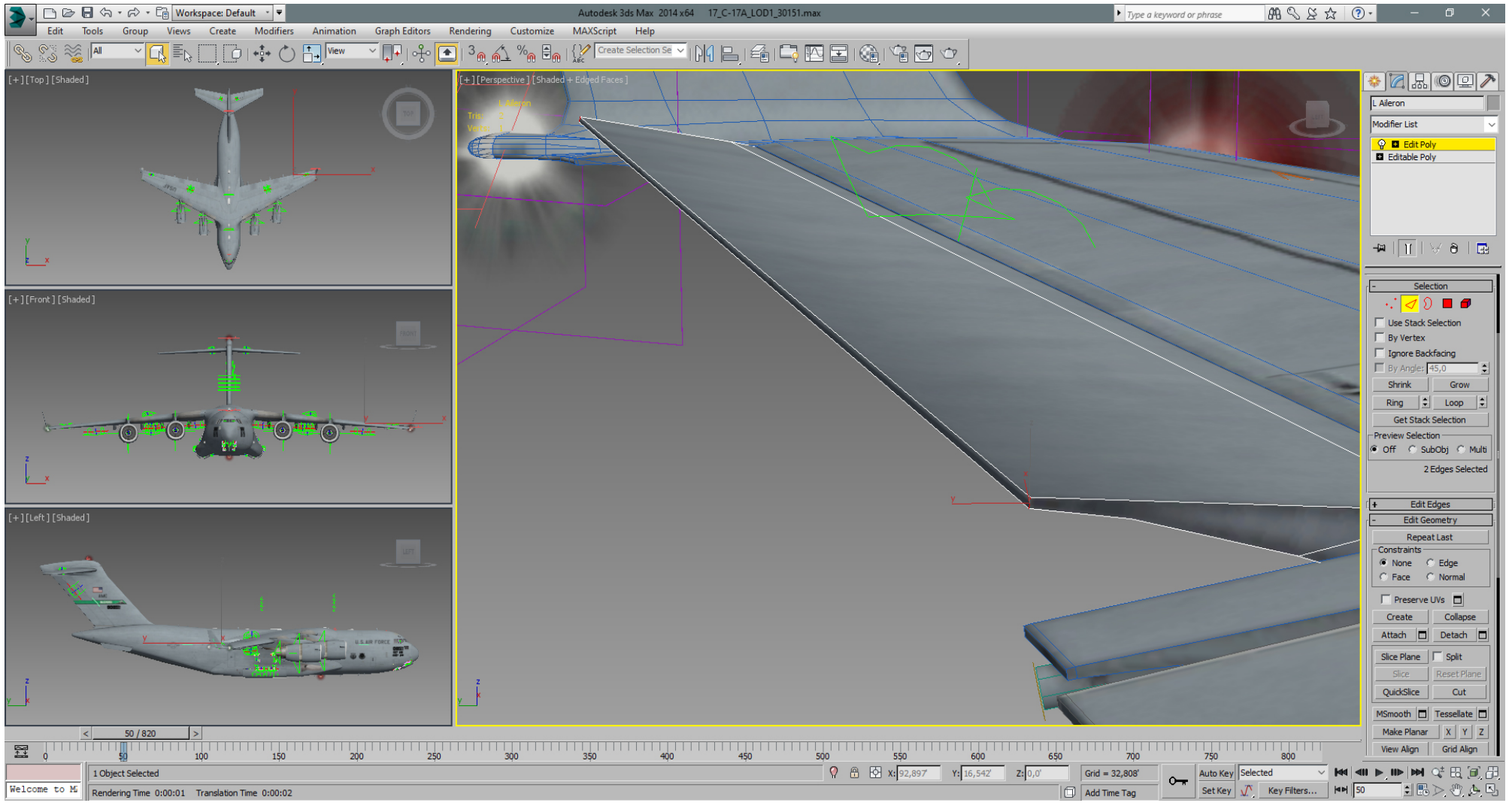
To get rid of the thickness and those restricting edges for our LOD 2, we can for the aileron "Collapse" the "Stack" and add another "Edit Poly" modifier on top.

Then we select one of the restricting edges in "Edge" sub mode and click "Loop".
This should select all 4 restricting edges of the aileron as seen here:

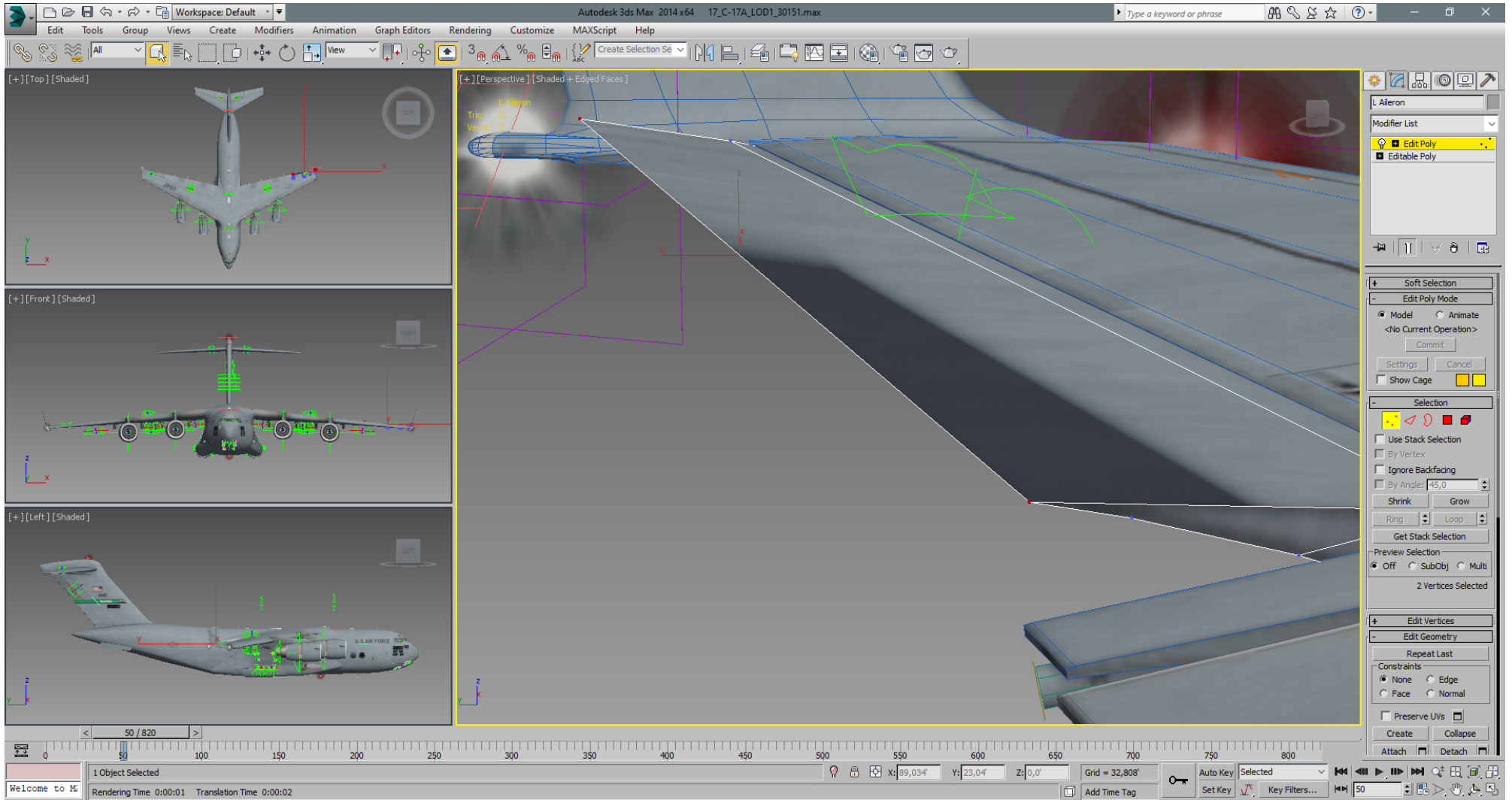


We press CTRL + BKSP and they are gone.
Note the darker shading.

Next we select the 2 back end thickness edges then click "Collapse".

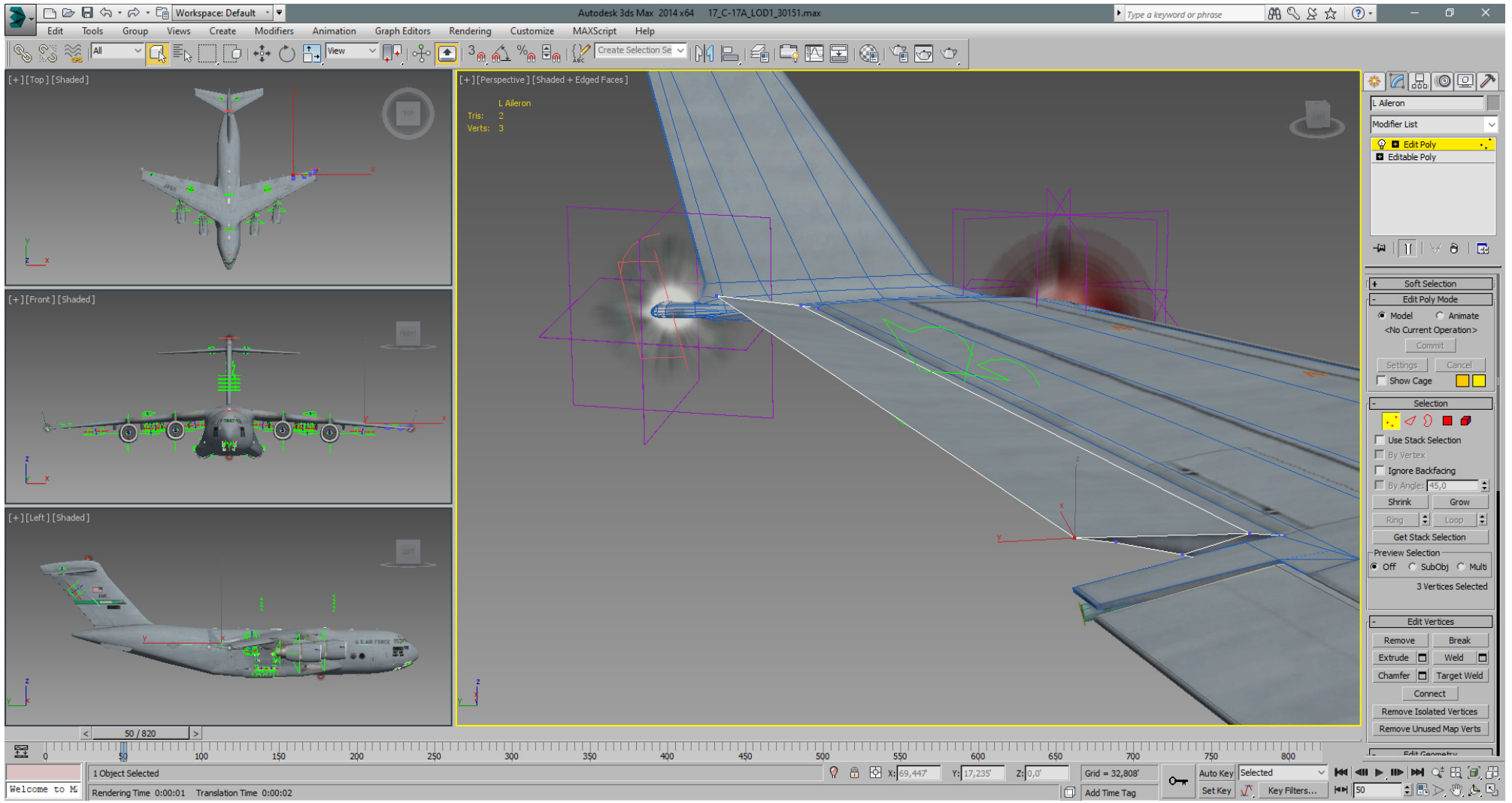


The shading got even worse.
So we select the now 2 back end vertices in "Vertex" sub mode.

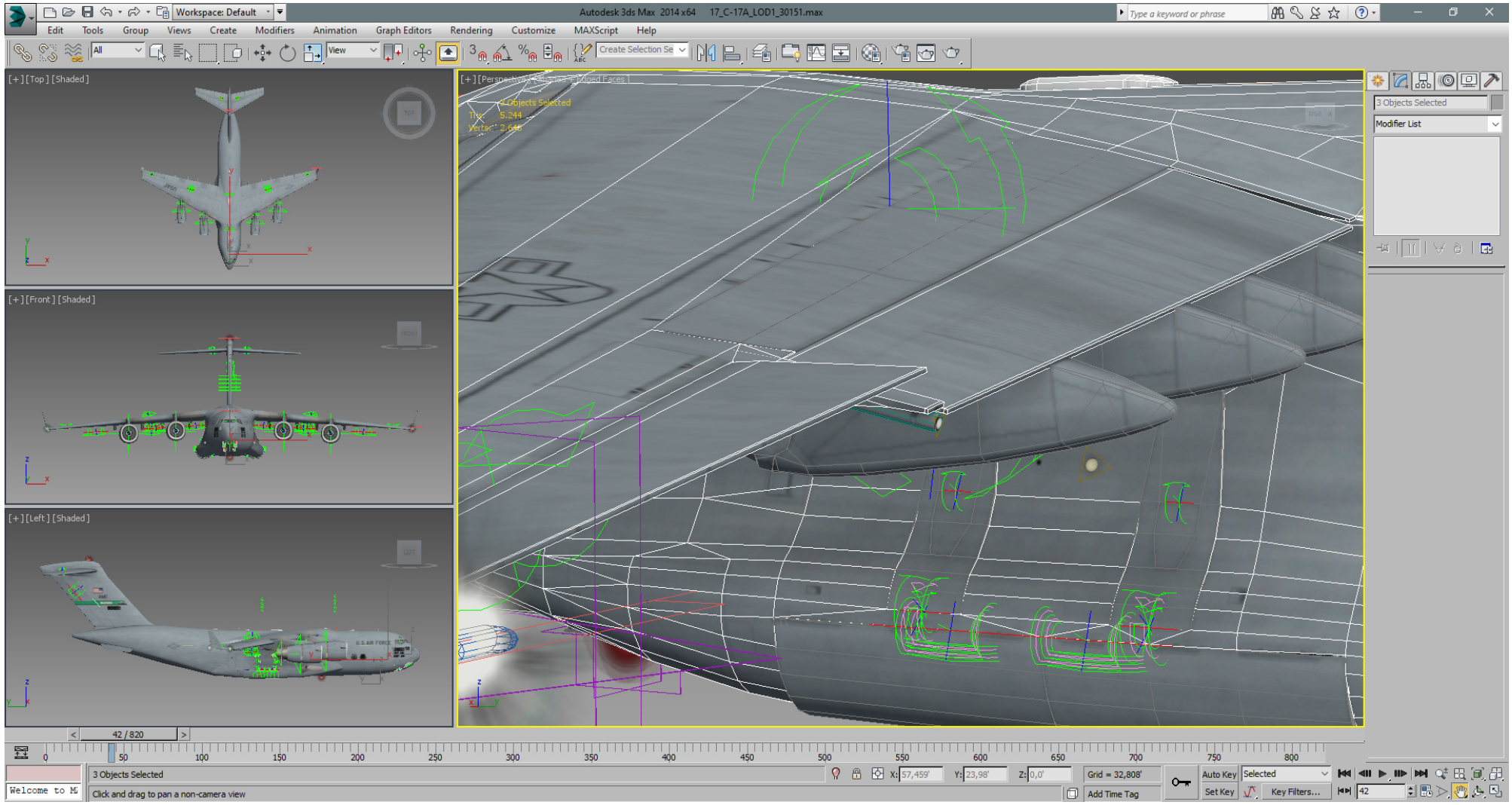


Then we click "Break". This will result in 2 back end edges, which will also separate the top tris from the bottom tris, and therefore solves the bad shading.

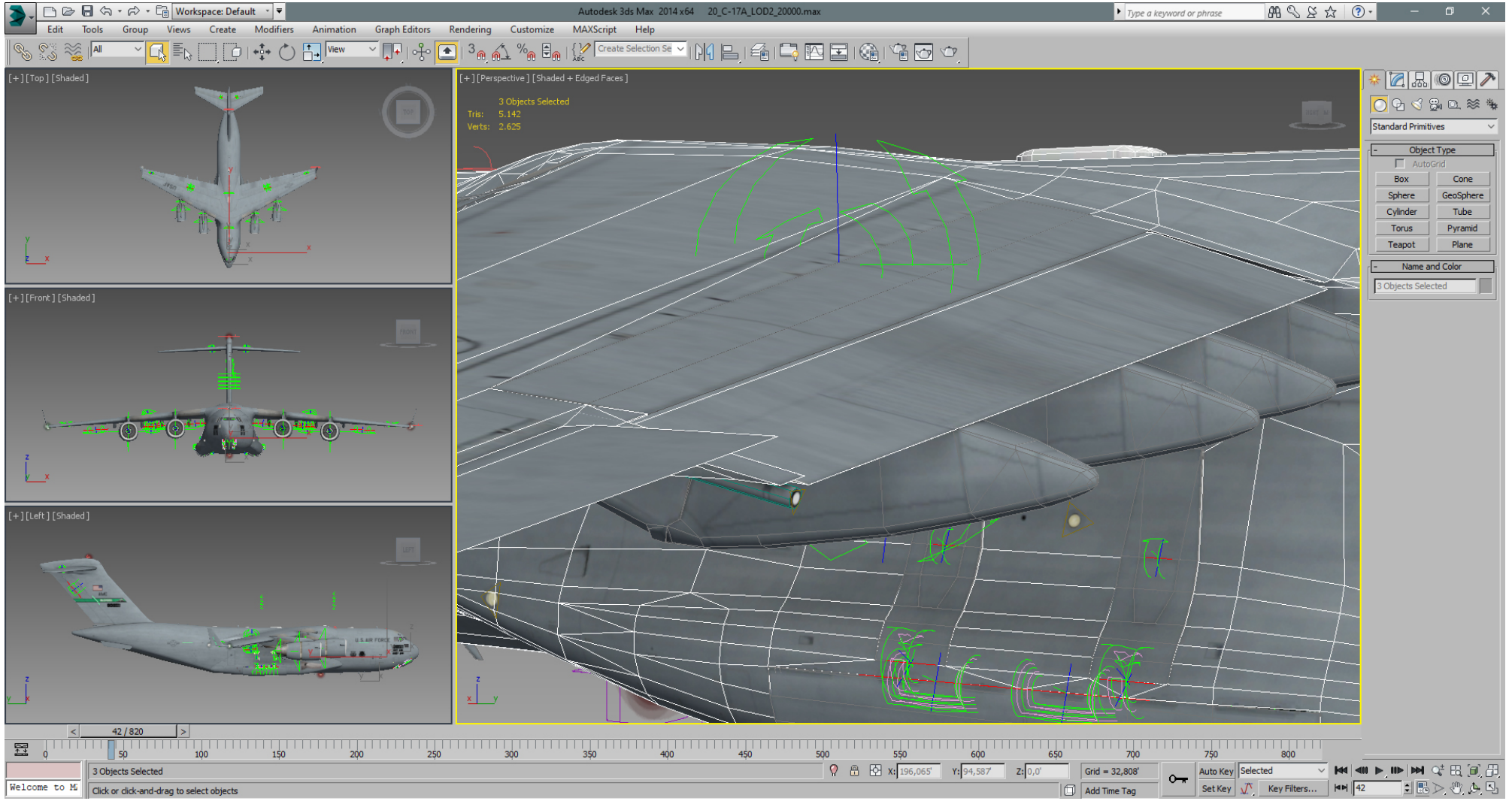
Note the now 3 vertices selected on one back end corner.



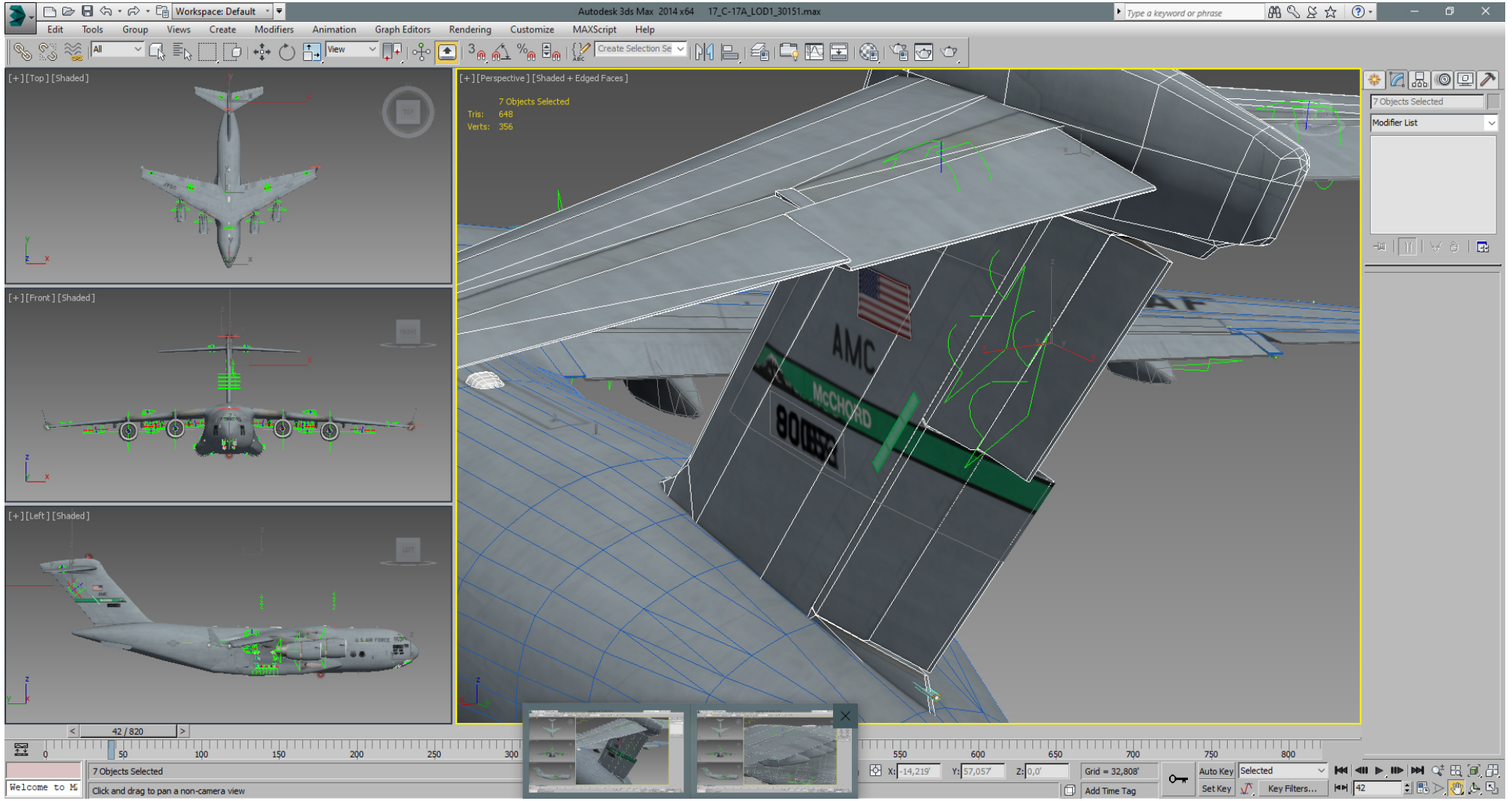
With the above workflow, we've got rid of back end thickness around the model.
Before (LOD 1): The wing, flaps etc. with thickness.



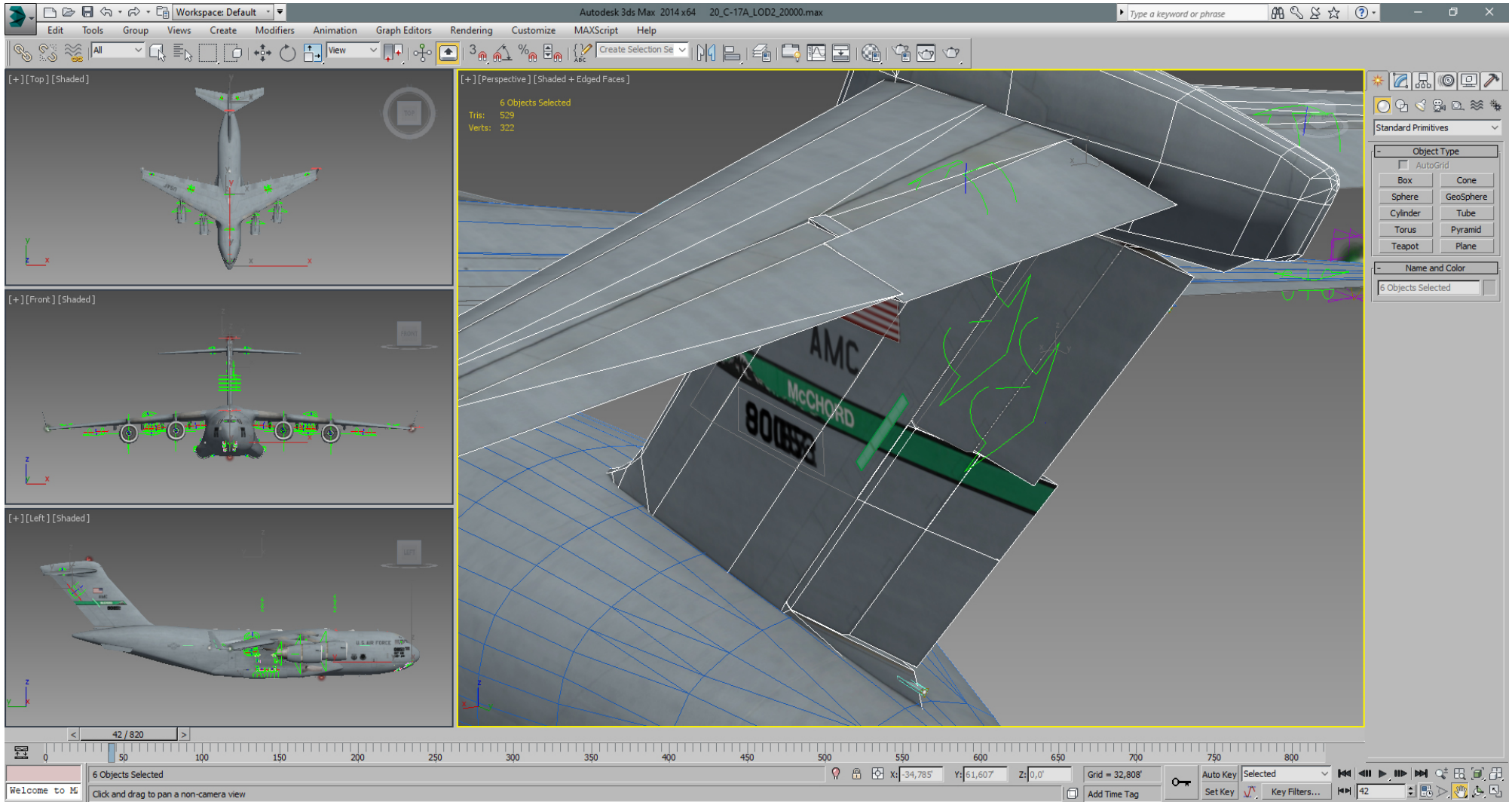
After (LOD 2): thickness gone, sharp back ends



Before (LOD 1): The stabilizers, elevators, rudders with thickness:



After (LOD 2): thickness gone, sharp back ends
Note that we've also simplified the license plates for the tail band accordingly.

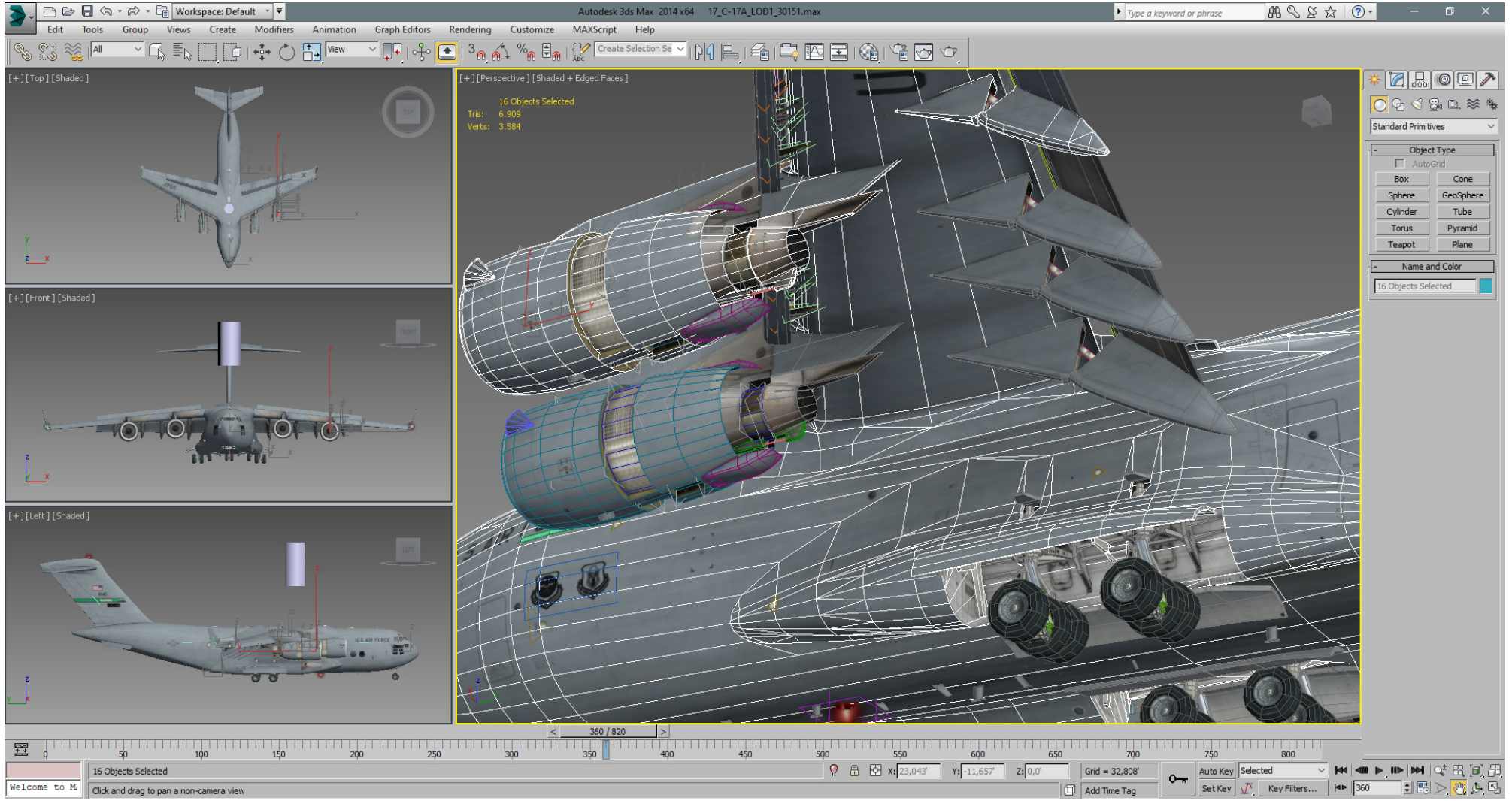


The winglets will be simplified with the wing, wingtips and wing backlights geometry, so they are not done as yet.
But we got instead rid of the thickness of the spoilers back end, and the tail bottom fins thickness. (not shown in pictures)

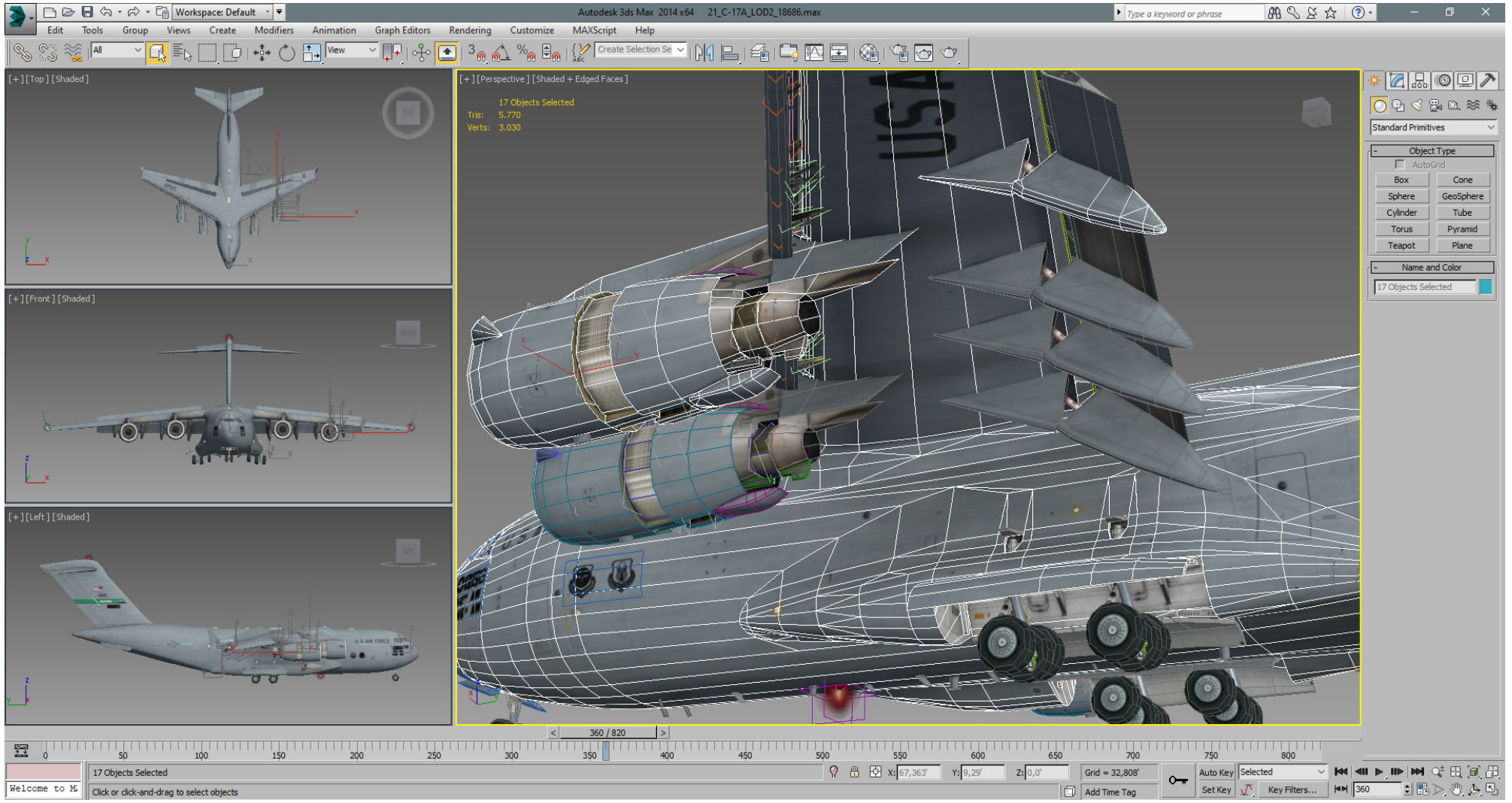
You see, doing the lower LODs can be extensive as creating the LOD 0.
Totally tri count reduced to 22363.

So next we'll put our hands on the engine and pylons, but note also the sponsons and MLG doors.
Basically half of the edges along the y- axis of the engines are gone, also we saved some more tris on the bottom of the flap fairings.

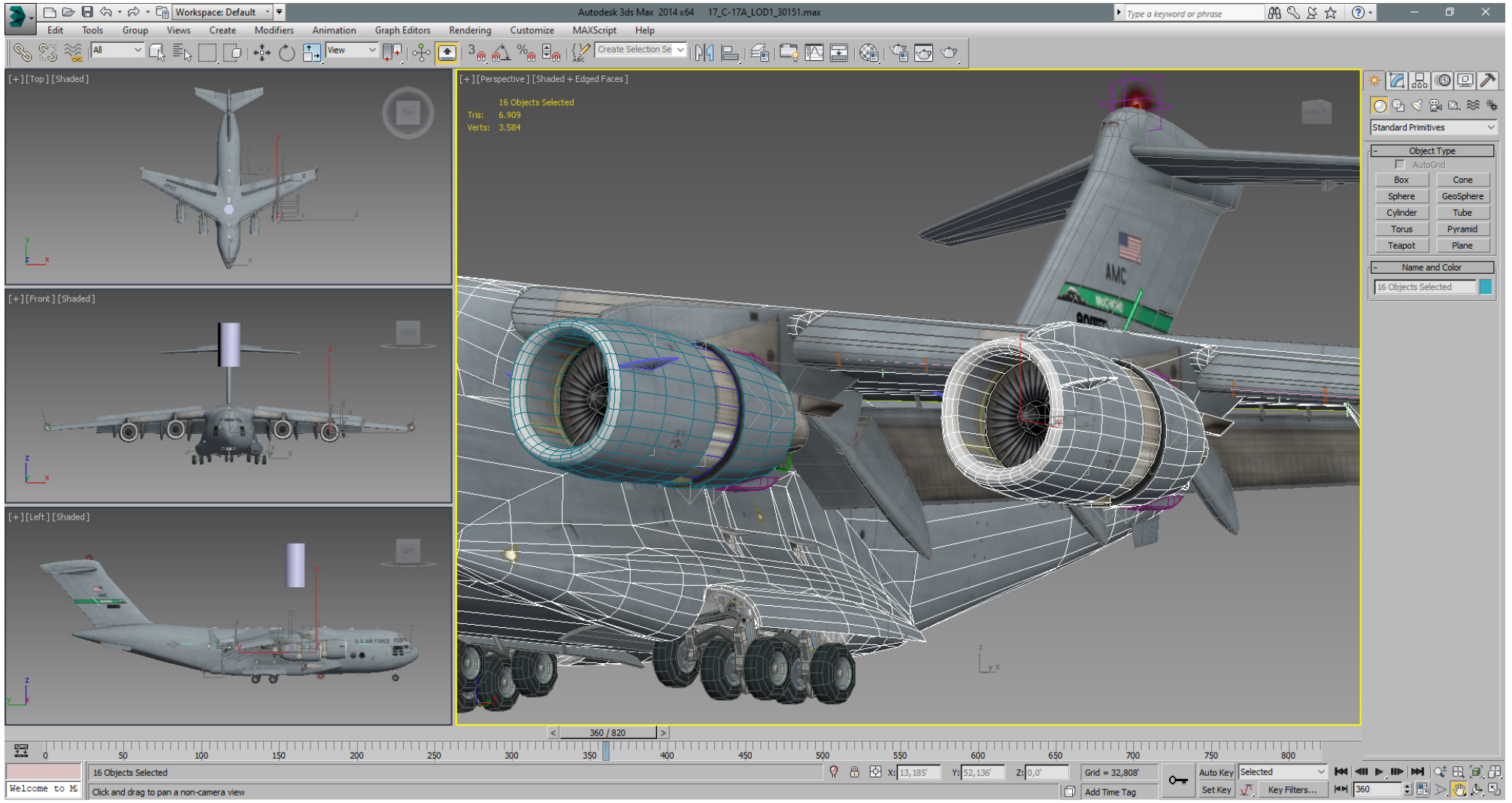
Before (LOD 1):



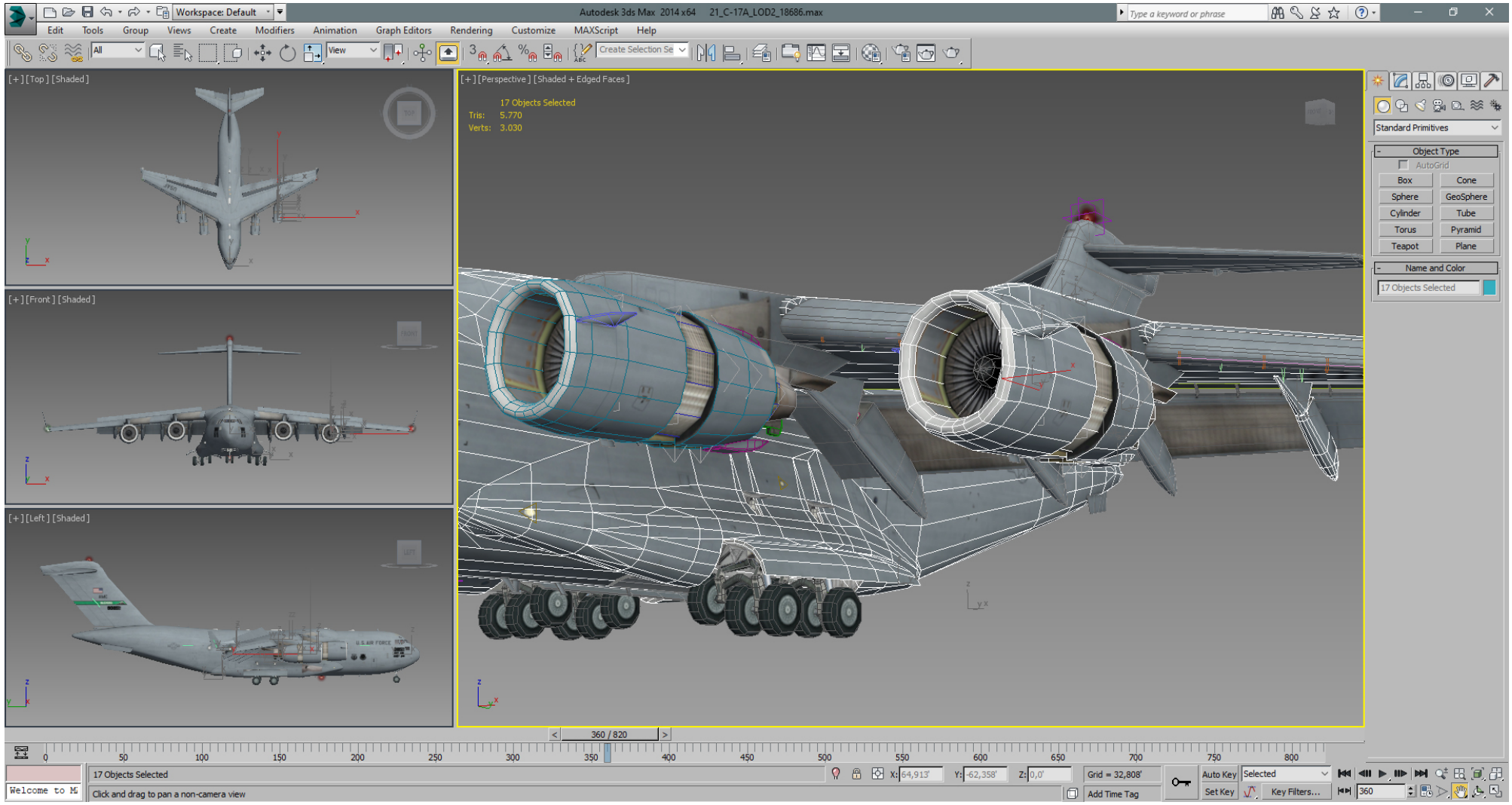
After (LOD 2):


Autodesk 3ds Max 2014 x64 21_C-17A_LOD2_18686.max
[+][Top][Shaded]
[+][Front][Shaded]
[+][Left][Shaded]
[+][Perspective][Shaded + Edged Faces]
17 Objects Selected
Tris: 5.770
Verts: 3.030
Standard Primitives
Object Type
AutoGrid
Box
Cone
Sphere
GeoSphere
Cylinder
Tube
Torus
Pyramid
Teapot
Plane
Name and Color
17 Objects Selected
360 / 820
Click or click-and-drag to select objects
Add Time Tag
Auto Key
Set Key
Key Filters...

Before (LOD 1):


Autodesk 3ds Max 2014 x64 17_C-17A_LOD1_30151.max
Workspace: Default
Edit Tools Group Views Create Modifiers Animation Graph Editors Rendering Customize MAXScript Help
[+][Top][Shaded]
[+][Front][Shaded]
[+][Left][Shaded]
[+][Perspective][Shaded + Edged Faces]
16 Objects Selected
Tris: 6.909
Verts: 3.584
Standard Primitives
Object Type
AutoGrid
Box Cone
Sphere GeoSphere
Cylinder Tube
Torus Pyramid
Teapot Plane
Name and Color
16 Objects Selected
AMC
360 / 820
16 Objects Selected
Click and drag to pan a non-camera view
Add Time Tag
Auto Key
Set Key
Key Filters...

After (LOD 2):

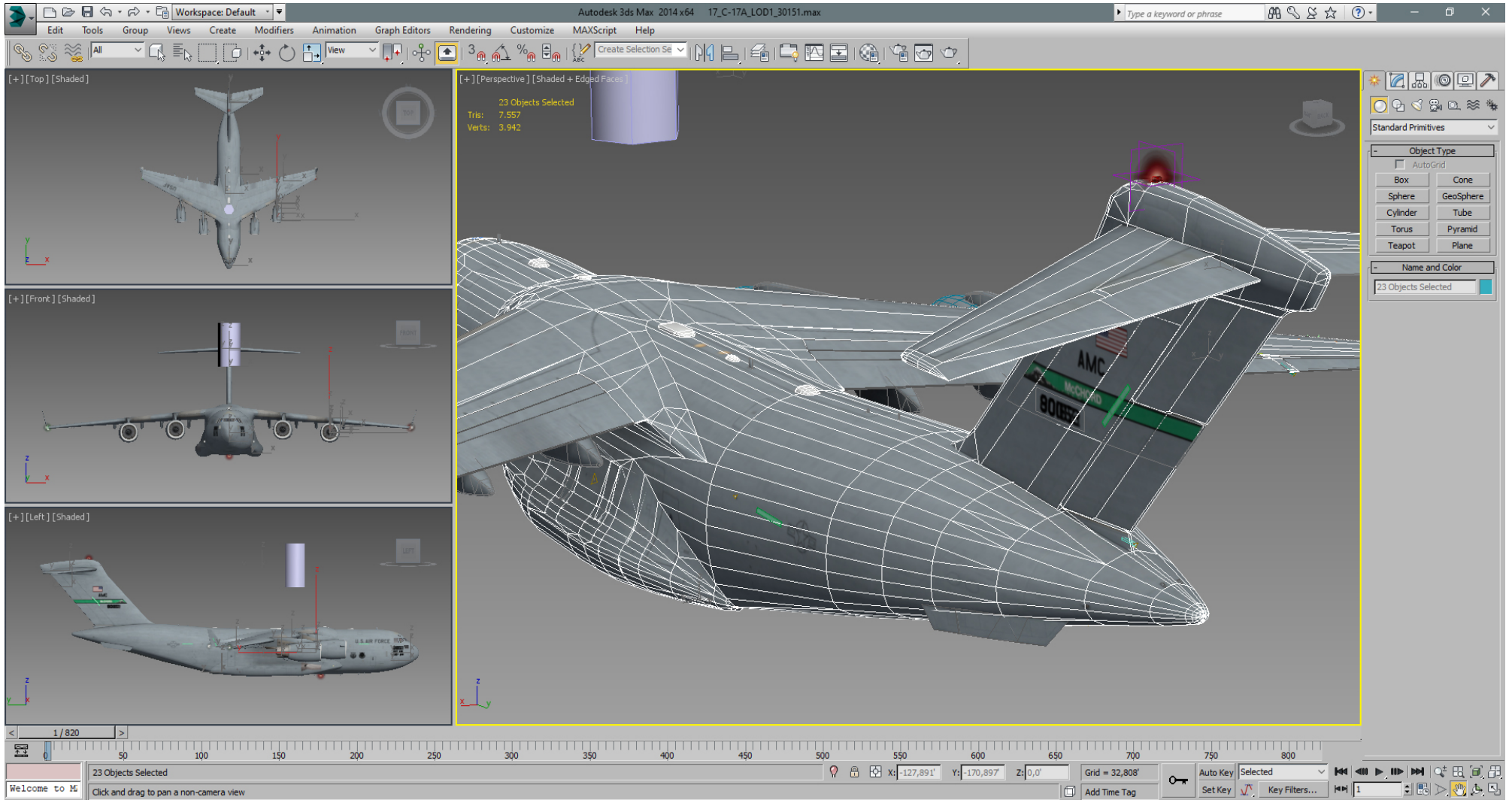


We did some more simplifying on the horizontally and vertically stabilizers again, before we've started to optimize the tail of the fuselage toward the wings.

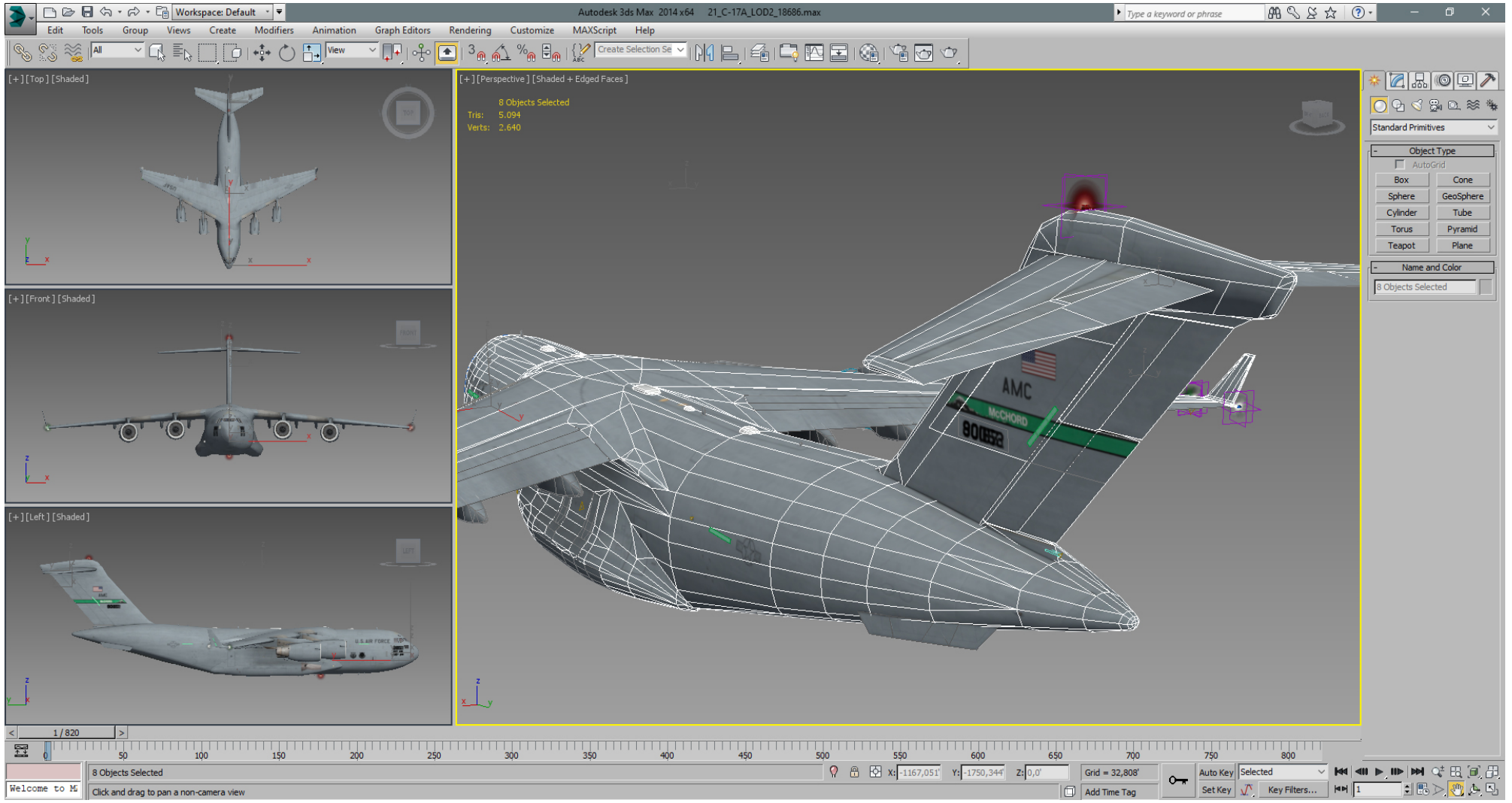
Note: Especially on the fuselage but also the sponsons we need to take care to not affect the UVW mapping seams. So we keep the edges of the UVW mapping seams where they are.

If in doubt where the UWV mapping seams are, we can add a temporary "Unwrap UVW" modifier.

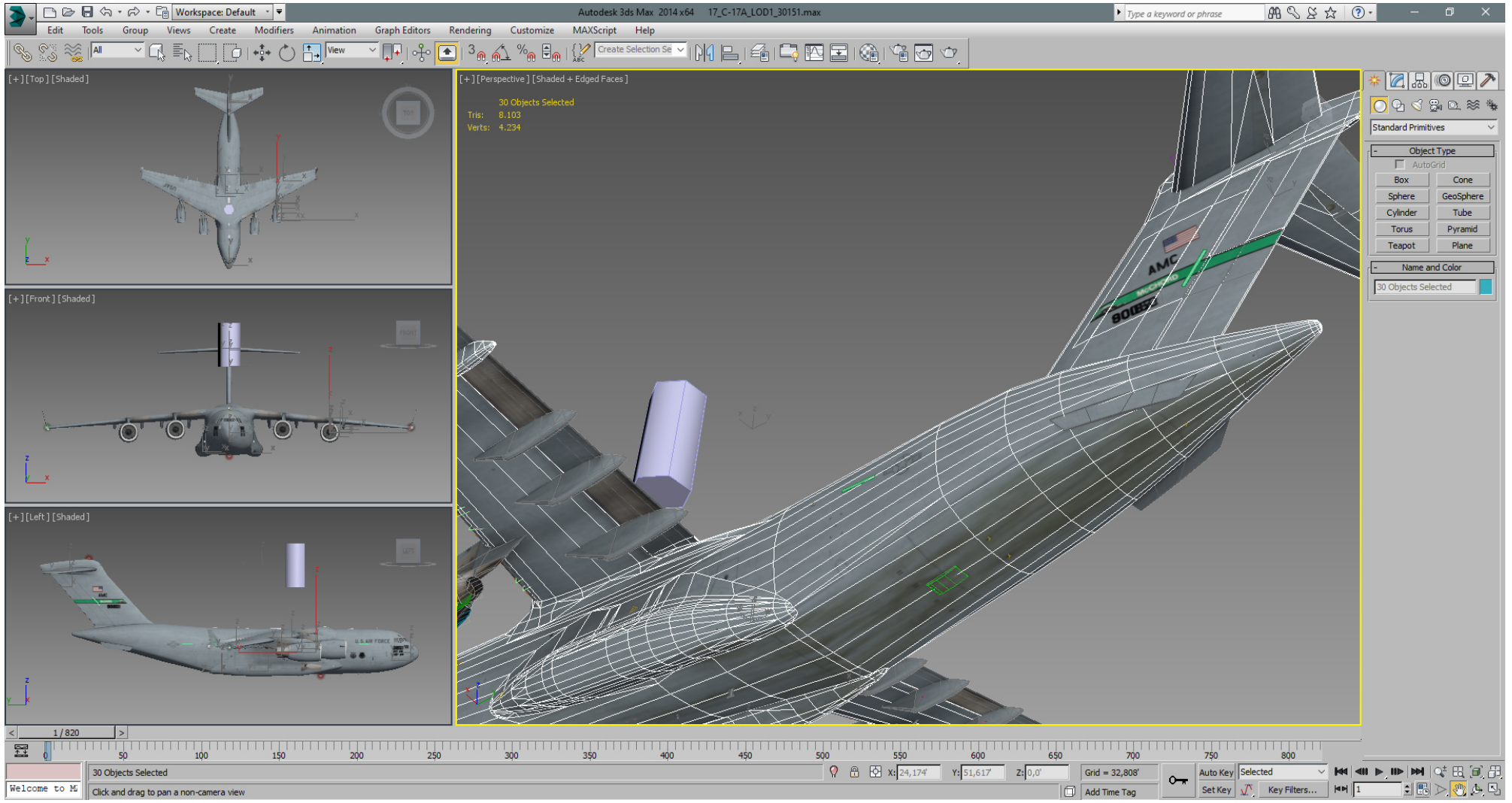
Before (LOD 1):



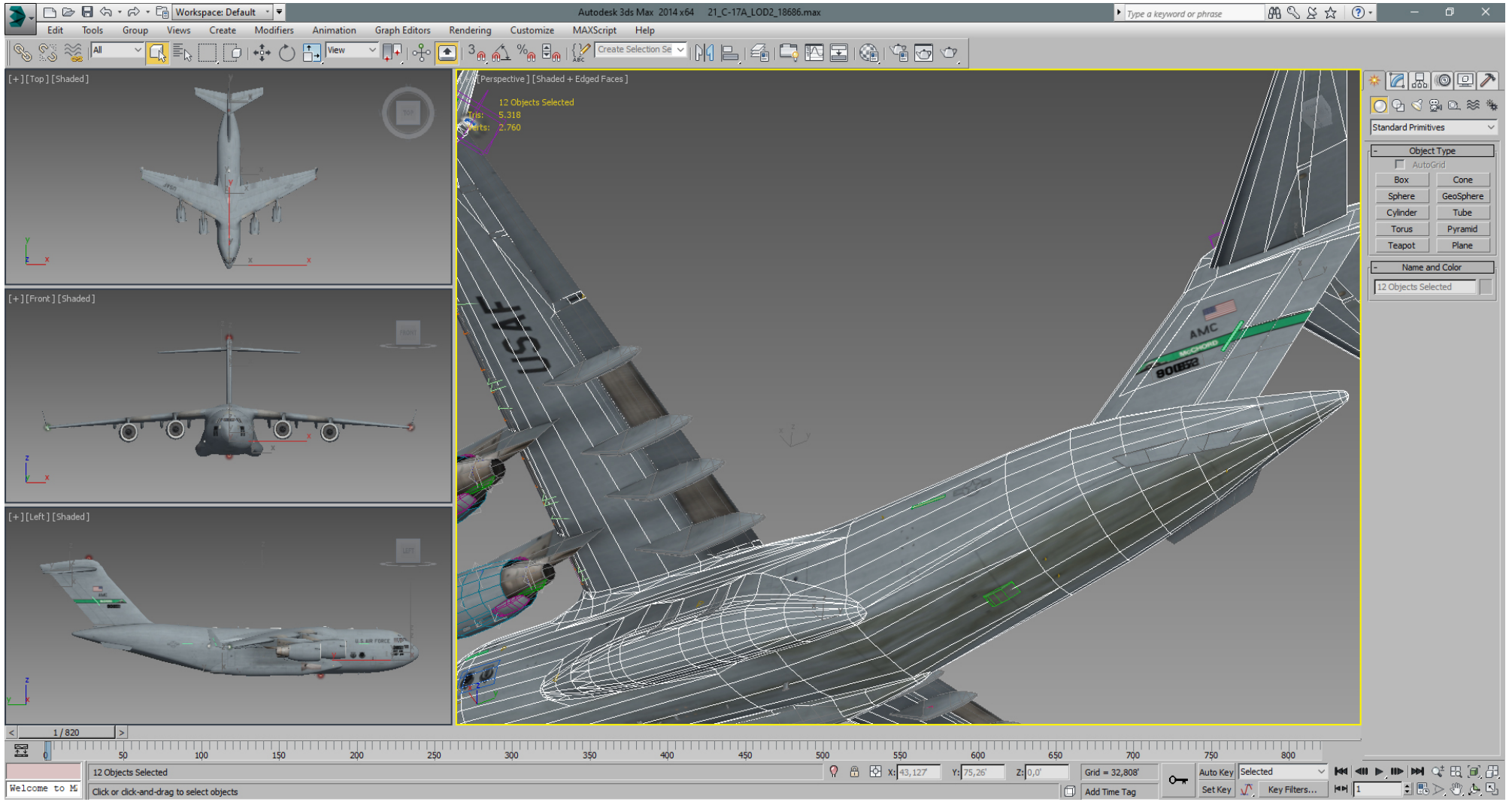
After (LOD 2):


Autodesk 3ds Max 2014 x64 21_C-17A_LOD2_18686.max
[+][Top][Shaded]
[+][Front][Shaded]
[+][Left][Shaded]
[+][Perspective][Shaded + Edged Faces]
8 Objects Selected
Tris: 5.094
Verts: 2.640
AMC
McCHORD
Standard Primitives
Object Type
Box
Cone
Sphere
GeoSphere
Cylinder
Tube
Torus
Pyramid
Teapot
Plane
Name and Color
8 Objects Selected
Click and drag to pan a non-camera view

Before (LOD 1):


Autodesk 3ds Max 2014 x64 17_C-17A_LOD1_30151.max
[+][Top][Shaded]
[+][Front][Shaded]
[+][Left][Shaded]
[+][Perspective][Shaded + Edged Faces]
30 Objects Selected
Tris: 8.103
Verts: 4.234
Standard Primitives
Object Type
AutoGrid
Box
Cone
Sphere
GeoSphere
Cylinder
Tube
Torus
Pyramid
Teapot
Plane
Name and Color
30 Objects Selected
AMC
1 / 820
Click and drag to pan a non-camera view
Add Time Tag
Auto Key
Set Key
Key Filters...

After (LOD 2):

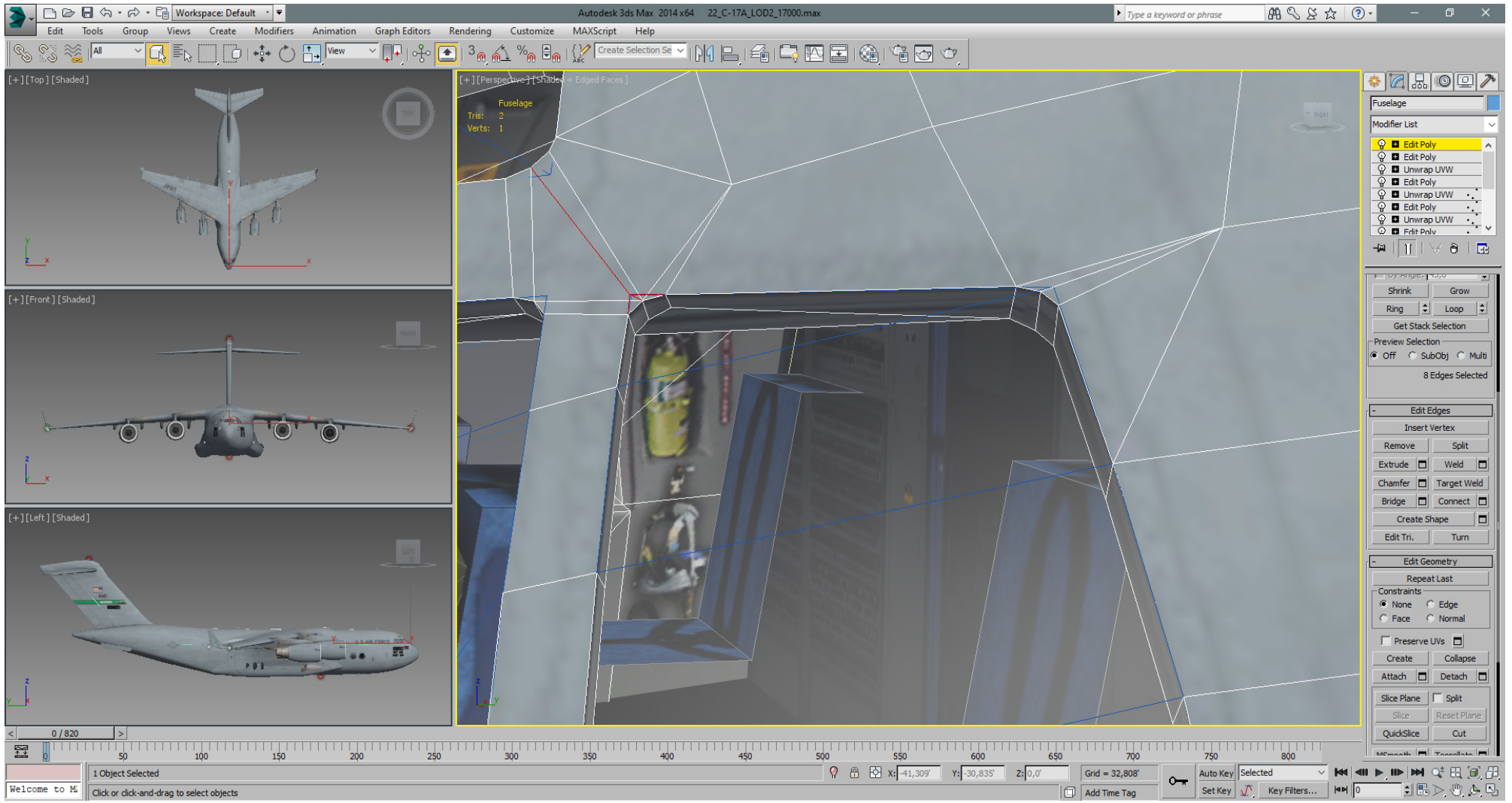


Most of the optimizing has been done using "Collapse" on selected edges.

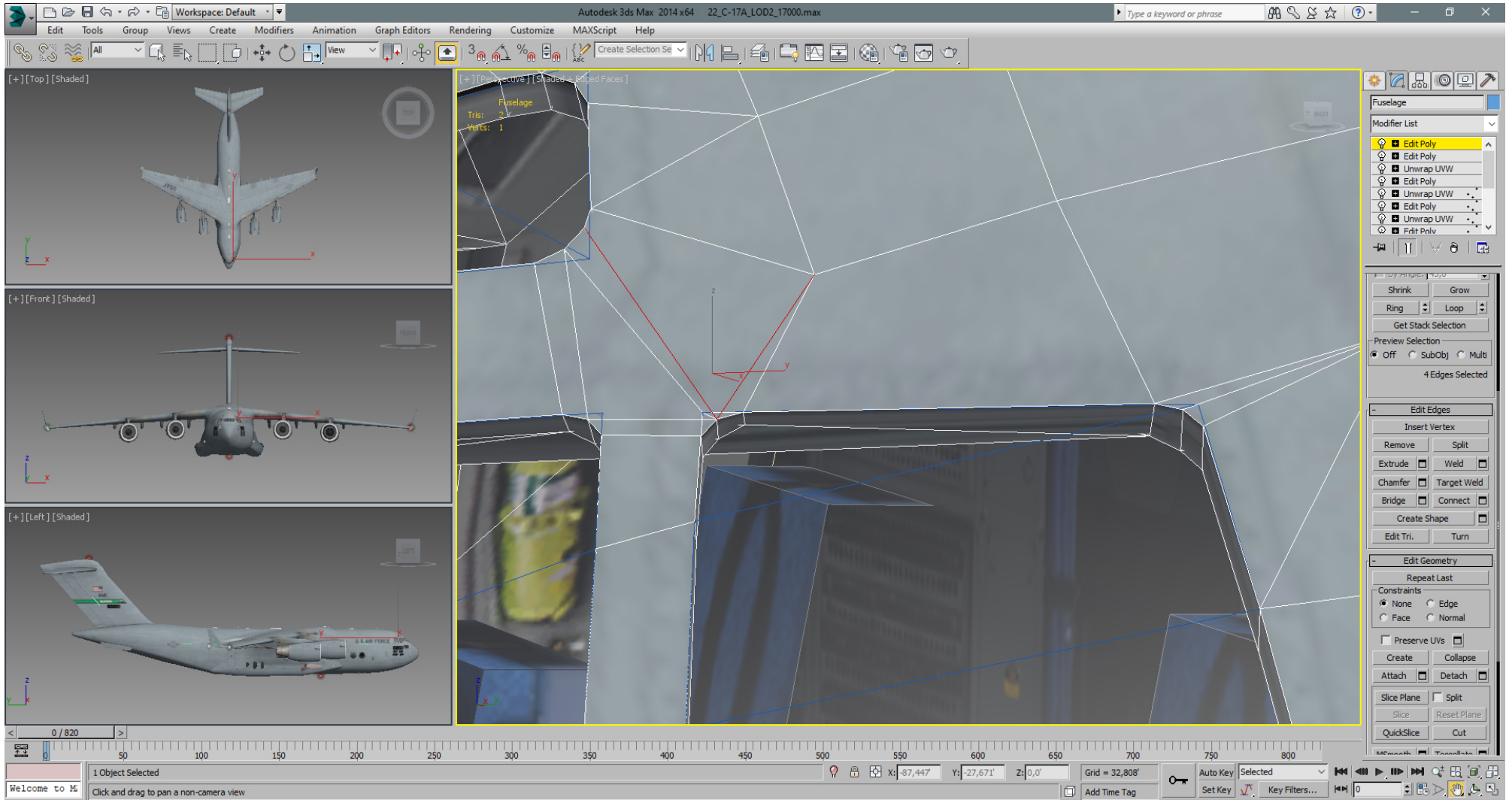
Tri- count for our LOD 2 WIP is actually 18686.

Let's continue to get rid of the rounded corners of the windows.

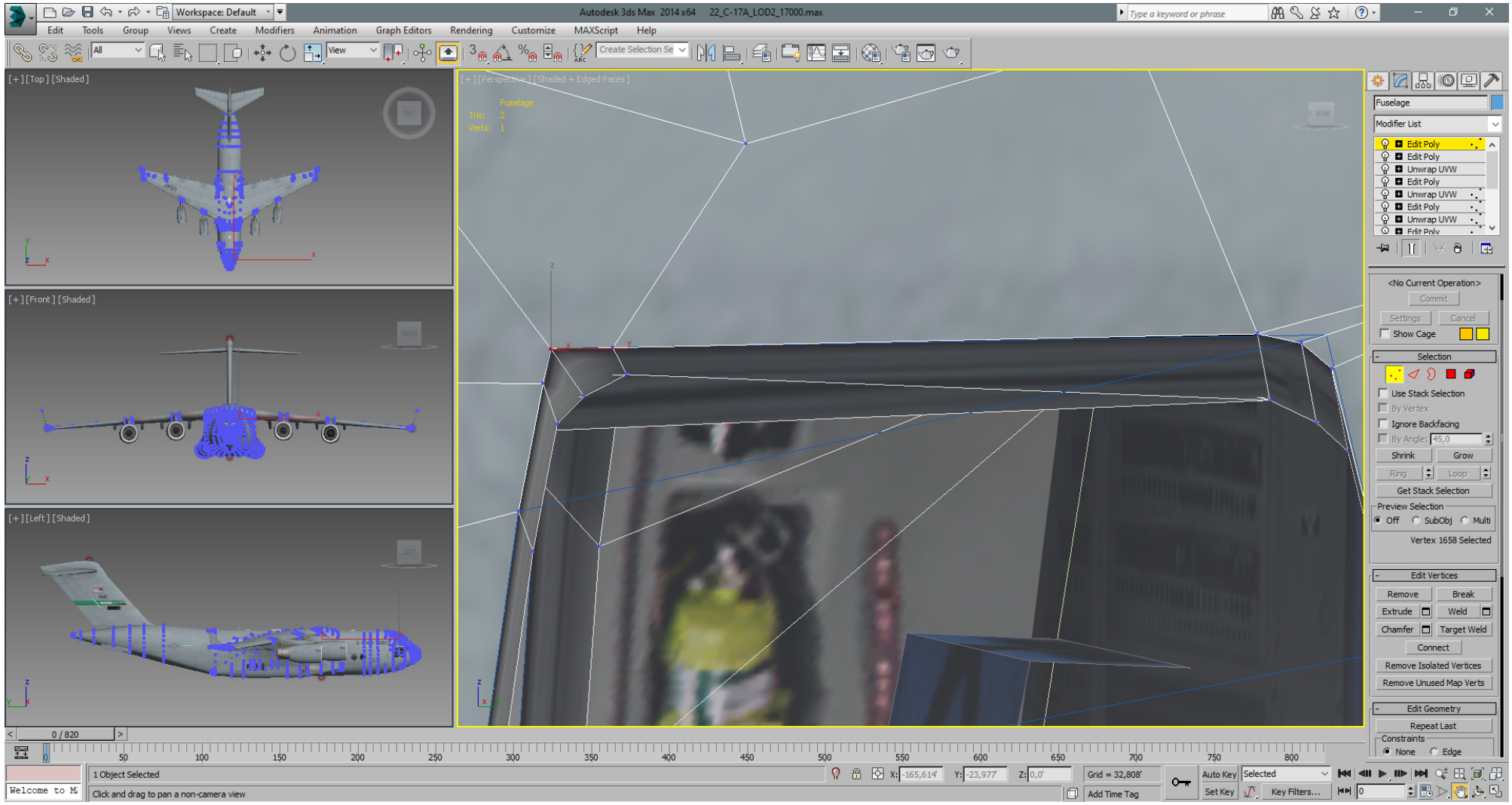
Therefore we cut new corners by hand, and connect the new corner meaningful with two more edges. (red selected)



We select distracting edges and get rid of them with CTRL + BKSP.

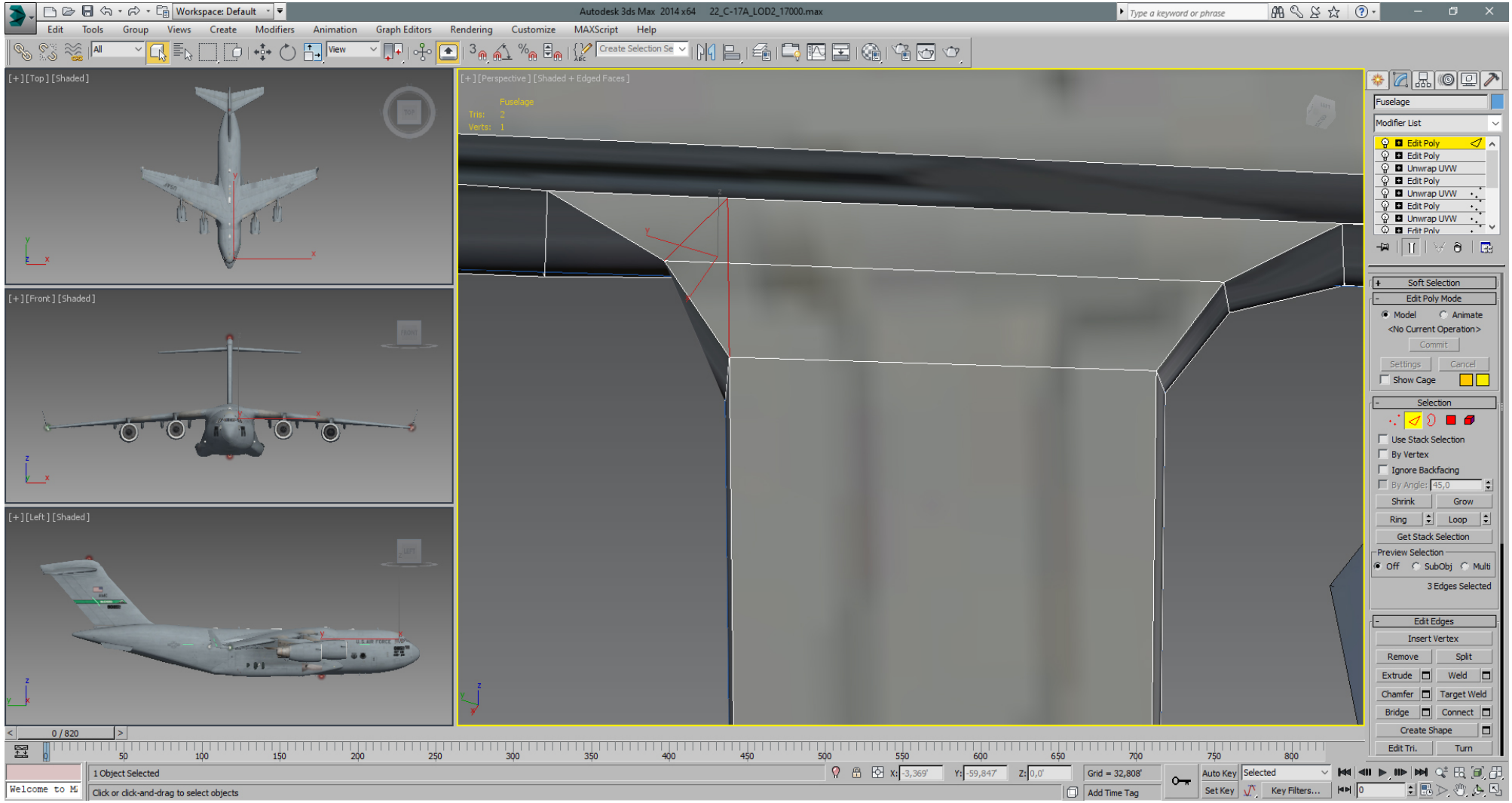


Now we can change to "Vertex" sub mode and "Target Weld" that middle vertex to the corner.

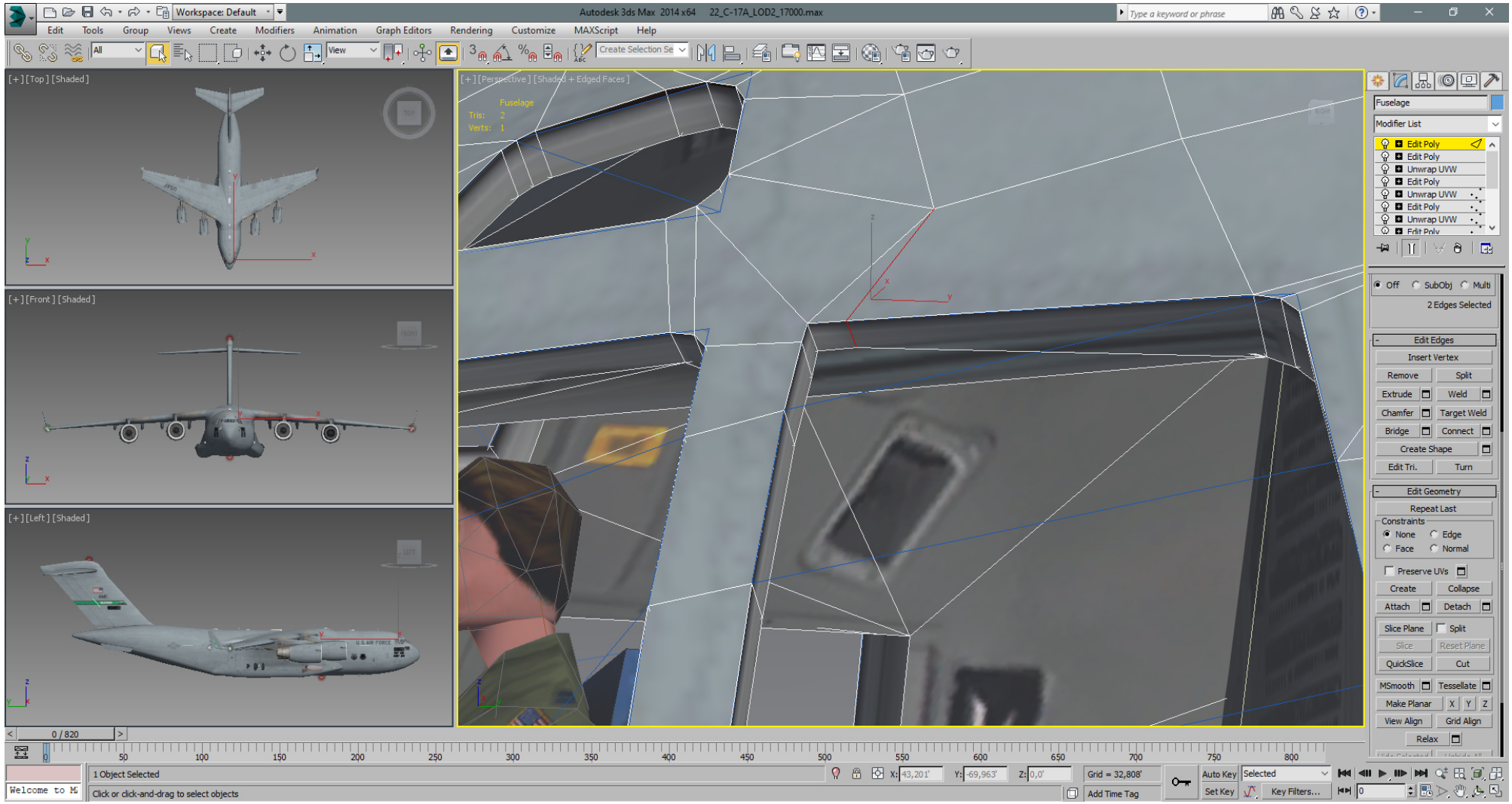


We need to do similar for the cockpit inside.
One vertically freehand cut, and one cut to connect as shown in the picture below.

Then get rid of distracting edges with CTRL + BKSP, before we "Target Weld" that middle vertex to the corner.



After the new corner is done, we can get rid of useless edges using CTRL + BKSP again.



So we do this workflow for all window corners, inside cockpit and outside, where we re- cut edges meaningful and get rid of useless ones.

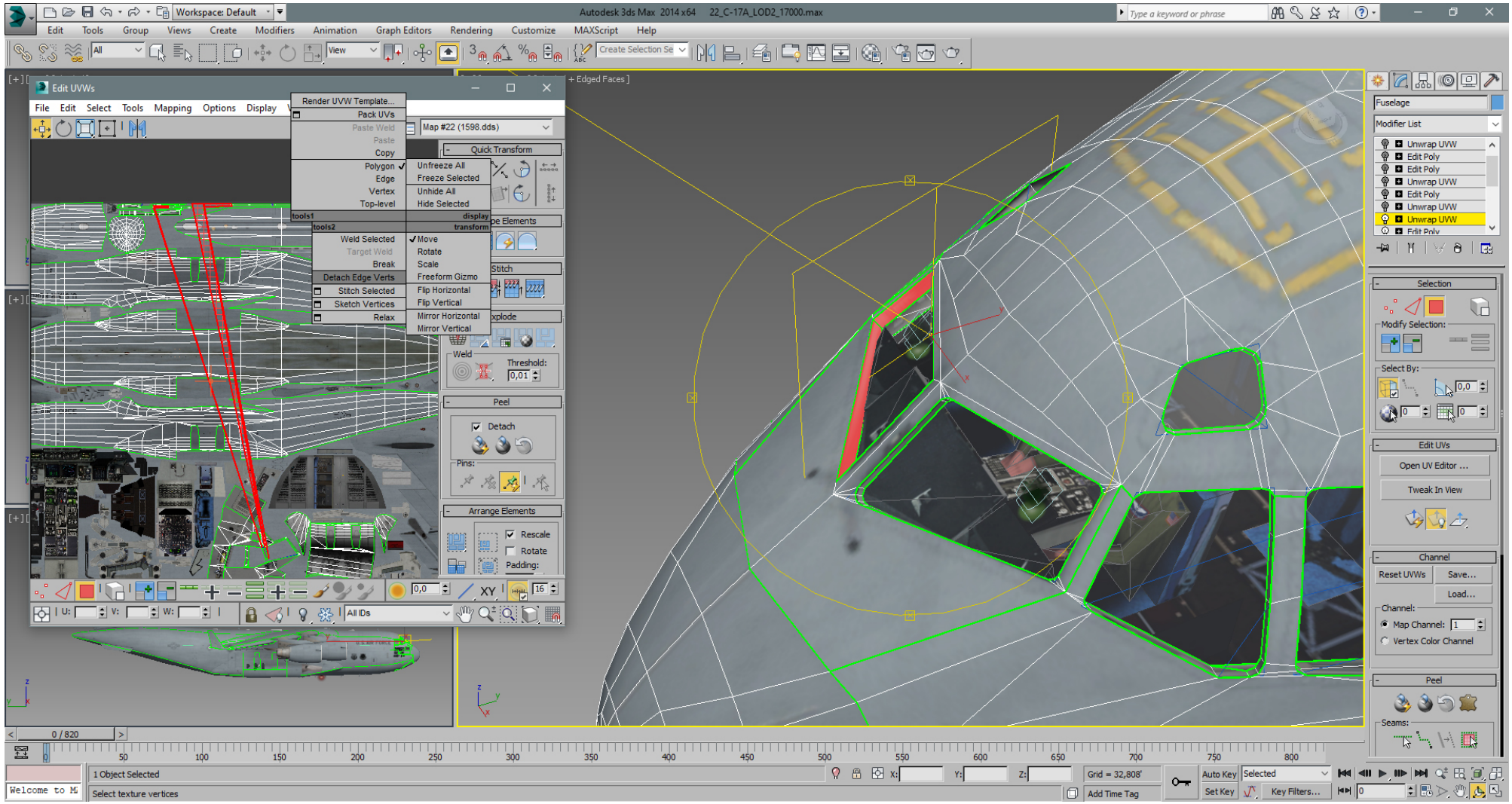
Like usually we care about welded vertices (especially after using "Cut"), the smoothing groups and the UVW mapping, which needed some re- adjustments in our case.

Side note the "Stack" in above pictures, where many "Edit Poly" and "Unwrap UVW" modifiers are used to work step by step.

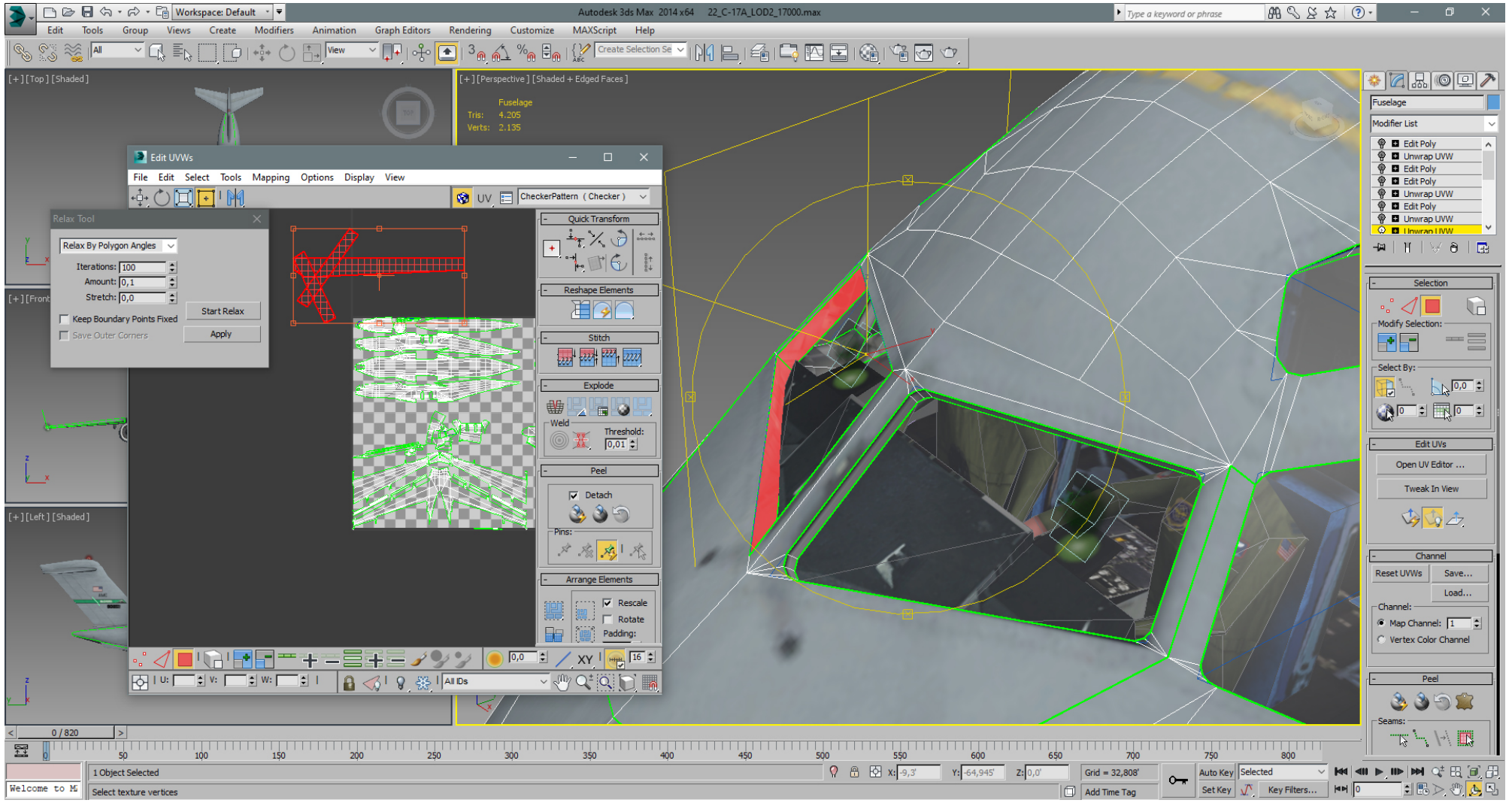
Here is an example what can happen to the UVW mapping during the tri- optimizing procedure.
The UV polys are stretched which is bad. In worst case they can be additionally twisted.

No panic, we can handle this.

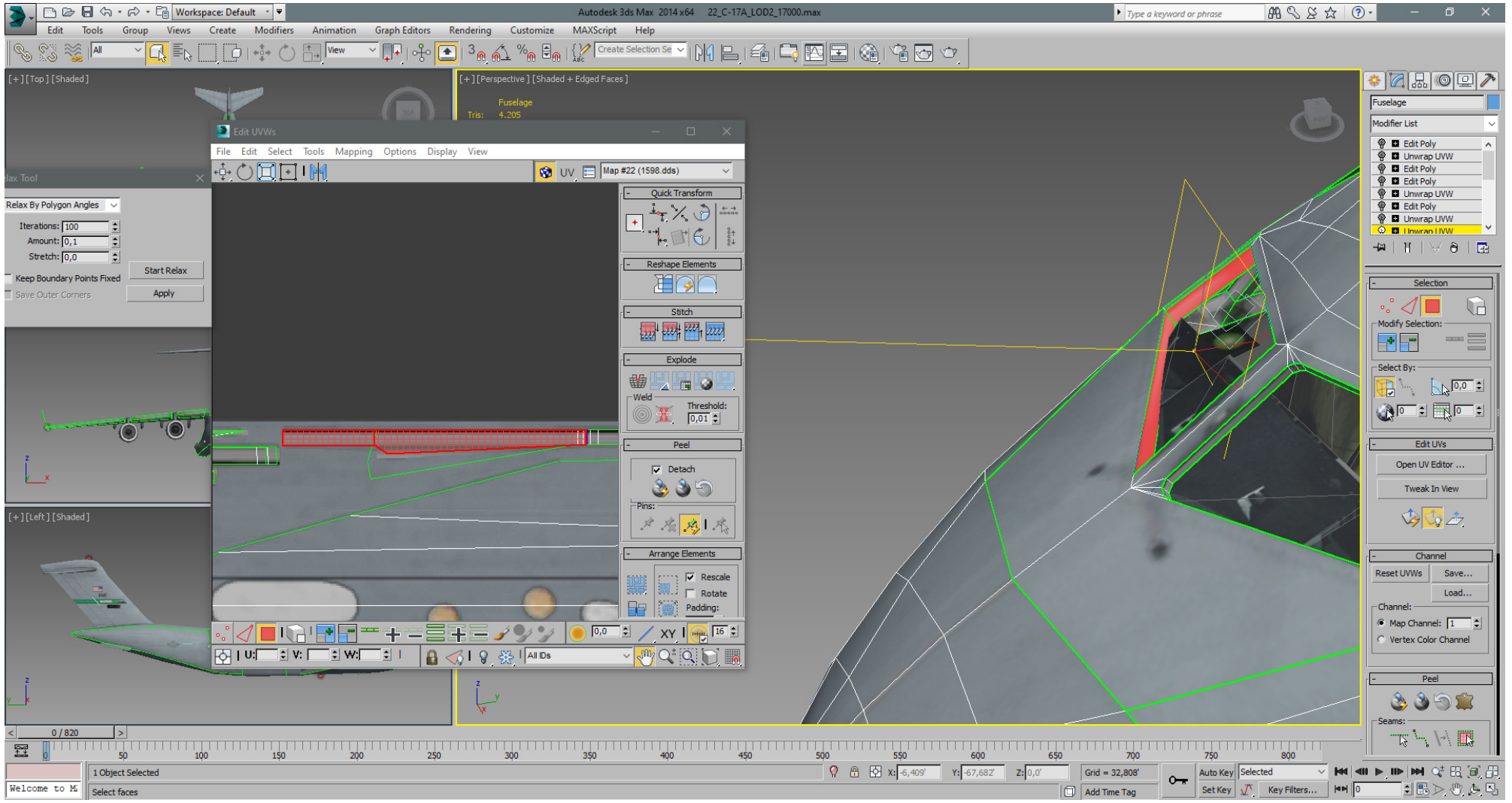
We simply right click on the selected UVW polys in the "Edit UVWs" editor an pick "Detach Edge Verts".



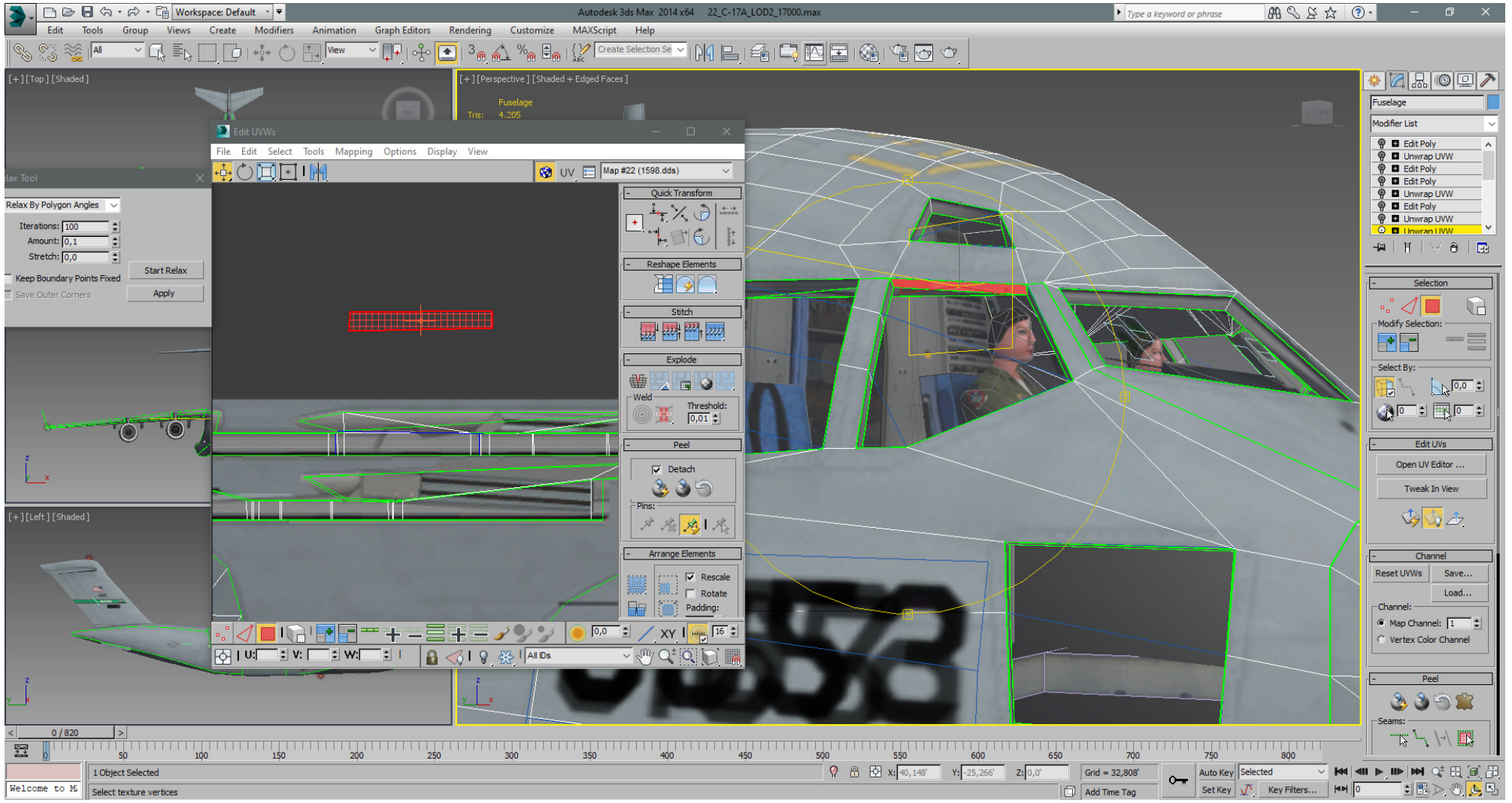
These UVW polys are now free and not connected to any others.
So we can use the "Relax" function on them.



And now we can scale and if necessary rotate them back in place.

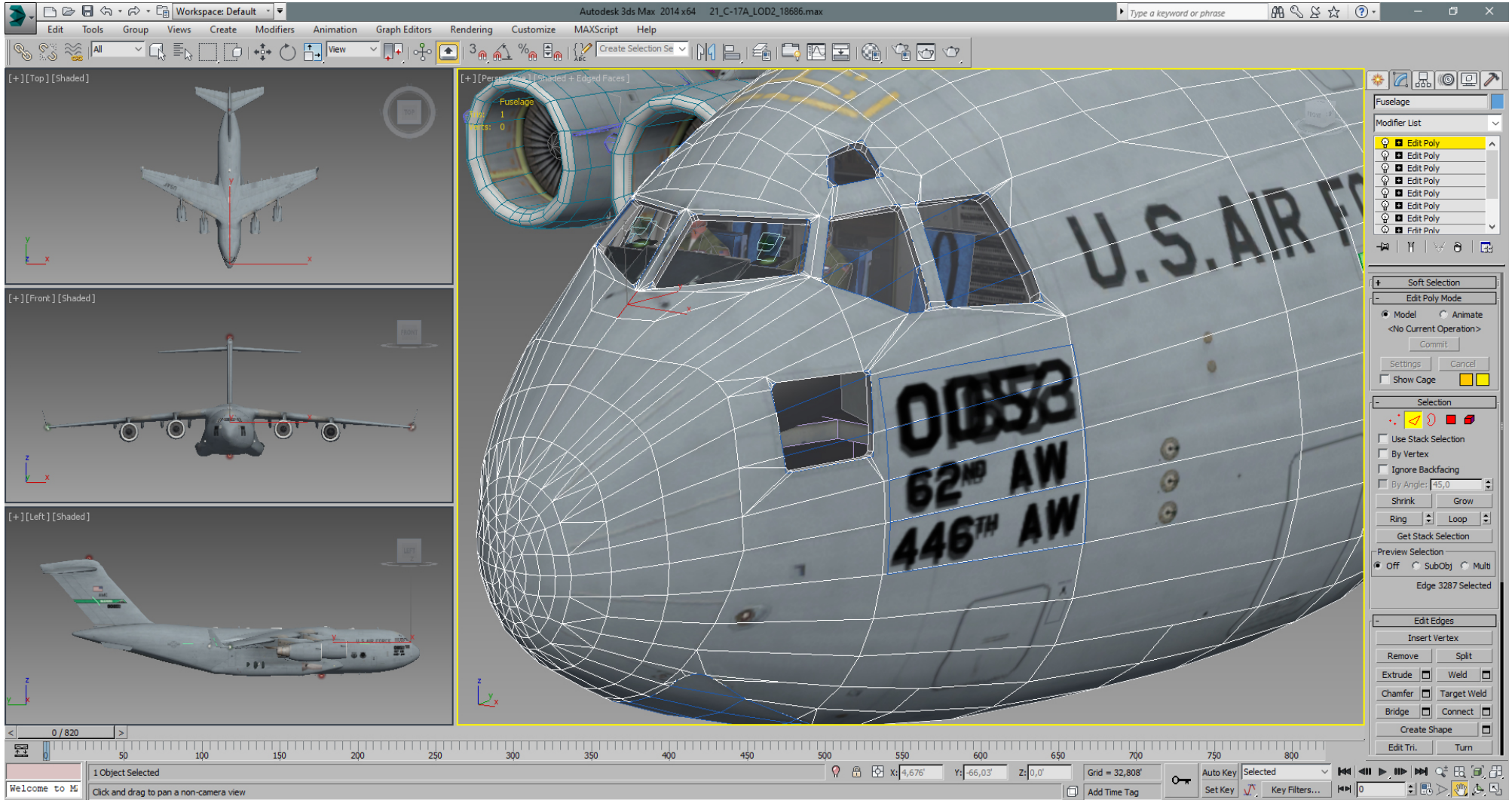


That third UVW poly belongs to the right side window top frame, and we know how to handle it.
Don't we?

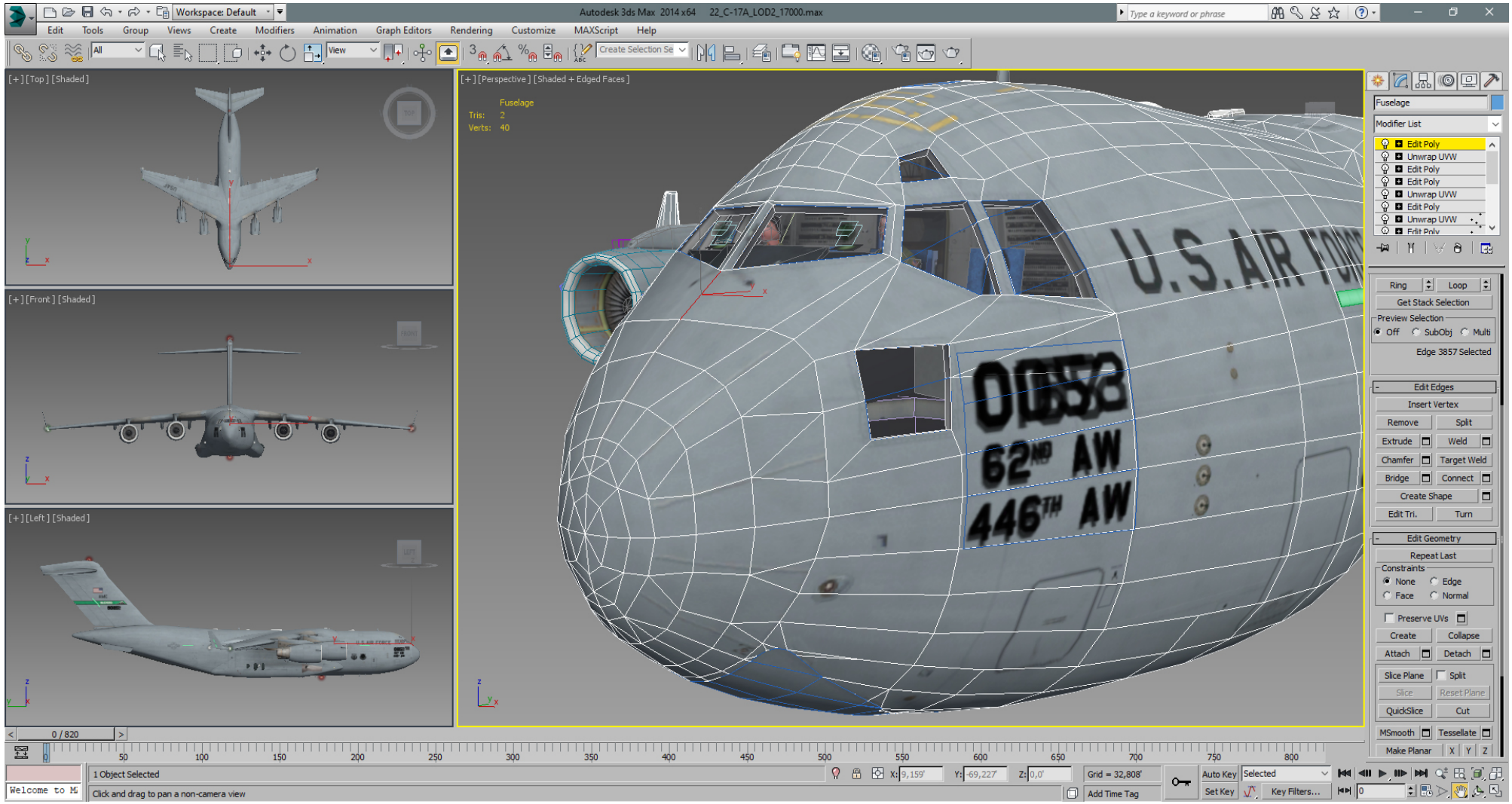


The window corners, and some work on the nose saved us further ~600 tris.
As yet, because we're not done on the front section.

Before (LOD 1):



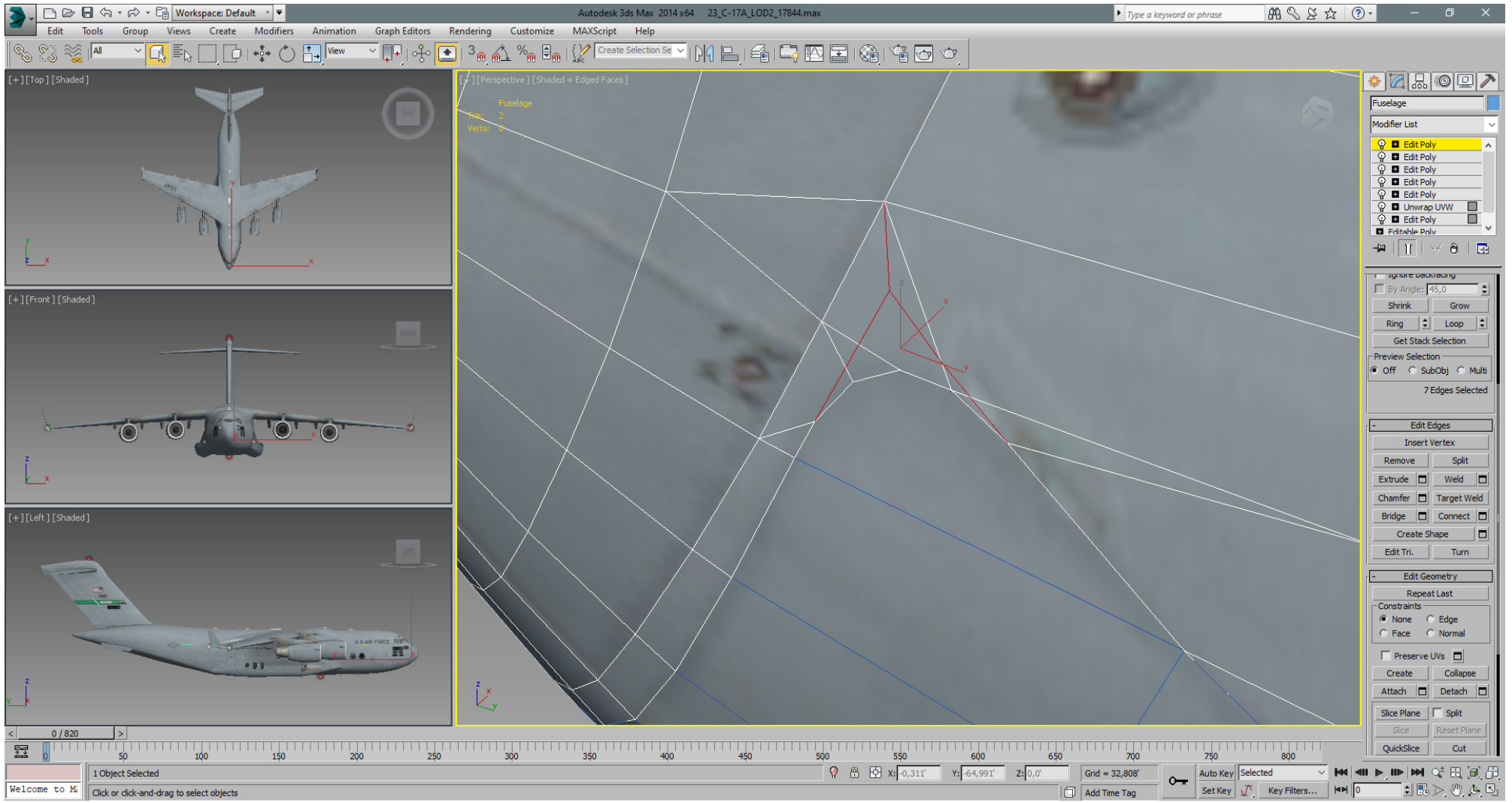
After (LOD 2):



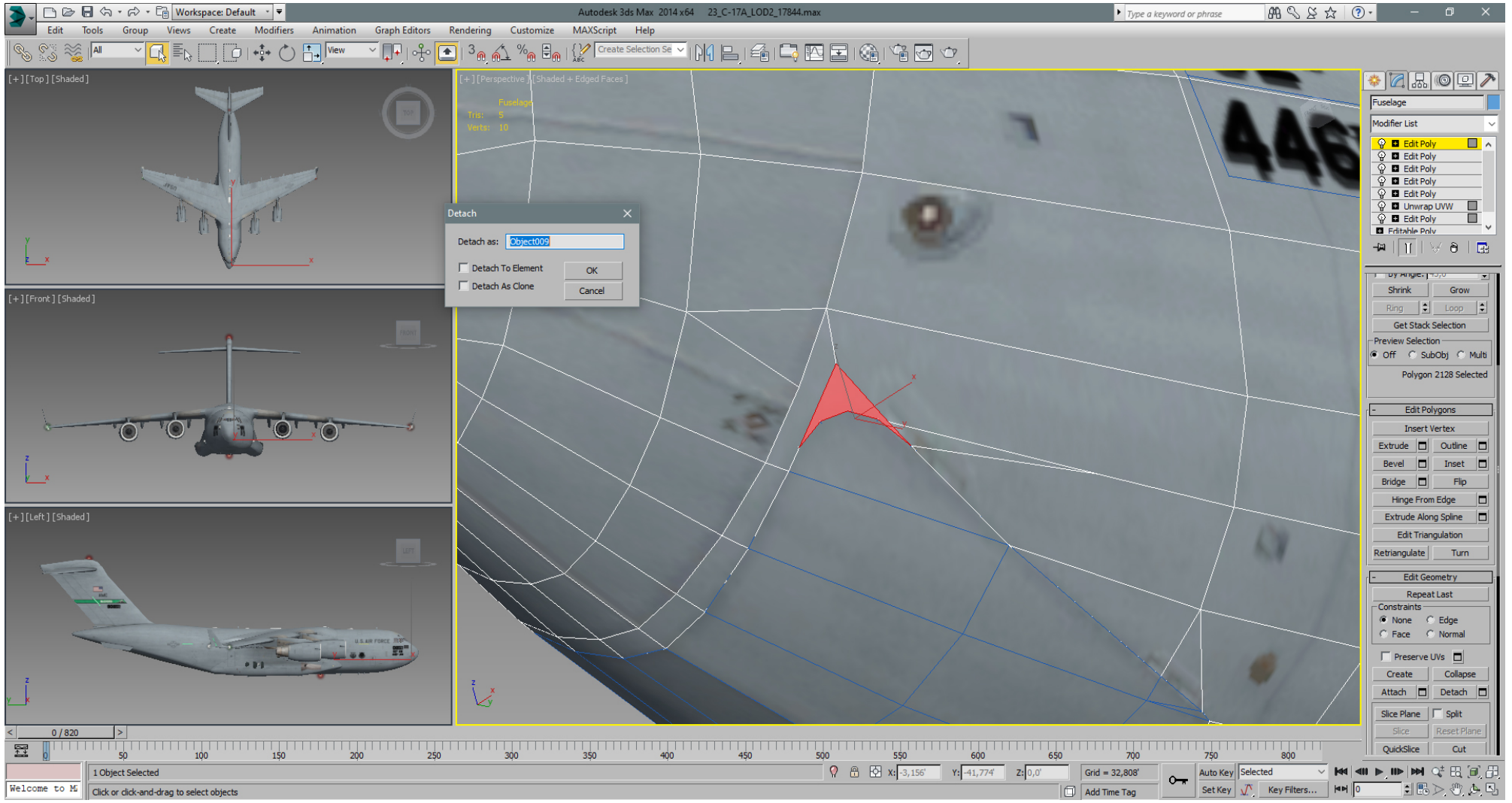
Tri- count for LOD 2 WIP is actually 18061.

We'll get also rid of the rounded corners of the front gear doors.

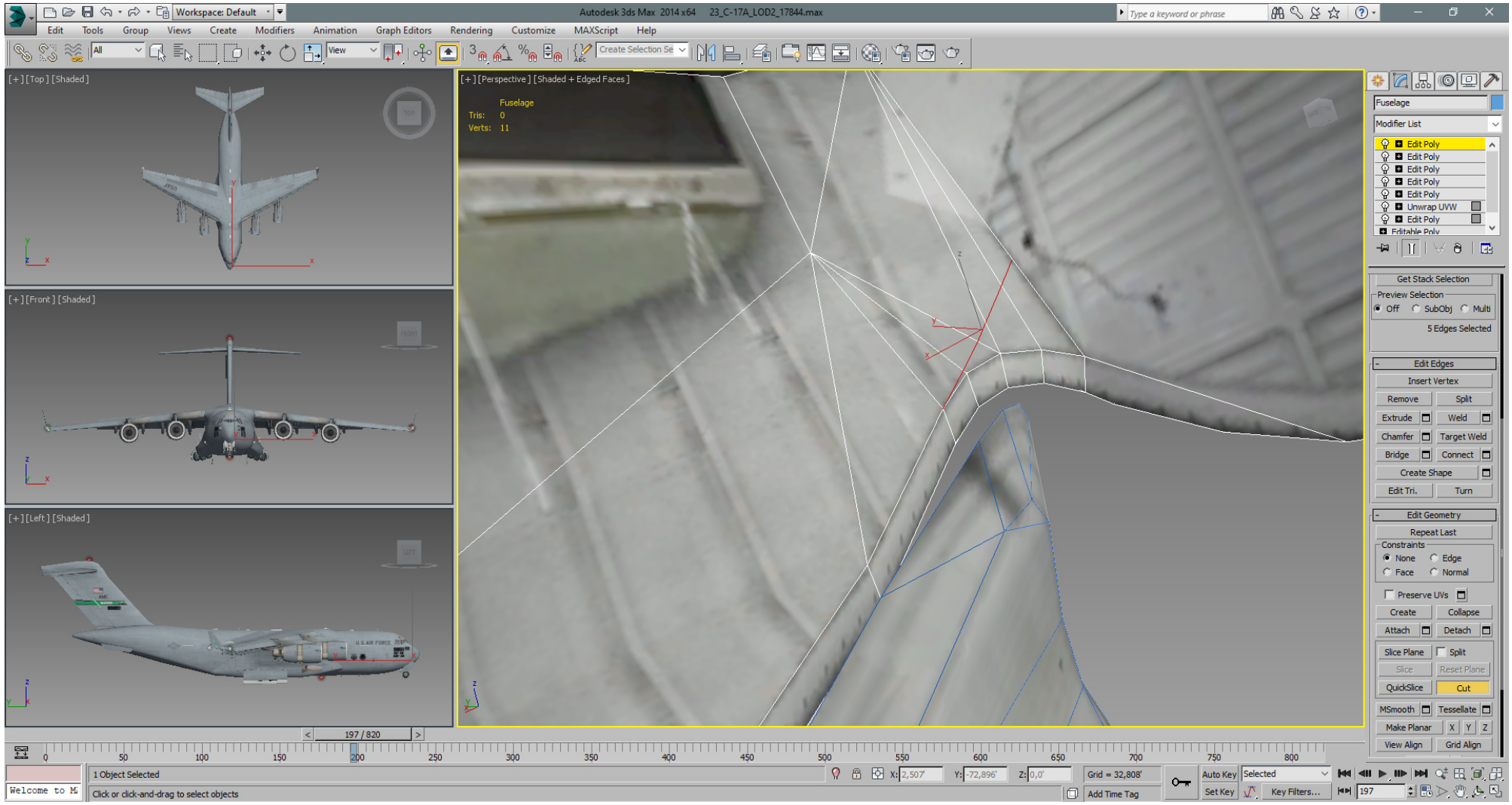
So we cut new corners by hand into the fuselage and connect the new corner meaningful with one more edge. (red selected)



After removing distracting edges with CTRL + BKSP, we select the corner tris in "Polygon" sub mode and "Detach" them to a new object. Then we hide that new object for now. (select -> right click -> "Hide Selection")

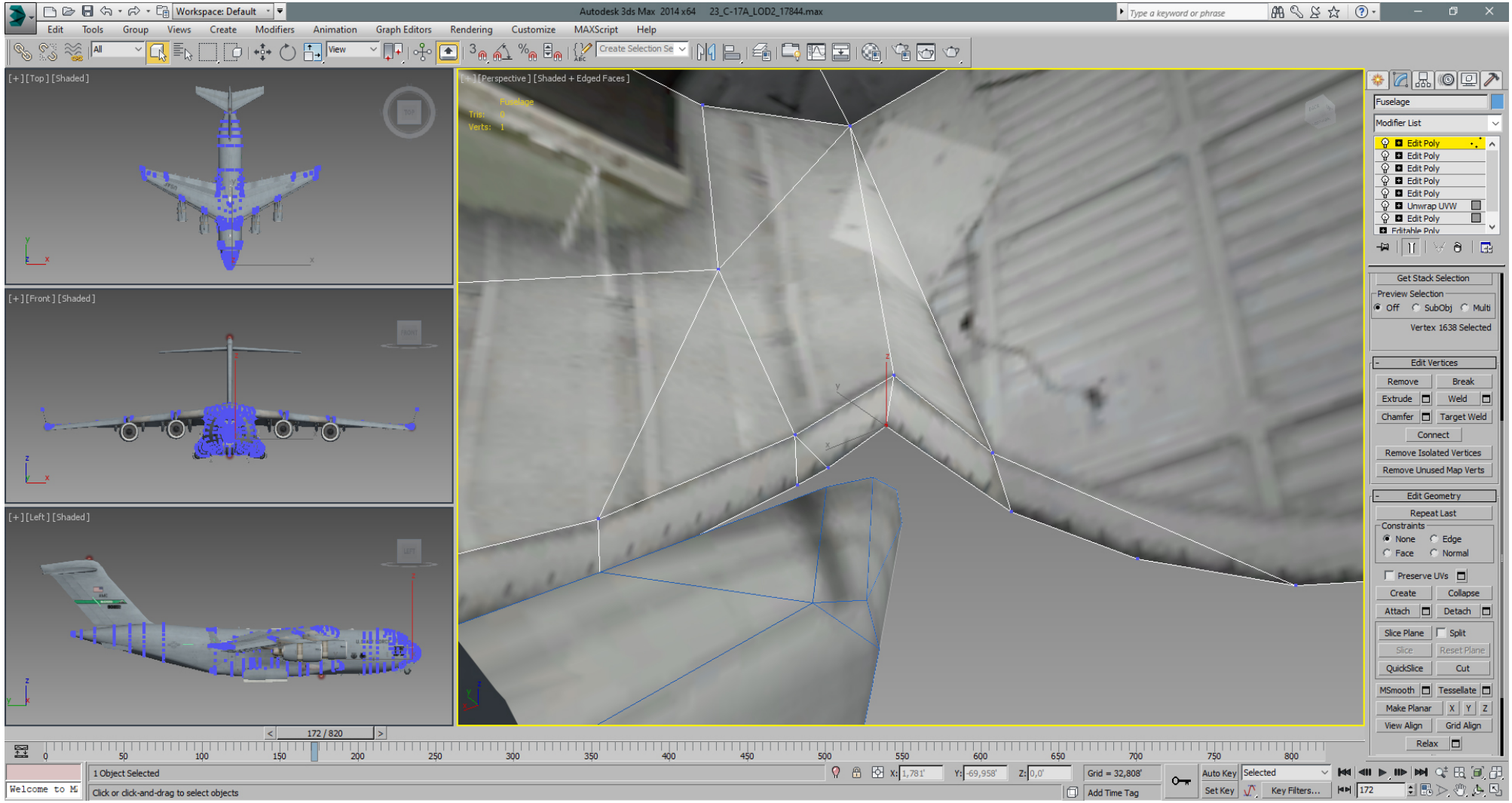


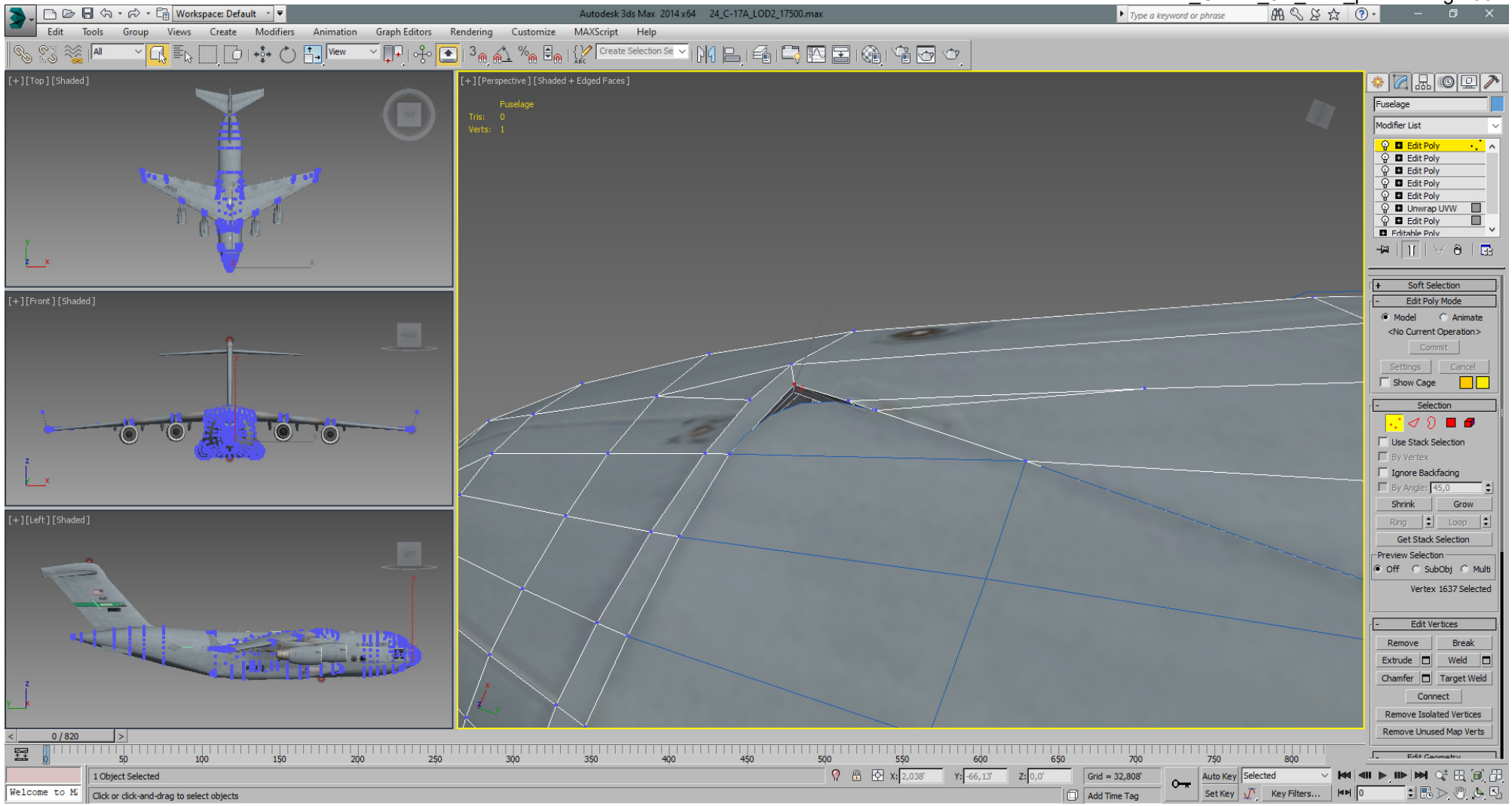
Inside the gear bay we start with a "Cut".



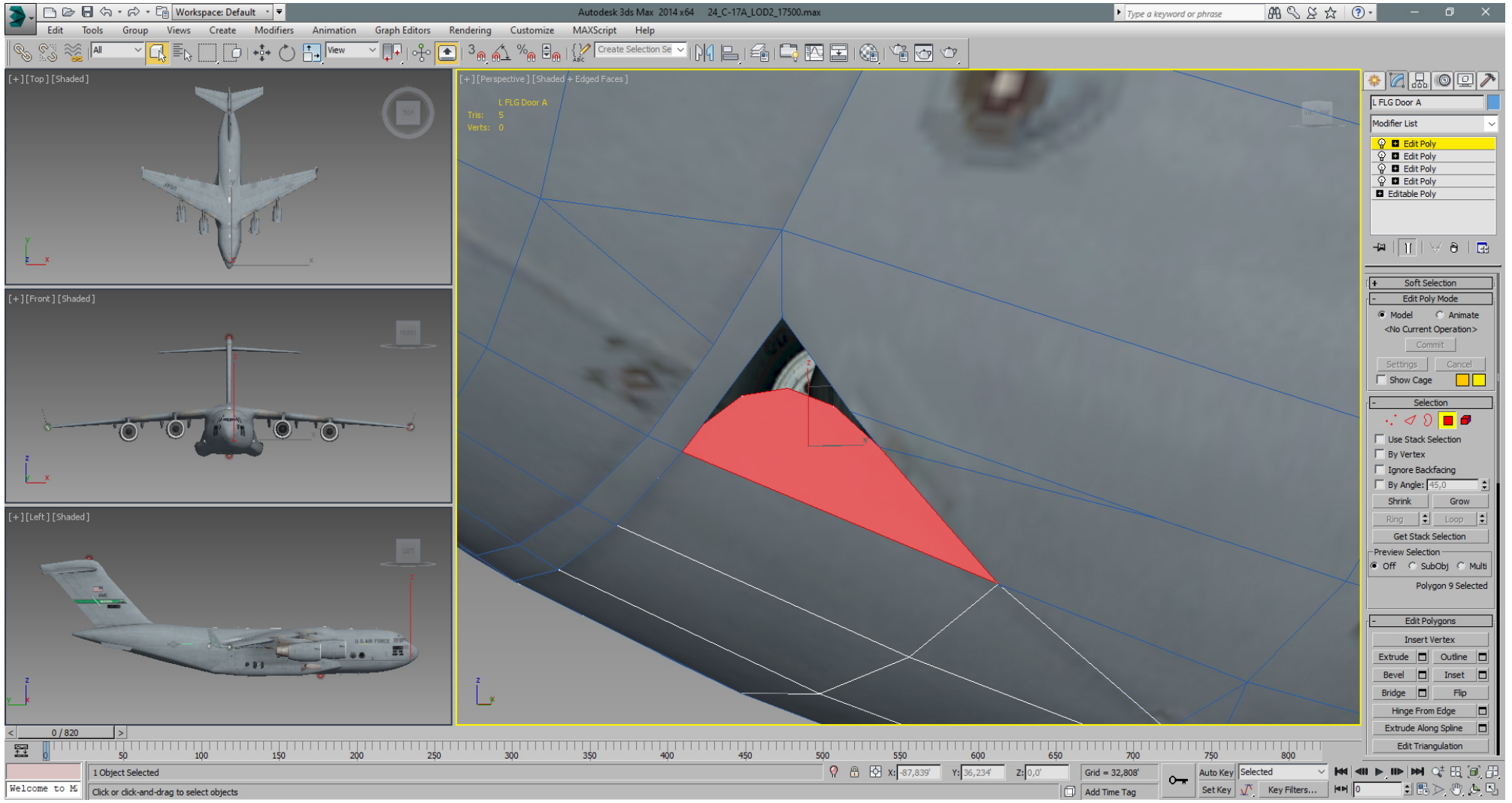
Then we can get rid of useless or distracting edges, but keep the middle edge of the rounded corner.
So we can "Target Weld" the bottom vertex to the new cutted corner of the fuselage, and move the top vertex in place.

The corner vertices in place and some edges re- cutted looks like this now.

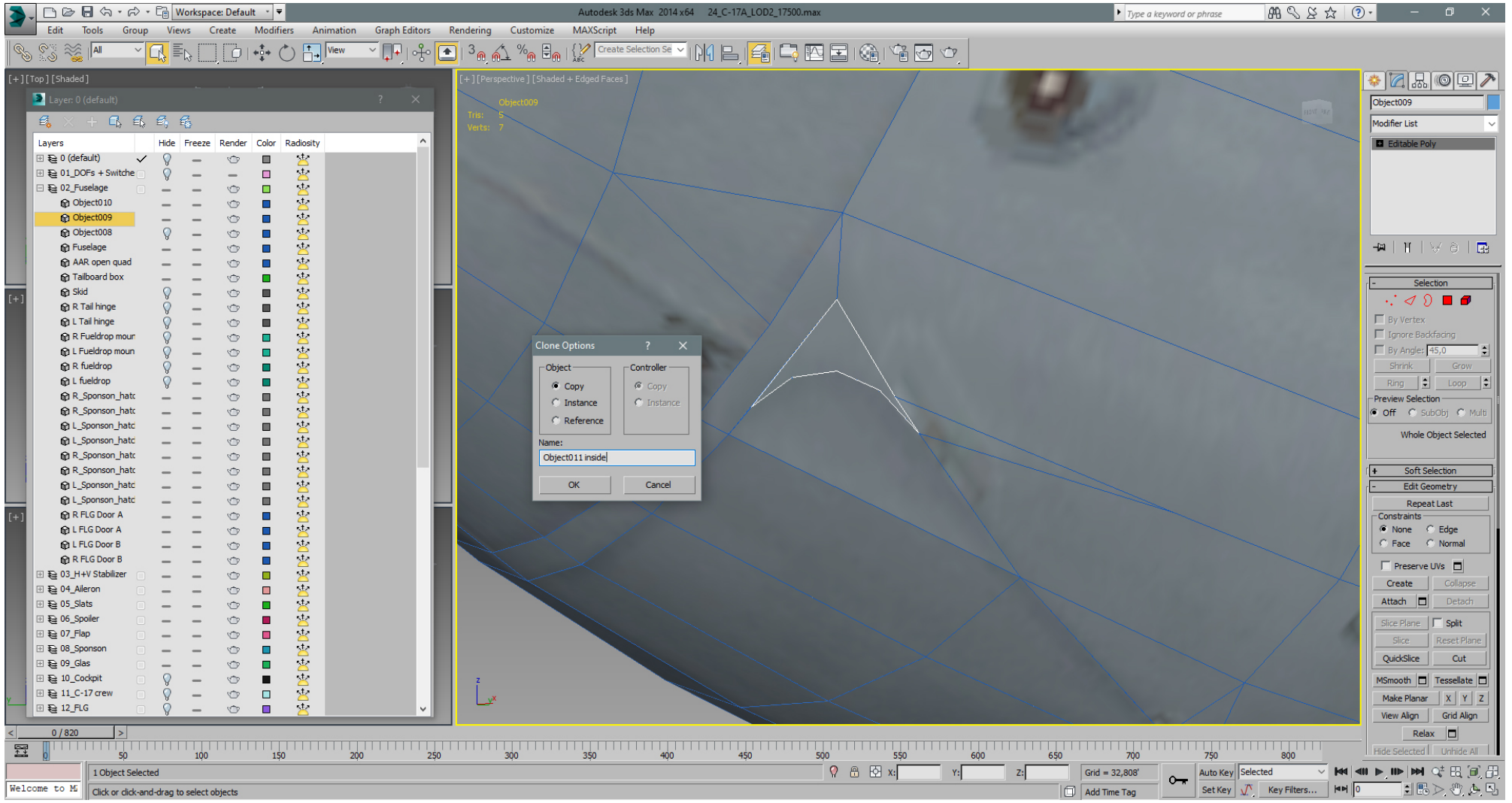



Workspace: Default
Autodesk 3ds Max 2014 x64 24_C-17A_LOD2_17500.max
Edit Tools Group Views Create Modifiers Animation Graph Editors Rendering Customize MAXScript Help
[+][Top][Shaded]
[+][Front][Shaded]
[+][Left][Shaded]
[+][Perspective][Shaded + Edged Faces]
Fuselage
Tris: 0
Verts: 1
Fuselage
Modifier List
Edit Poly
Edit Poly
Edit Poly
Edit Poly
Edit Poly
Unwrap UVW
Edit Poly
Editable Poly
Soft Selection
Edit Poly Mode
Model
Animate
<No Current Operation>
Commit
Settings
Cancel
Show Cage
Selection
Use Stack Selection
By Vertex
Ignore Backfacing
By Angle: 45,0
Shrink
Grow
Ring
Loop
Get Stack Selection
Preview Selection
Off
SubObj
Multi
Vertex 1637 Selected
Edit Vertices
Remove
Break
Extrude
Weld
Chamfer
Target Weld
Connect
Remove Isolated Vertices
Remove Unused Map Verts
0 / 820
1 Object Selected
Click or click-and-drag to select objects
Add Time Tag
Auto Key
Selected
Set Key
Key Filters...

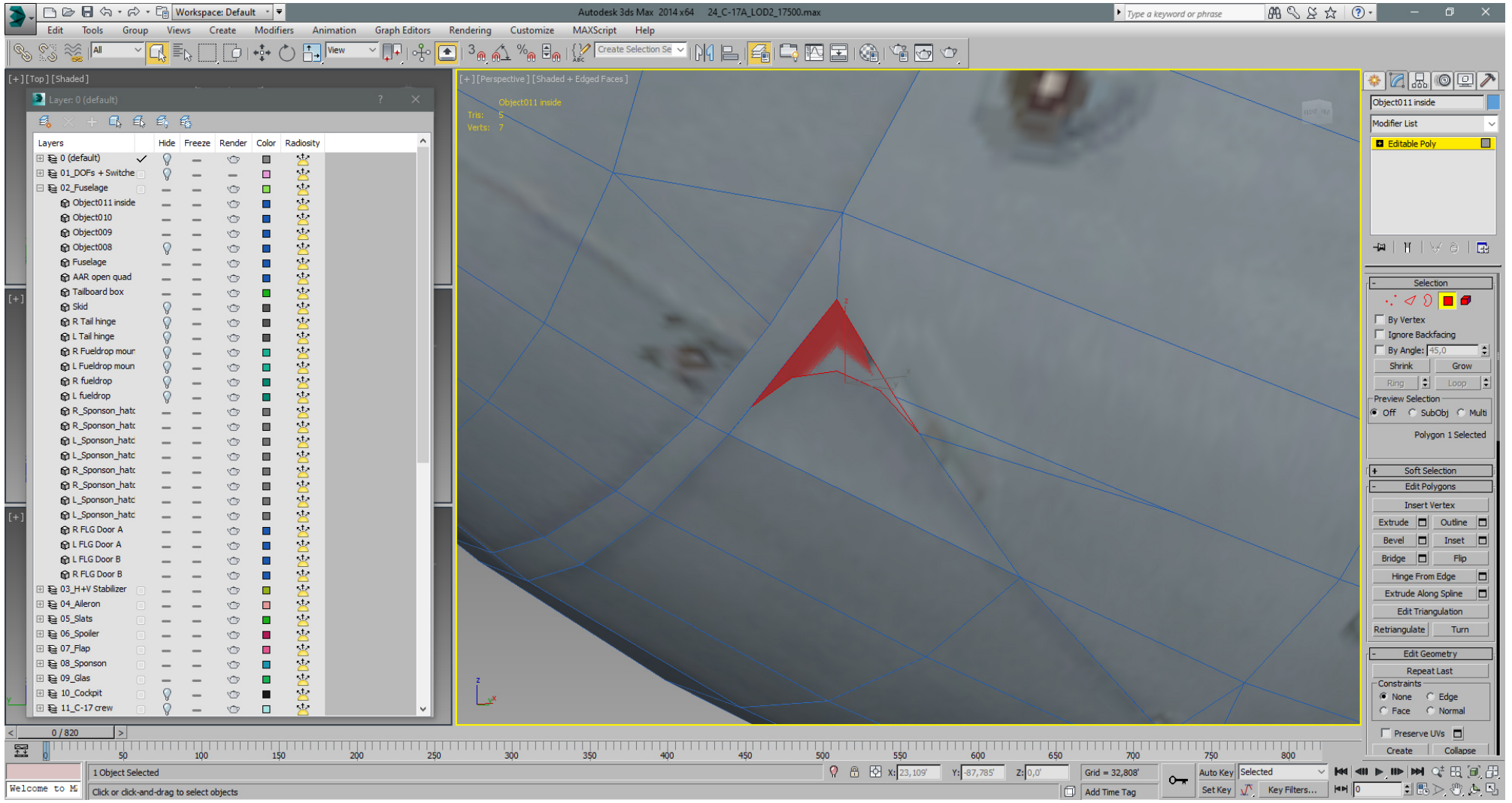
Next we select that one poly from the gear door and "Detach" it also to a new object.



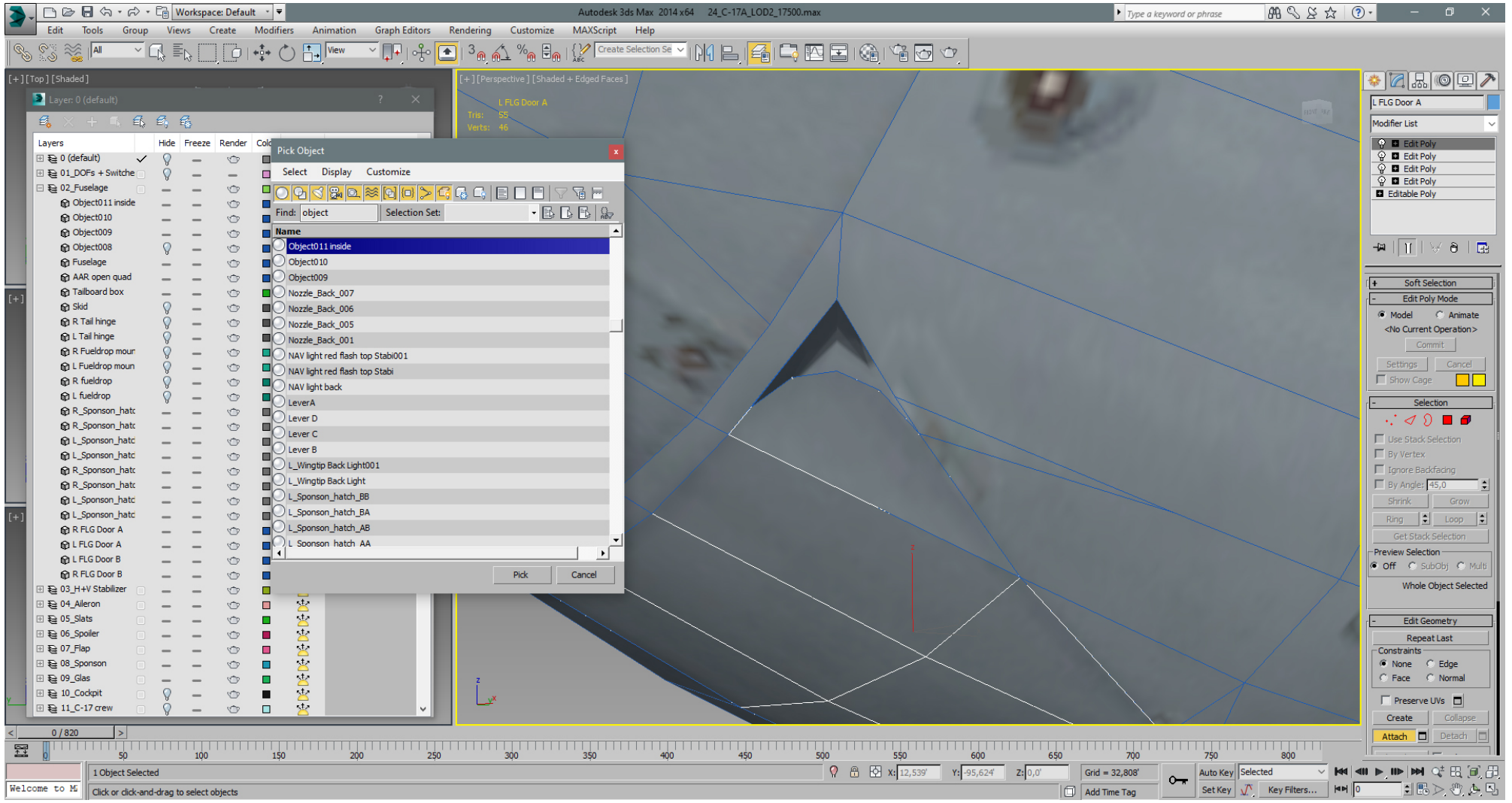
Then we unhide our previously hidden corner and "Clone" it.



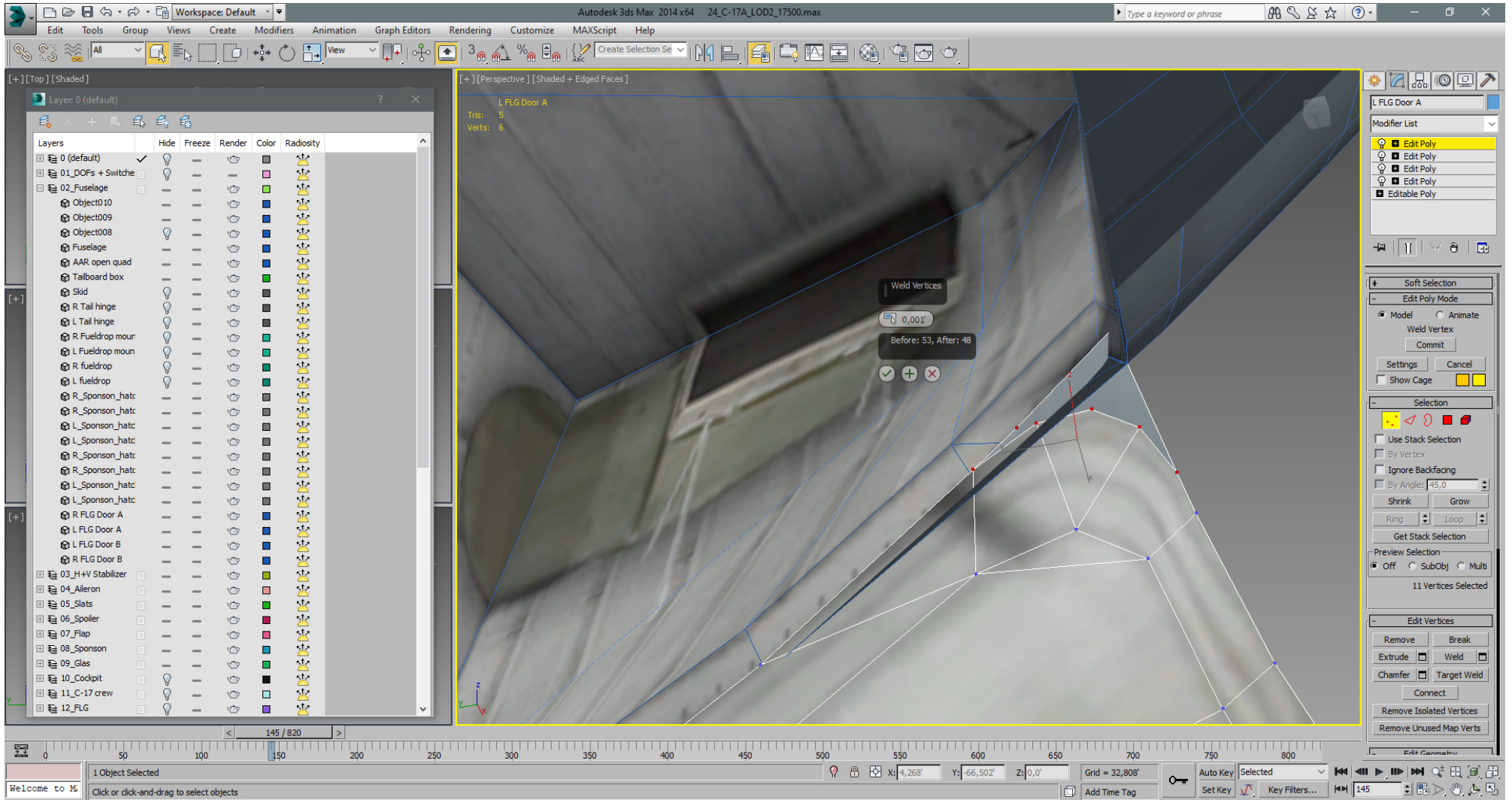
With that clone selected, we select all tris in "Polygon" sub mode and click "Flip".
This will flip the normals.



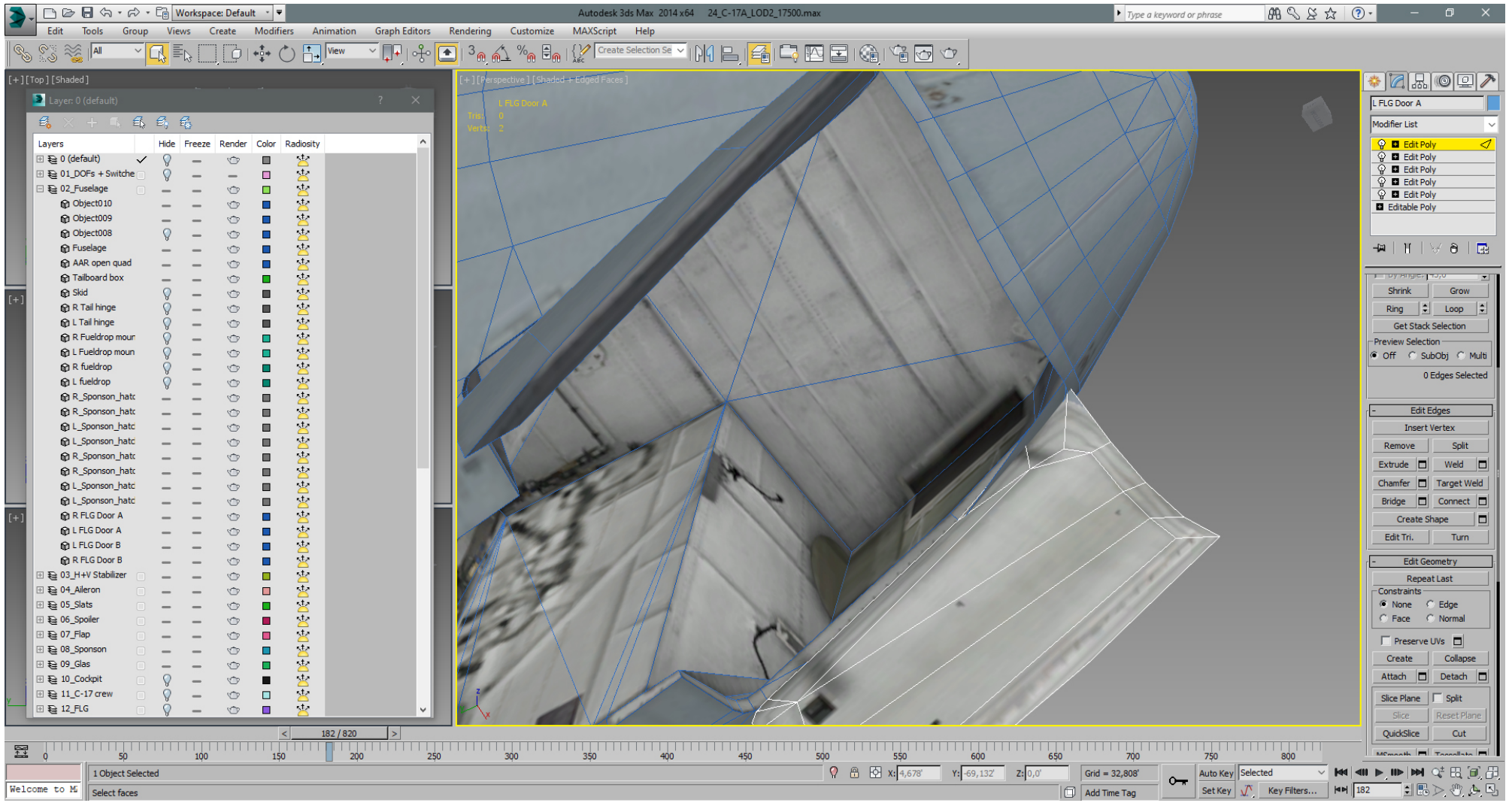
And now we can select the gear door and "Attach" that flipped corner.
While hard to pick we use "Select by Name" (press "H" on keyboard)



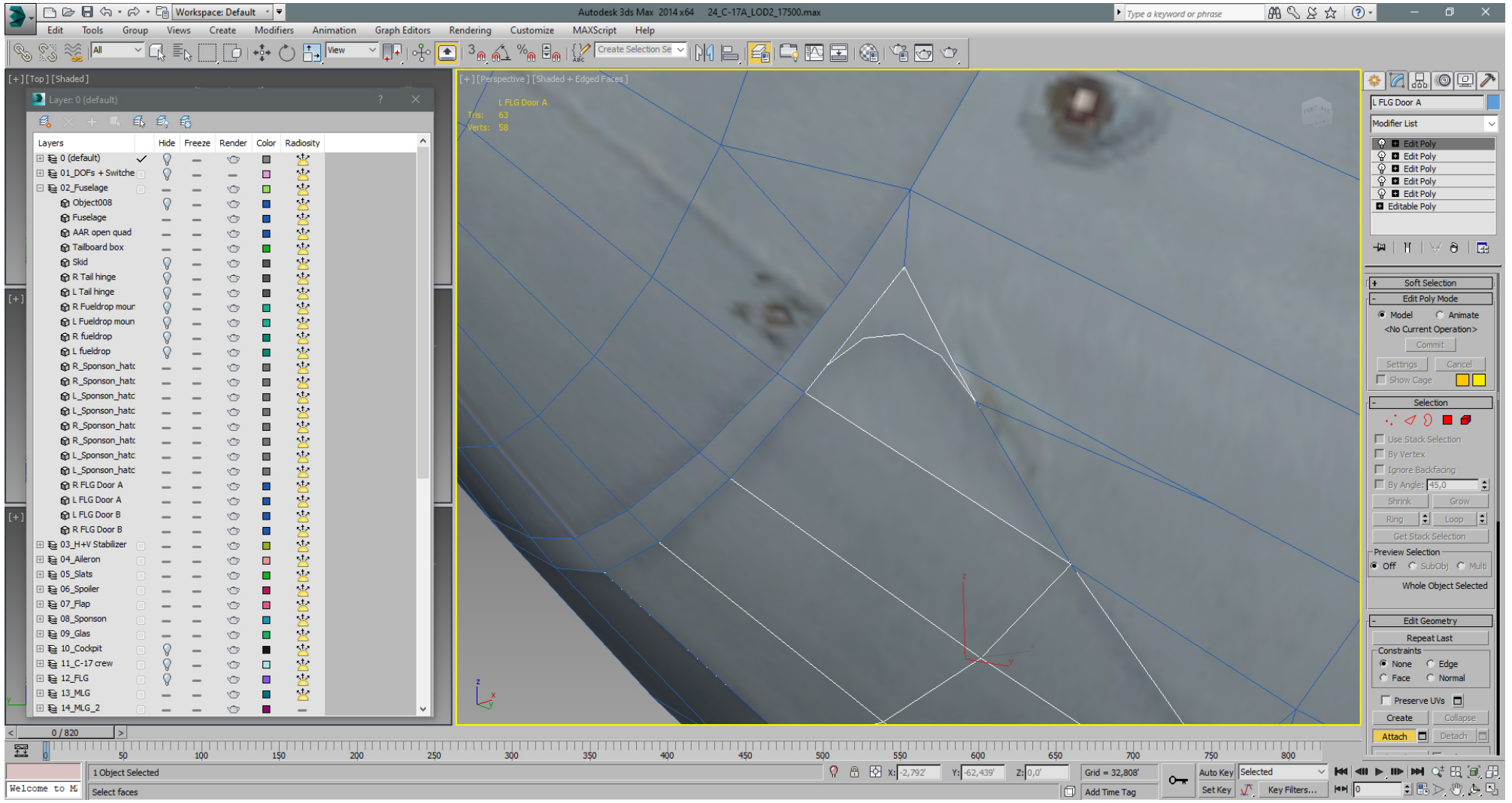
After the "Attach", those vertices need a "Weld.



So we can re- cut and clean up useless edges to get our corner there.
Side note that we did not correct the UVW mapping here, because it would need to increase the painted area on the texture. But it will be hardly noticed at the LOD 2 distance.

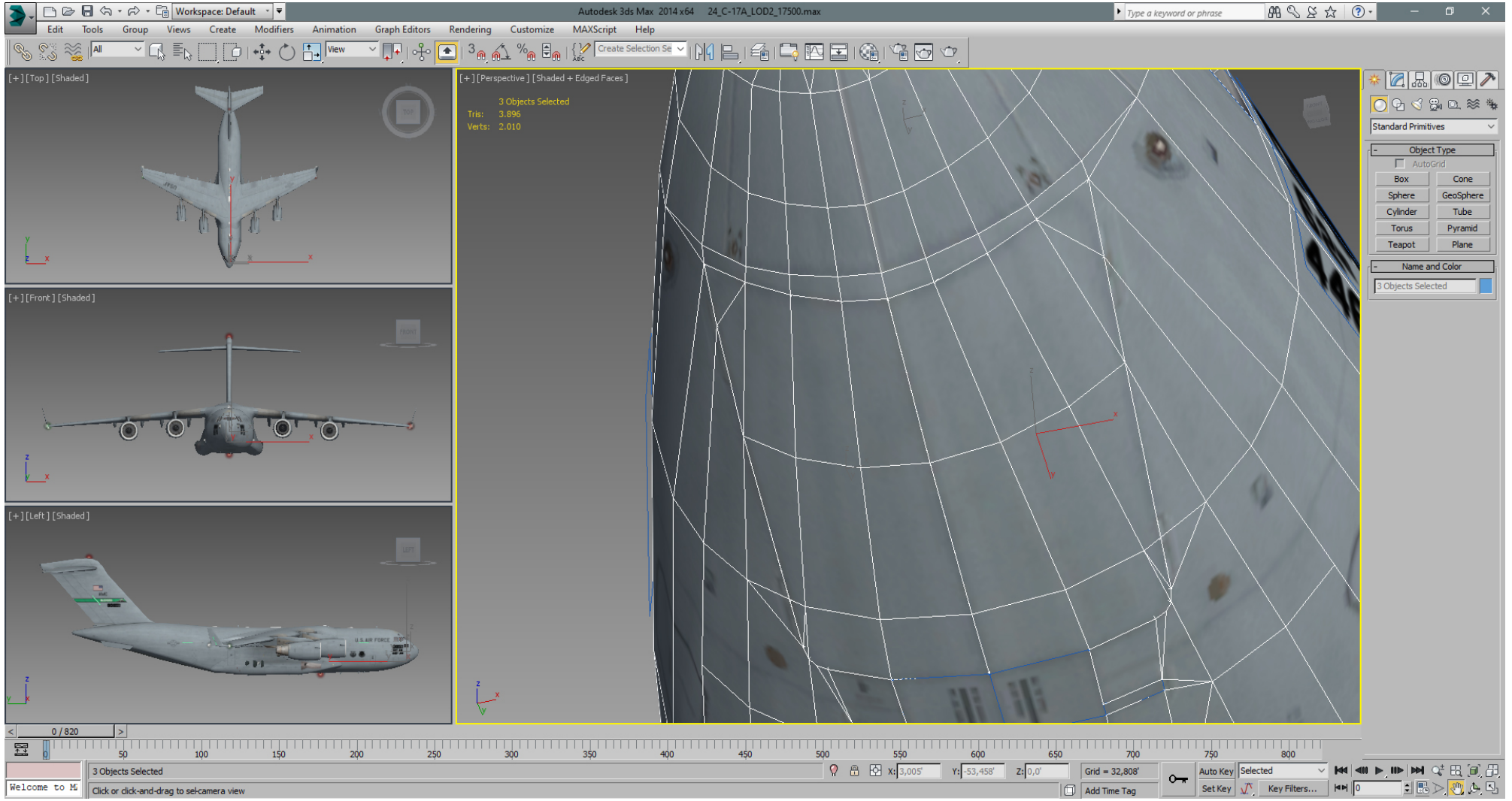


On the outside, we have still two detached objects.
So we can "Attach" both to the gear door.

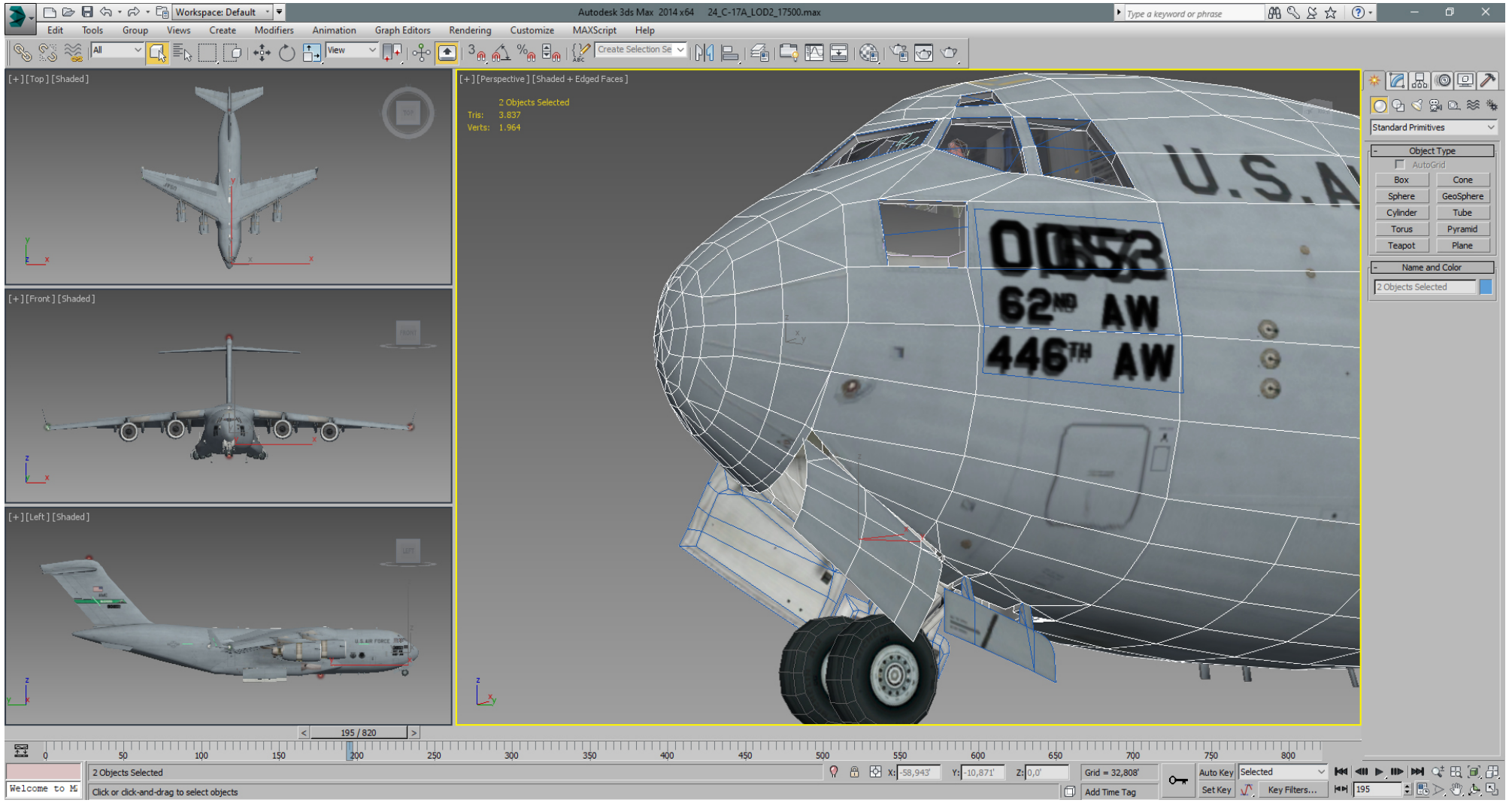


Again, we "Weld" vertices, then re- cut and clean up useless edges to get our corner there.
Checking smoothing groups is mandatory.

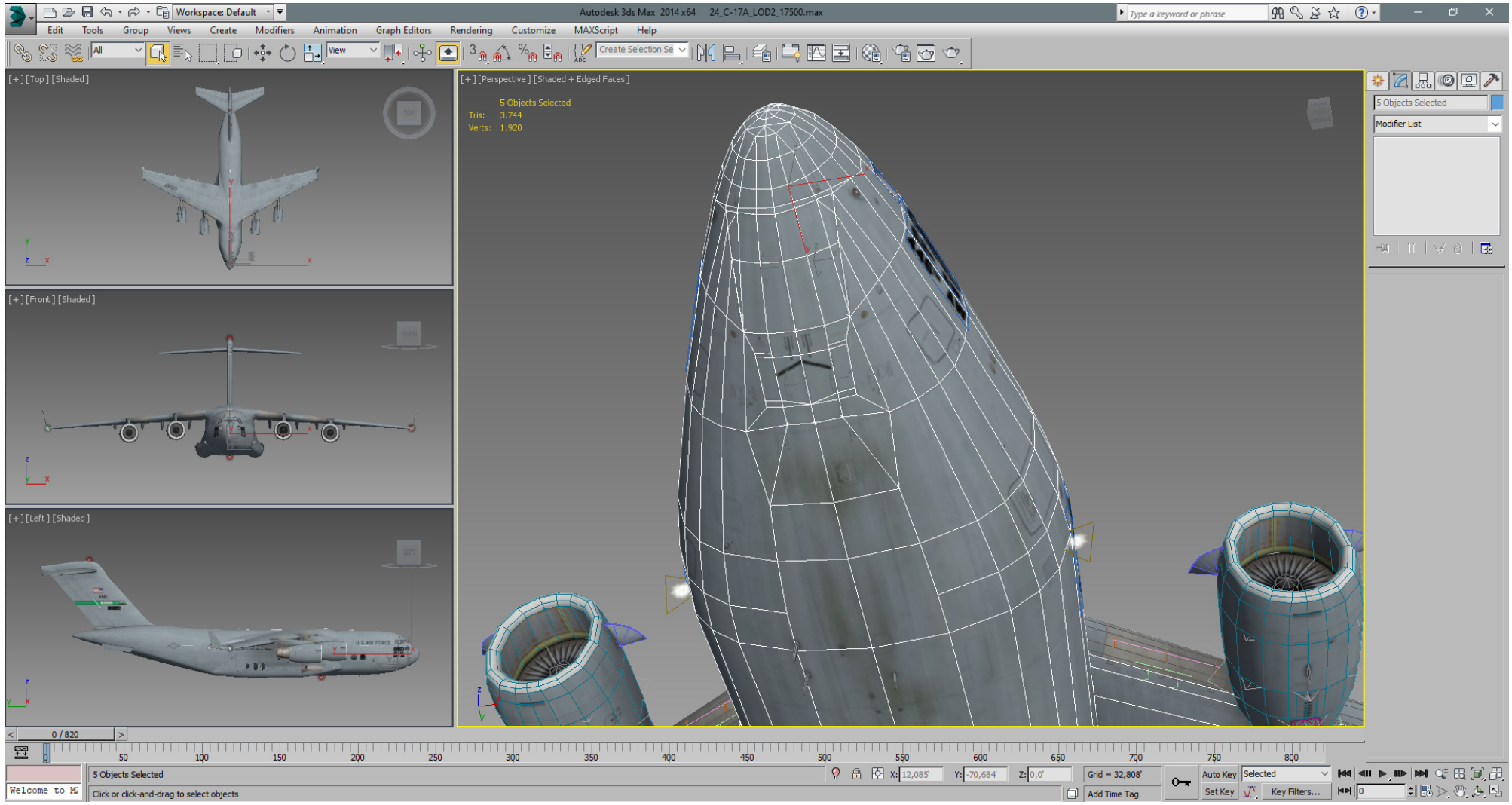
Here are those front corners on both gear doors done.
Note that on the outside, there is no need to correct UVW mapping because we did the UVW mapping for fuselage and gear doors together initially.



Beside the gear door corners, note that some work has also been done on the fuselage.



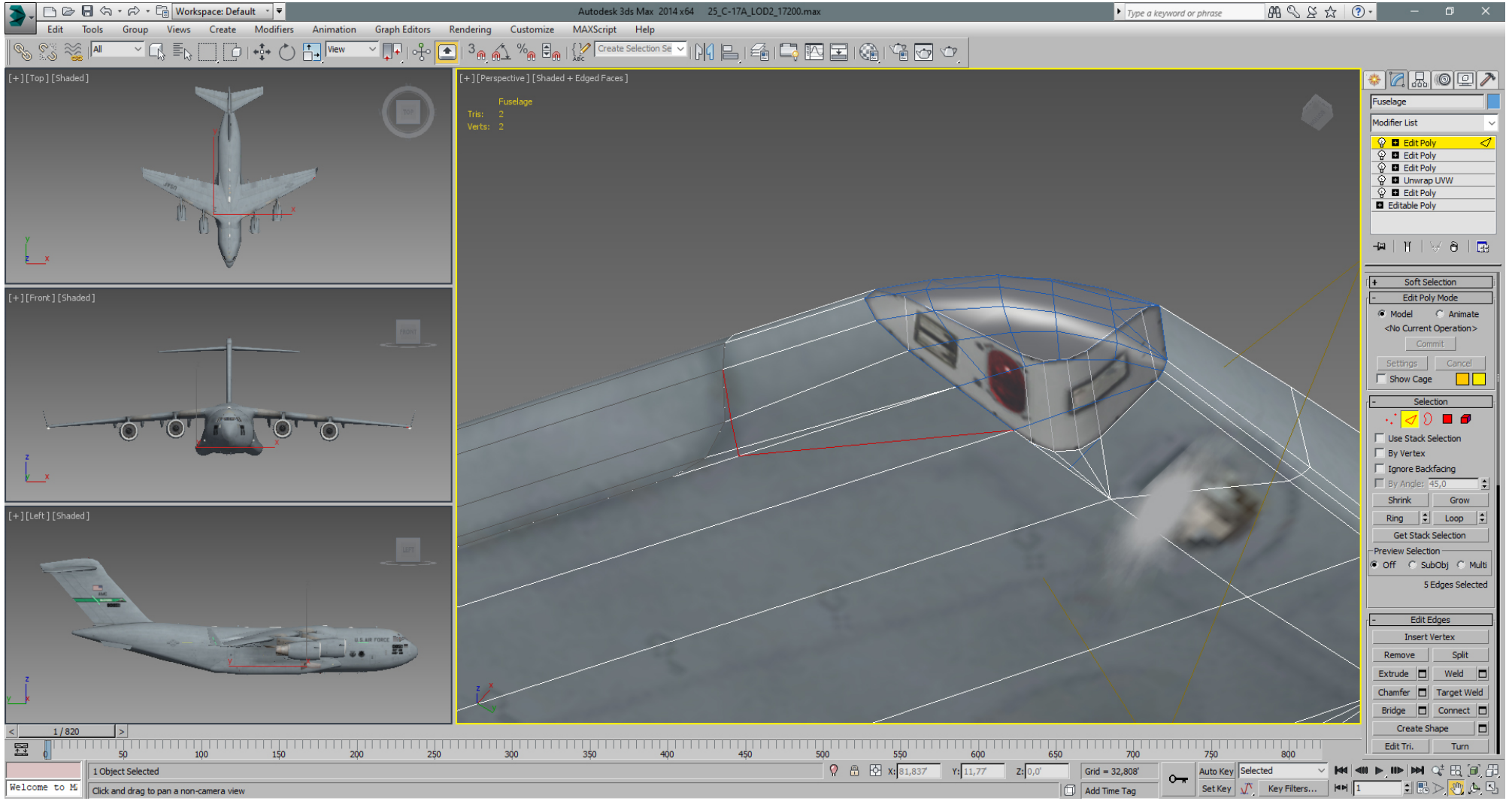
With all rounded gear door corners re- modeled to corners, and some more simplifying on the fuselage and nose.



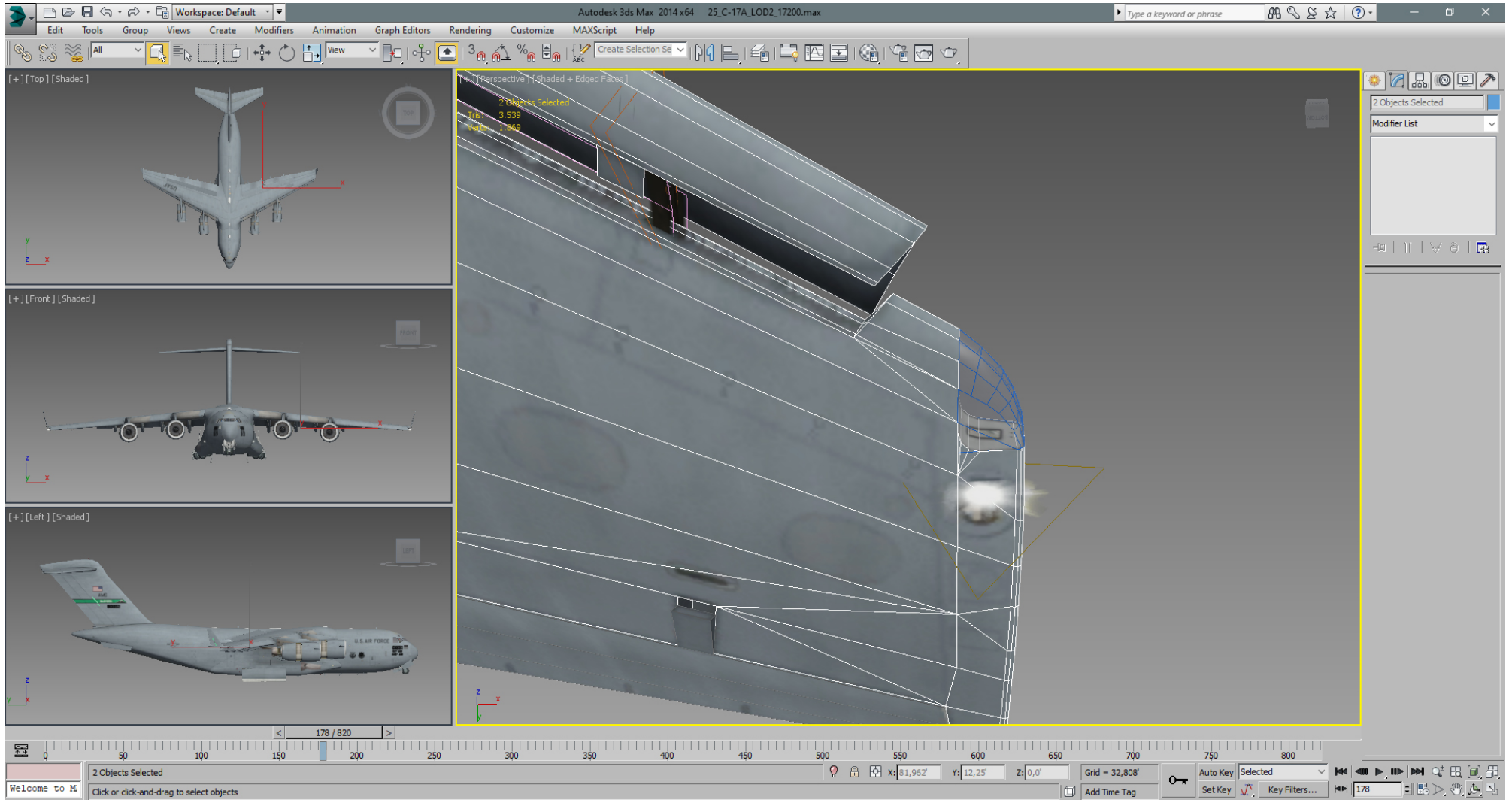
Tri- count for LOD 2 WIP is reduced to 17501.

Some more work on the nose, front fuselage and front of the sponsons has been done.
I think we'll notice some differences on pictures later.

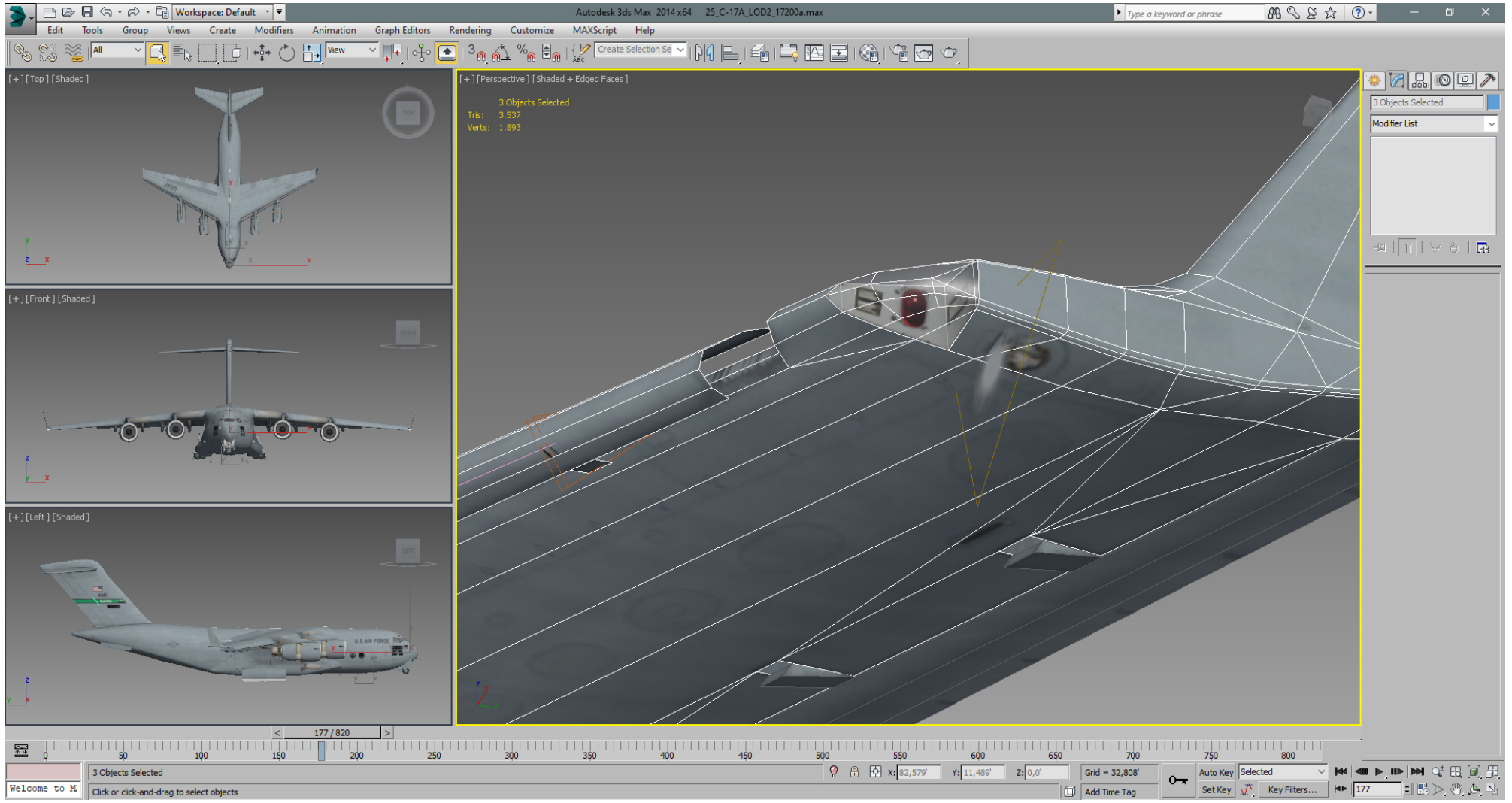
To continue, there are rounded corners at the bottom of the slats.
Let's get rid of them.



This saved us no tris as yet.



But now we can easier simplify the slats and the front of the wings, including the tris behind the slats.
Note that we have saved some tris on the wingtip lights geometry as well.



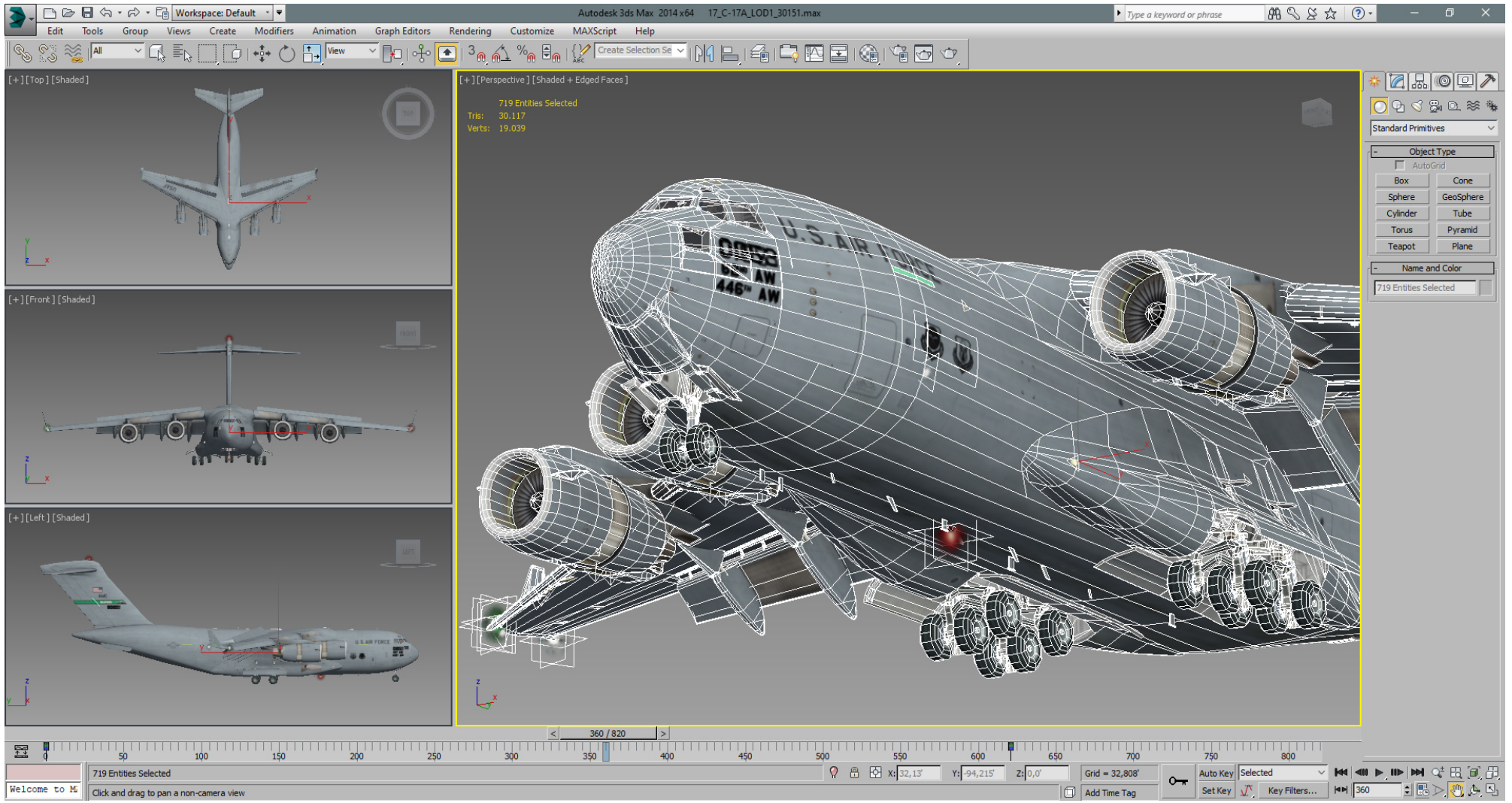
This reduce the tri- count further to 17018.

Next we have further simplified the wingtips and the wings, the ailerons, flaps and fairings,
the engines and pylons, the fan hubs, the wings shoulder, the back bottom fins, top white bulbs,
and more things where we could save some tris.

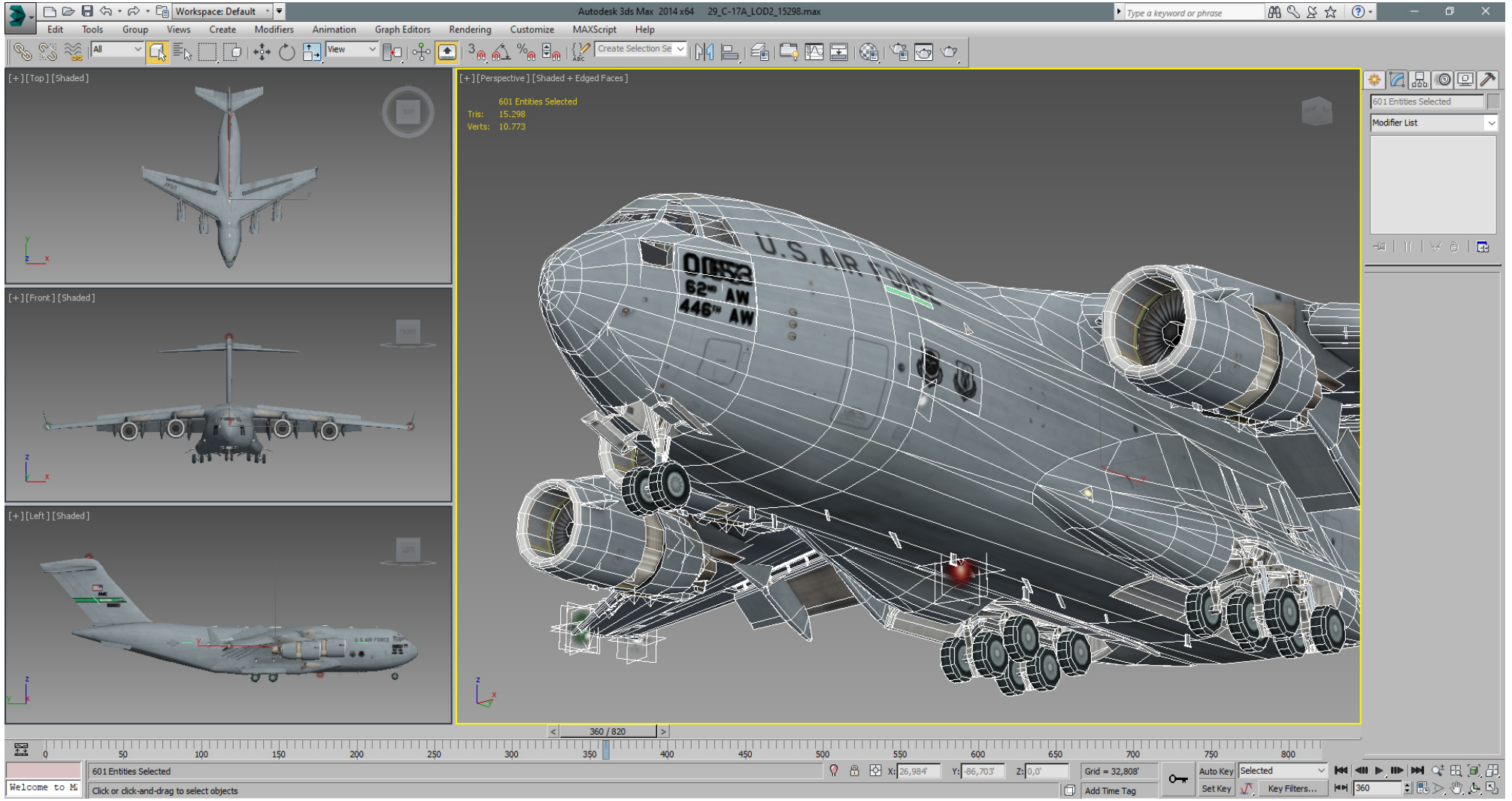
To many things to explain with explicit detailed pictures.

Anyway, our overall tri- count is reduced to 15298, which is approximately 50% of our LOD 1.
So this one shall be our LOD 2.

Before (LOD 1):



After (LOD 2):


Autodesk 3ds Max 2014 x64 29_C-17A_LOD2_15298.max
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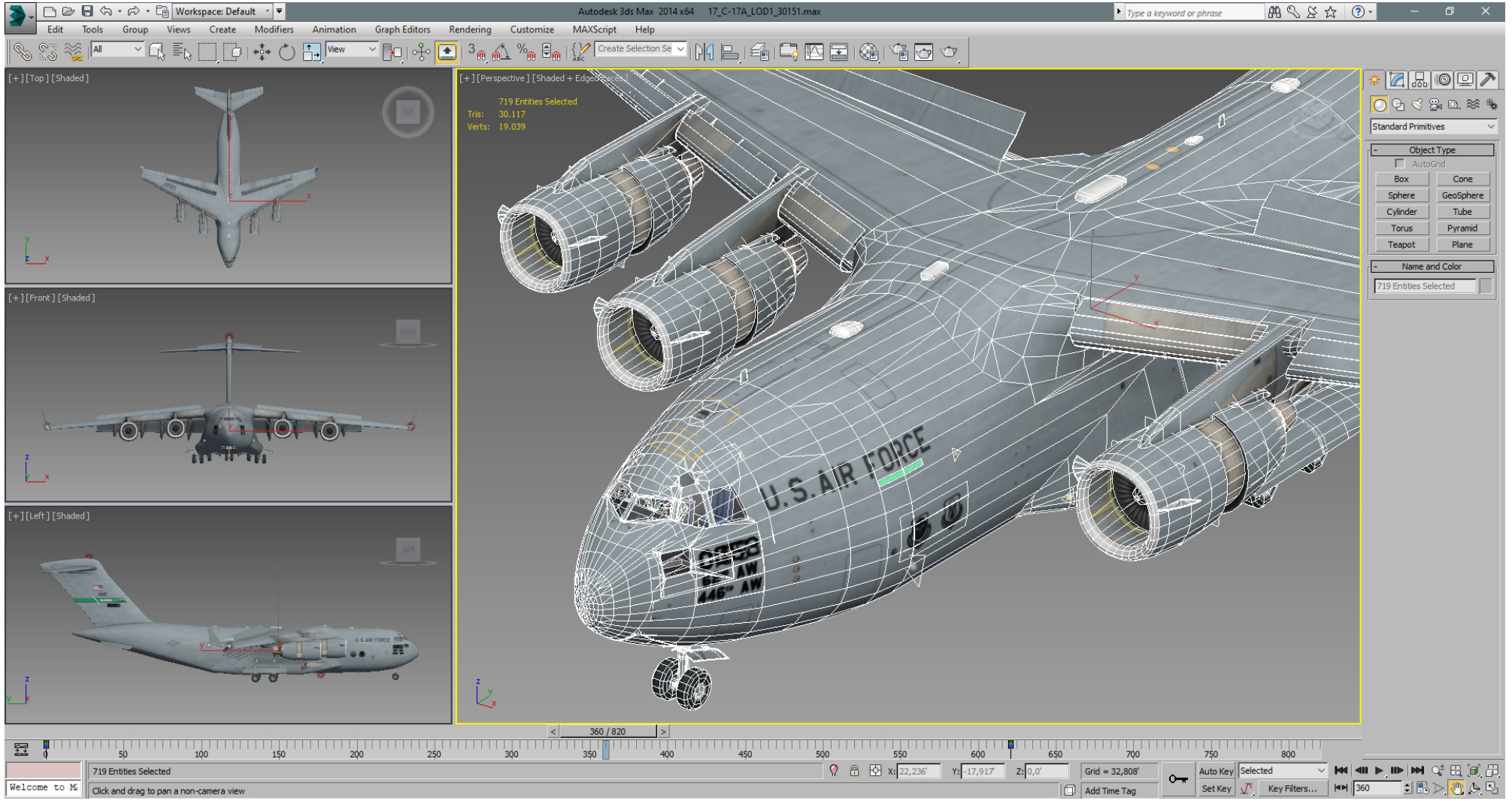
[+][Front][Shaded]
[+][Left][Shaded]
[+][Perspective][Shaded + Edged Faces]
601 Entities Selected
Tris: 15.298
Verts: 10.773
U.S.AIR FORCE
62ND AW
446TH AW
Modifier List
360 / 820
601 Entities Selected
Click or click-and-drag to select objects
Add Time Tag
Auto Key
Set Key
Key Filters...

Before (LOD 1):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[+][Left][Shaded]
[+][Perspective][Shaded + Edged Faces]
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Tris: 30.117
Verts: 19.039
U.S. AIR FORCE
Standard Primitives
Object Type
AutoGrid
Box
Cone
Sphere
GeoSphere
Cylinder
Tube
Torus
Pyramid
Teapot
Plane
Name and Color
719 Entities Selected
360 / 820
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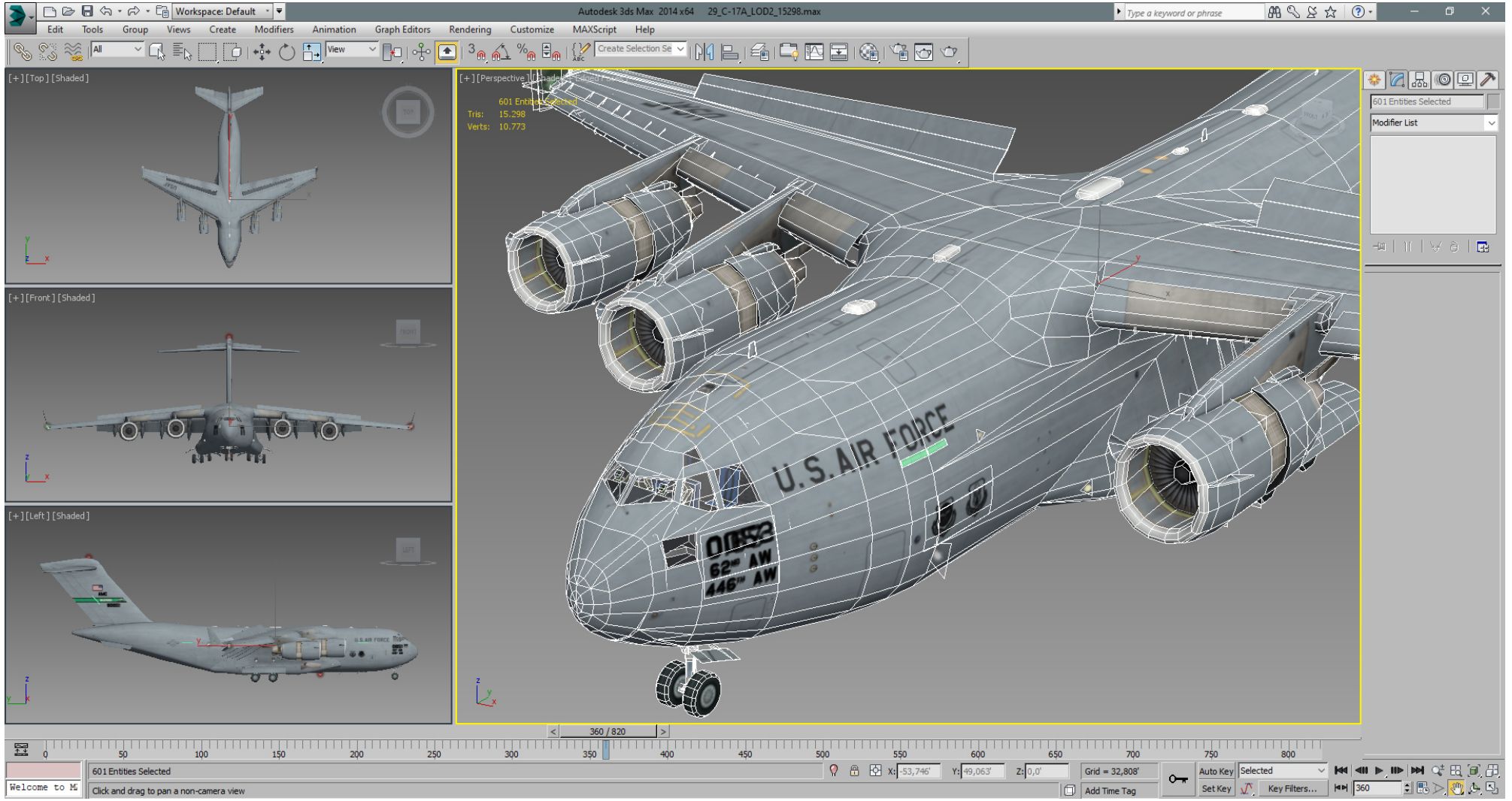
Add Time Tag
Auto Key
Selected
Set Key
Key Filters...

After (LOD 2):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[+][Front][Shaded]
[+][Left][Shaded]
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Tris: 15.298
Verts: 10.773
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Modifier List
360 / 820
601 Entities Selected
Click and drag to pan a non-camera view

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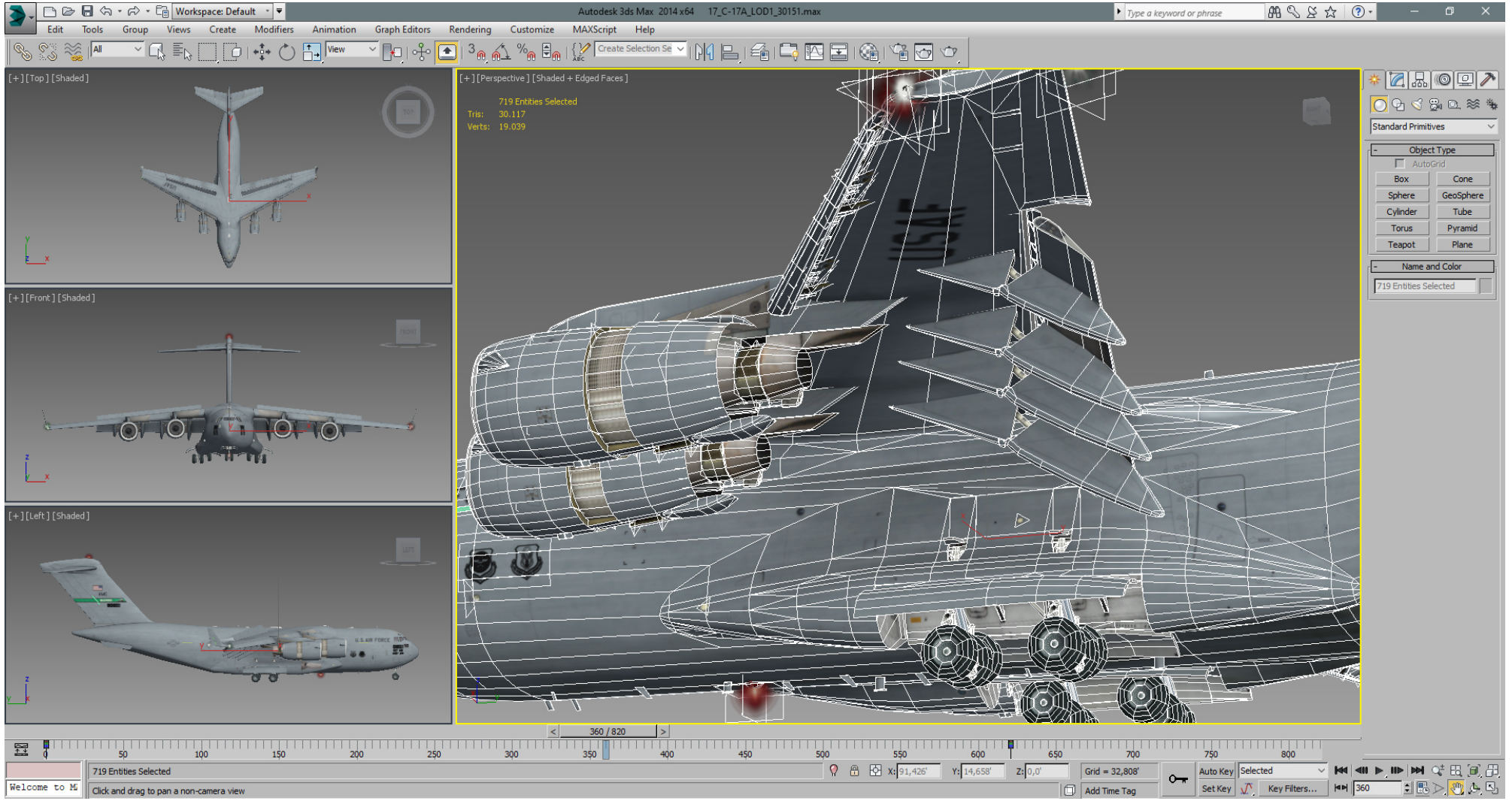
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Verts: 19.039
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Object Type
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Sphere
GeoSphere
Cylinder
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Pyramid
Teapot
Plane
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Add Time Tag
Auto Key
Set Key
Key Filters...

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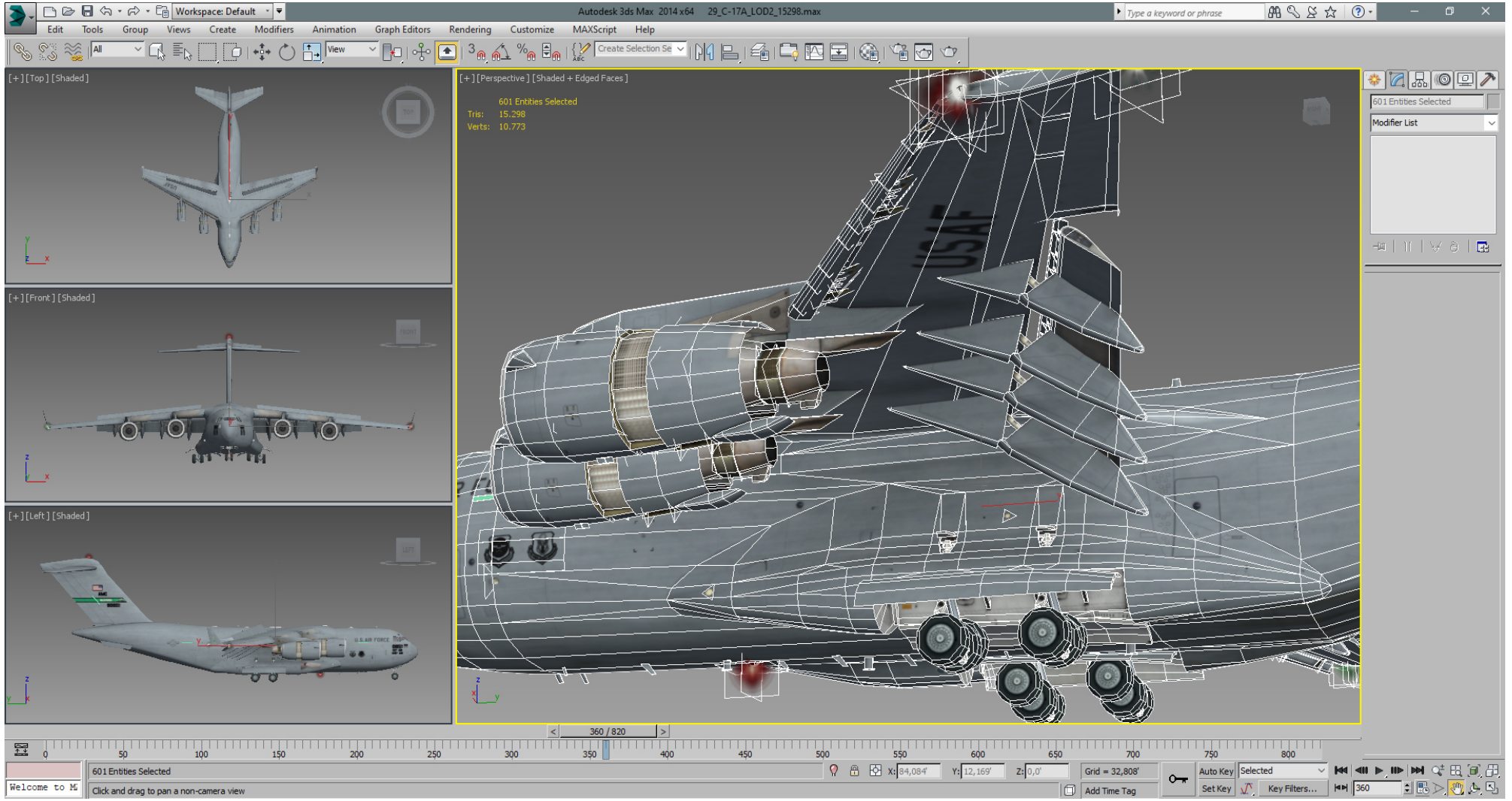
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[+][Left][Shaded]
[+][Perspective][Shaded + Edged Faces]
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Verts: 10.773
Modifier List
360 / 820
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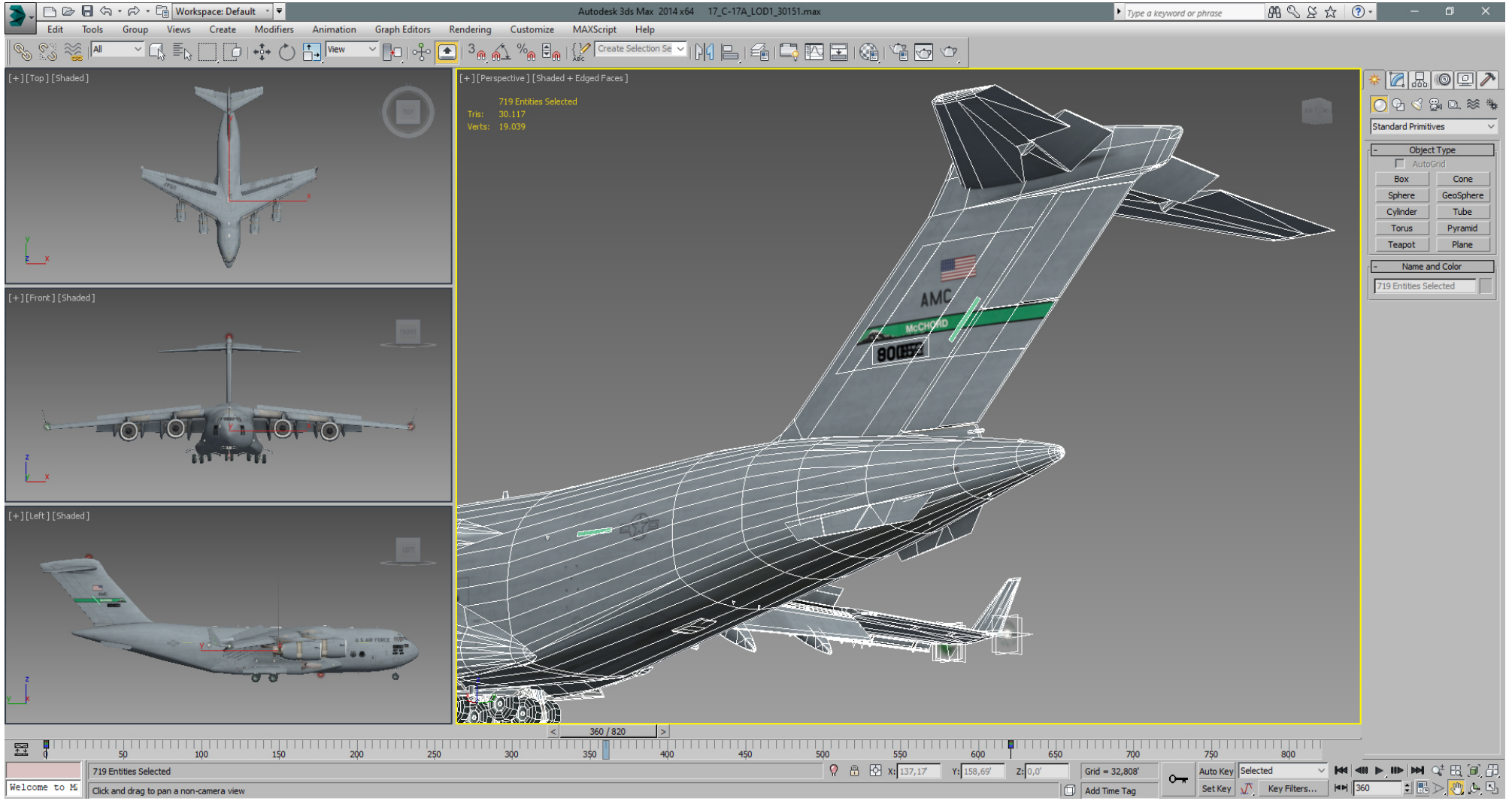
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[+][Perspective][Shaded + Edged Faces]
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Tris: 30.117
Verts: 19.039
AMC
McCHORD
Standard Primitives
Object Type
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Cone
Sphere
GeoSphere
Cylinder
Tube
Torus
Pyramid
Teapot
Plane
Name and Color
719 Entities Selected
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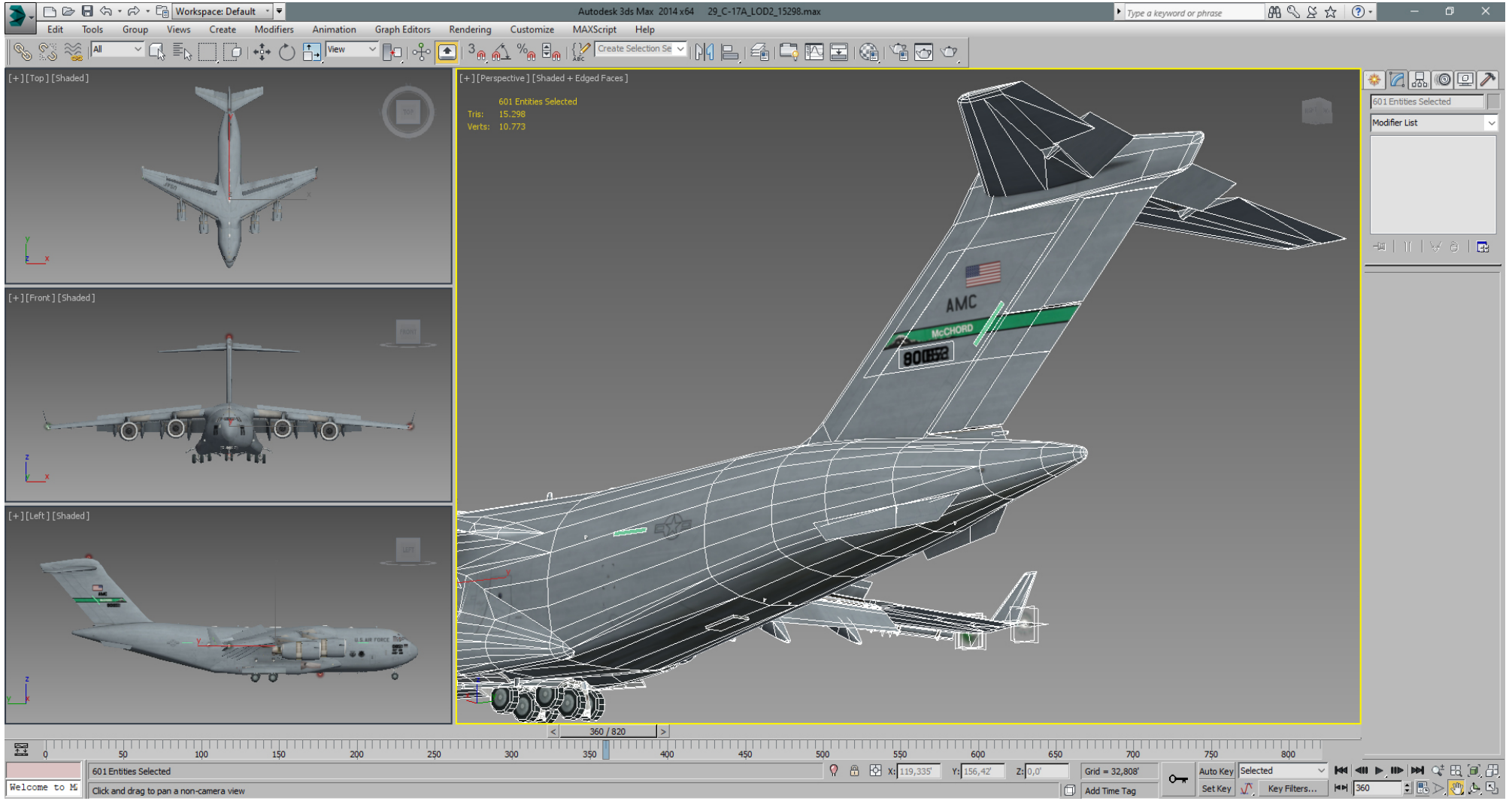
Grid = 32,808'
Add Time Tag
Auto Key
Selected
Set Key
Key Filters...

After (LOD 2):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[+][Left][Shaded]
[+][Perspective][Shaded + Edged Faces]
601 Entities Selected
Tris: 15.298
Verts: 10.773
AMC
McCHORD
601 Entities Selected
Click and drag to pan a non-camera view

Before (LOD 1):


Autodesk 3ds Max 2014 x64 17_C-17A_LOD1_30151.max
Workspace: Default
Edit Tools Group Views Create Modifiers Animation Graph Editors Rendering Customize MAXScript Help
[+][Top][Shaded]
[+][Front][Shaded]
[+][Left][Shaded]
[+][Perspective][Shaded]
Tris: 0
Verts: 0
U.S. AIR FORCE
Standard Primitives
Object Type
AutoGrid
Box Cone
Sphere GeoSphere
Cylinder Tube
Torus Pyramid
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360 / 820
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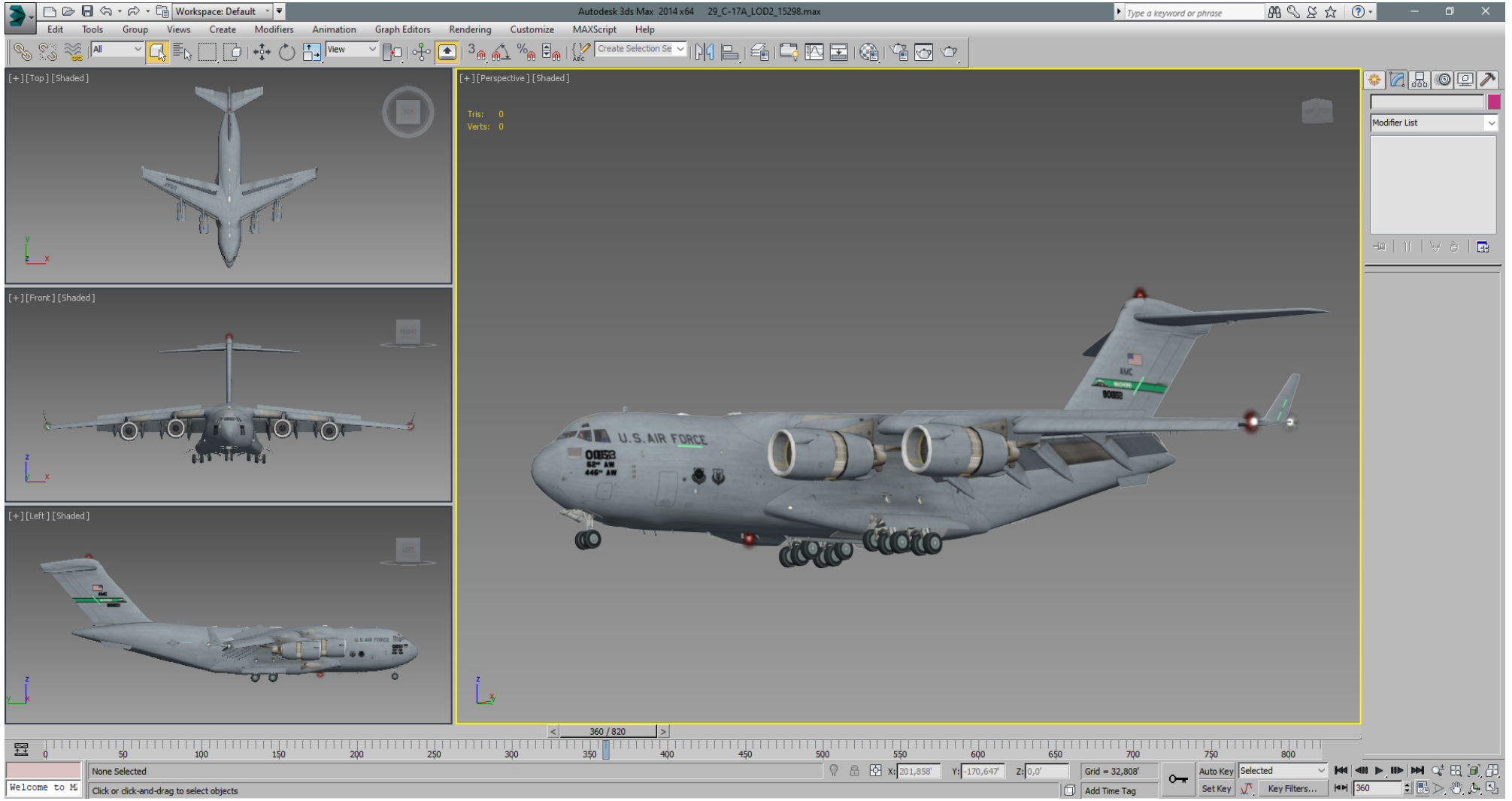
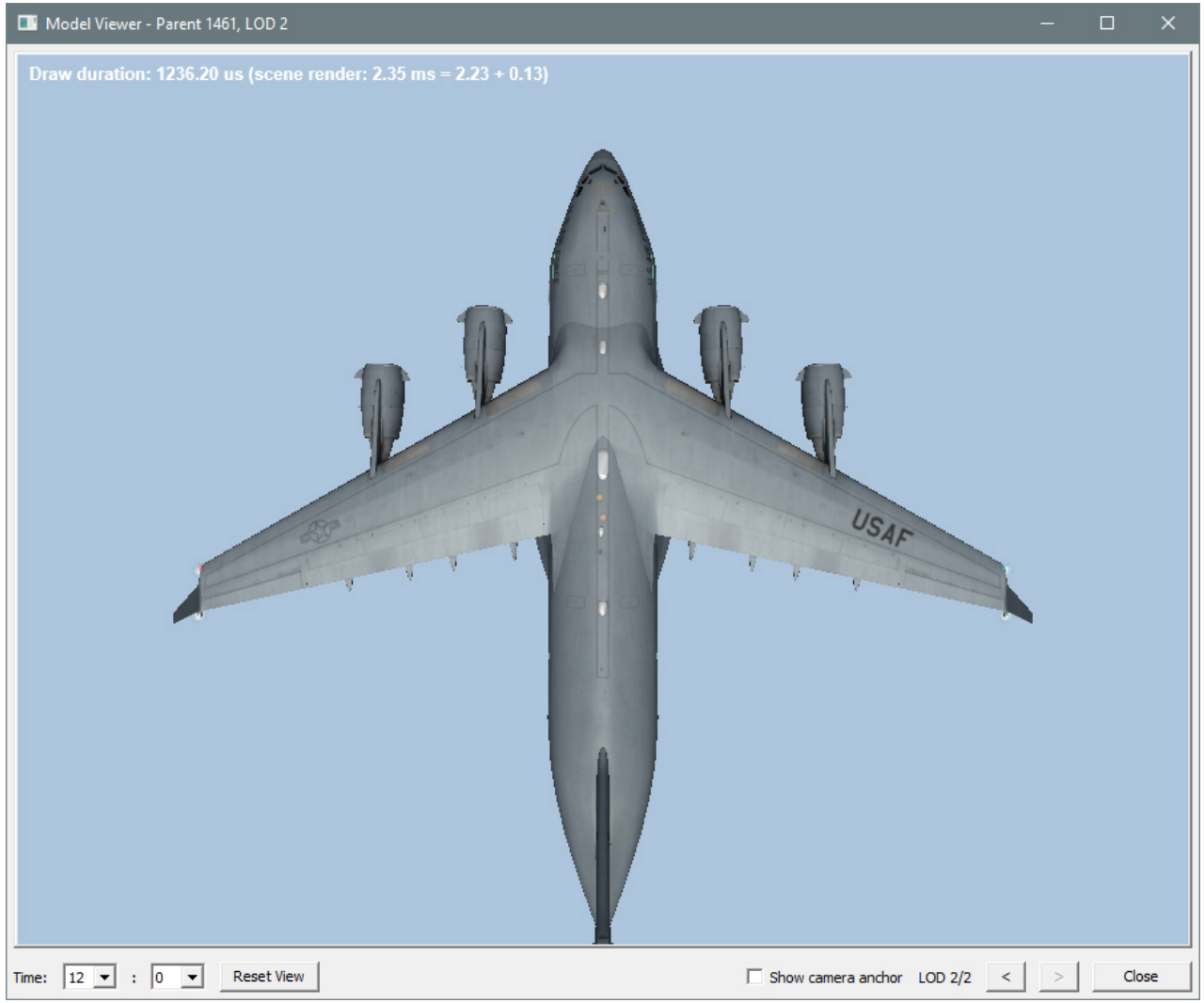
Add Time Tag
Auto Key
Set Key
Key Filters...

After (LOD 2):


Autodesk 3ds Max 2014 x64 29_C-17A_LOD2_15298.max
[+][Top][Shaded]
[+][Front][Shaded]
[+][Left][Shaded]
[+][Perspective][Shaded]
Tris: 0
Verts: 0
U.S. AIR FORCE
Modifier List
360 / 820
None Selected
Click or click-and-drag to select objects

After exporting this to .LOD and rebuilding the DB, we can fire up the BMS Editor- Model Viewer and switch to the LOD 2.



For doing lower LODs some often ask for automatic optimizing tools, like the "Optimize" or "ProOptimize" modifiers in 3dsMax, or even external tools. They surely all do their job as good as possible, but they can't reduce the tri- count dedicated with an IMHO acceptable result like we did manually for our LOD 2.

The manually job is boring and time intense, well generally intense. And the more work is done, the more it's harder to decide where to save some tris. When we think we can't save more tris, then it's sometimes even better to fight them the other day. We will find some!

With LOD 2 done, let's build the next lower LOD 3.

We add the line for LOD 3 in the PARENT.DAT.

Dimensions = 124.000000 -73.116997 87.394997 -12.500000 12.500000 -11.263000 9.737000
TextureSets = 1
Switches = 69
Dofs = 93
AddLOD = Model_0.LOD 150.000000
AddLOD = Model_1.LOD 300.000000
AddLOD = Model_2.LOD 600.000000
AddLOD = Model_3.LOD 1200.000000

With that last line added, LOD 3 is used from 600 ft up to 1200 ft distance.

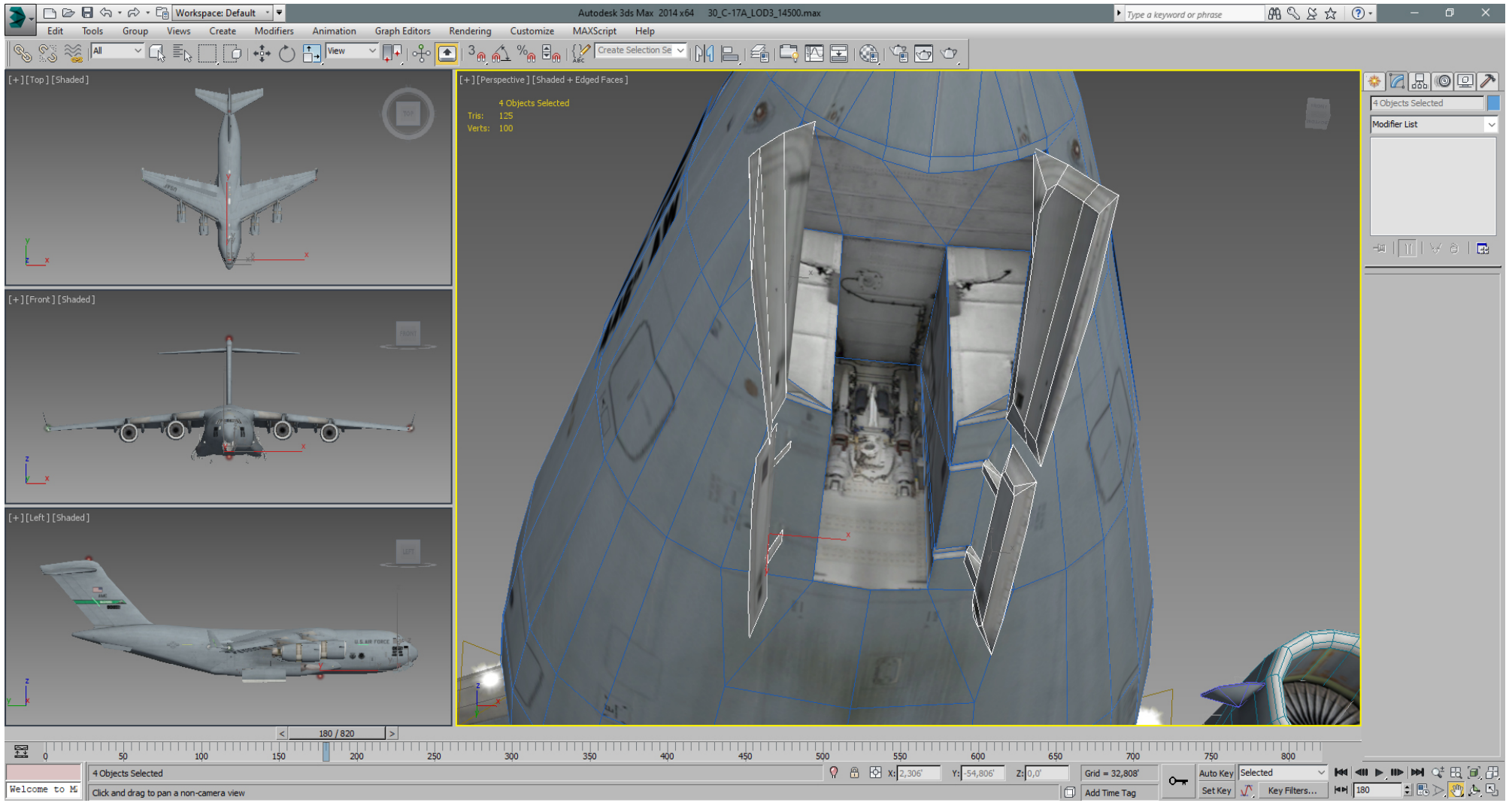
So we need a "Model_3.LOD" file in the \Data\TerrData\Objects\Parents\1461 folder
before we can rebuild the DB and fire up the sim or BMS editor/ Model viewer.

Now for LOD 3, we get first rid of antennas and sensors, pilots and seats, the slats hydraulic,
those little noses bottom of the slats, the struts between flaps and little secondary flaps,
the small tubes bottom of engines, the fan hubs, and the red lights pType 9 geometry fuselage bottom and stabilizer top.
(not the PType 20 lit effect geometry)

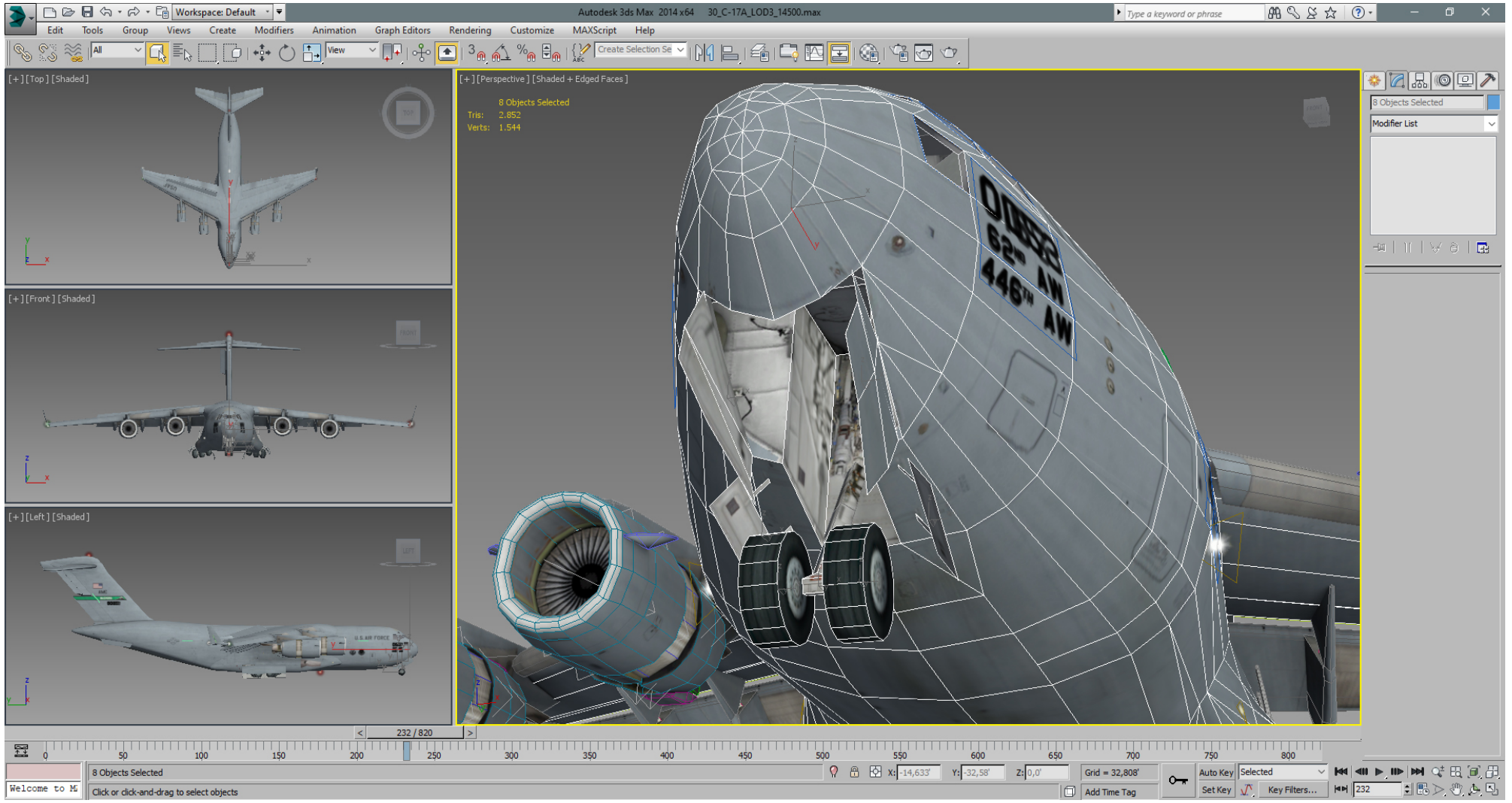
This saves us ~1800 tris and reduce the tri- count to 13501.

Then we can get rid of the thickness of the front gear doors.
We can see the difference in this picture.

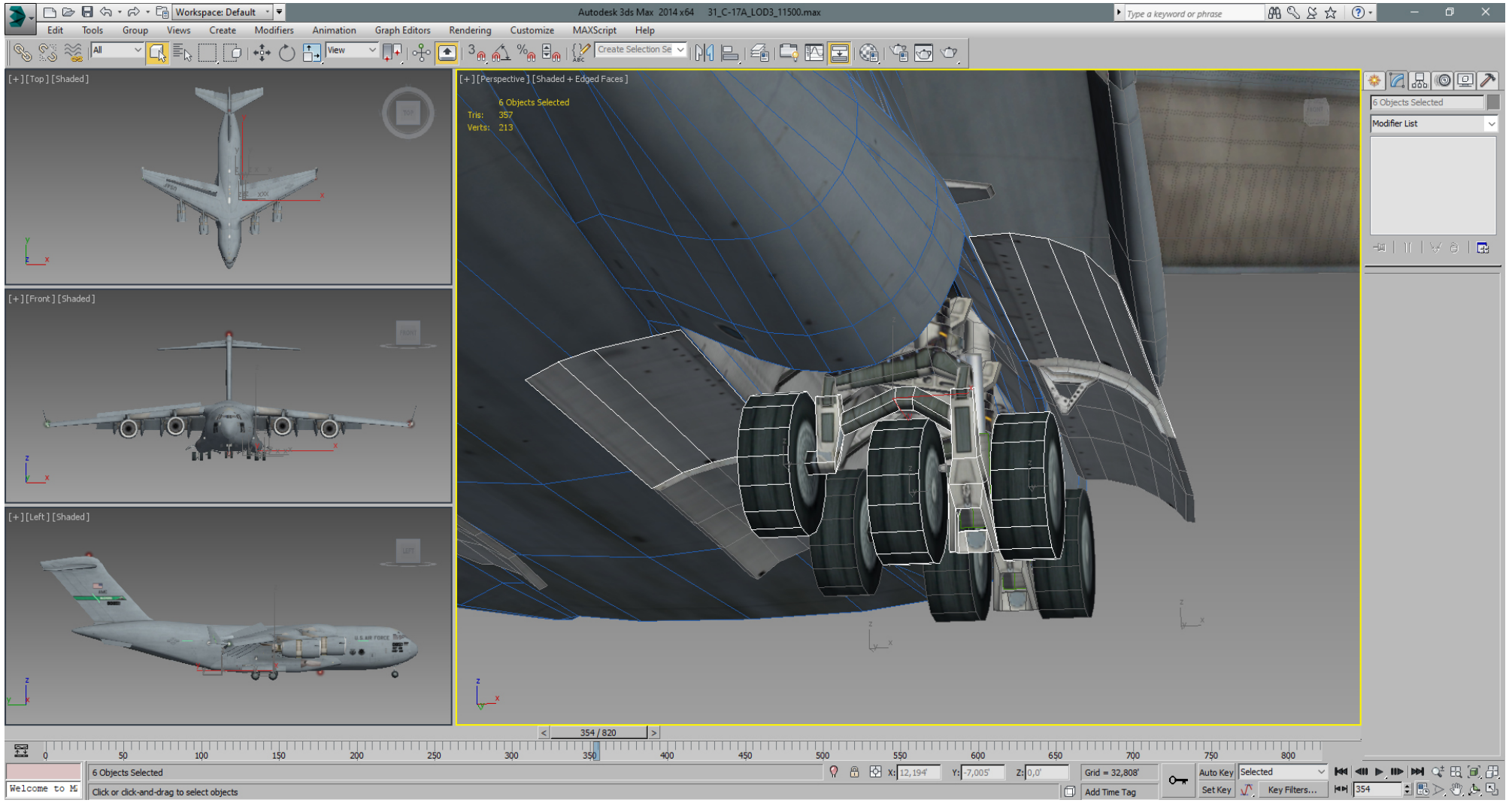
Note also we saved some tris on the fuselage there.



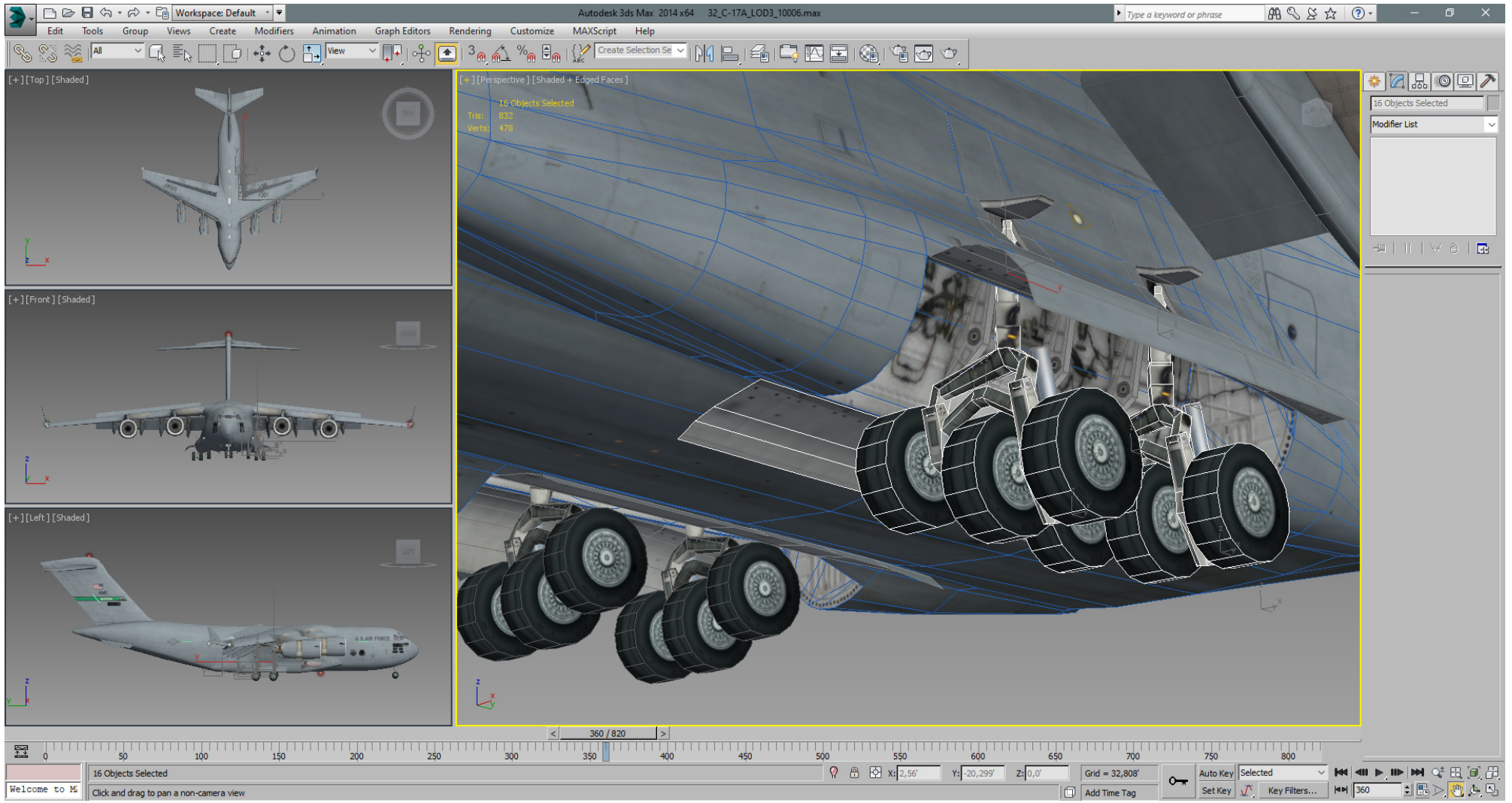
Some more work on the bottom nose, gear doors again.
The gear itself and the wheels became even more simplified.



We can do similar to the main landing gear, wheels and gear doors.
Here are the two front doors done and the gear is WIP.

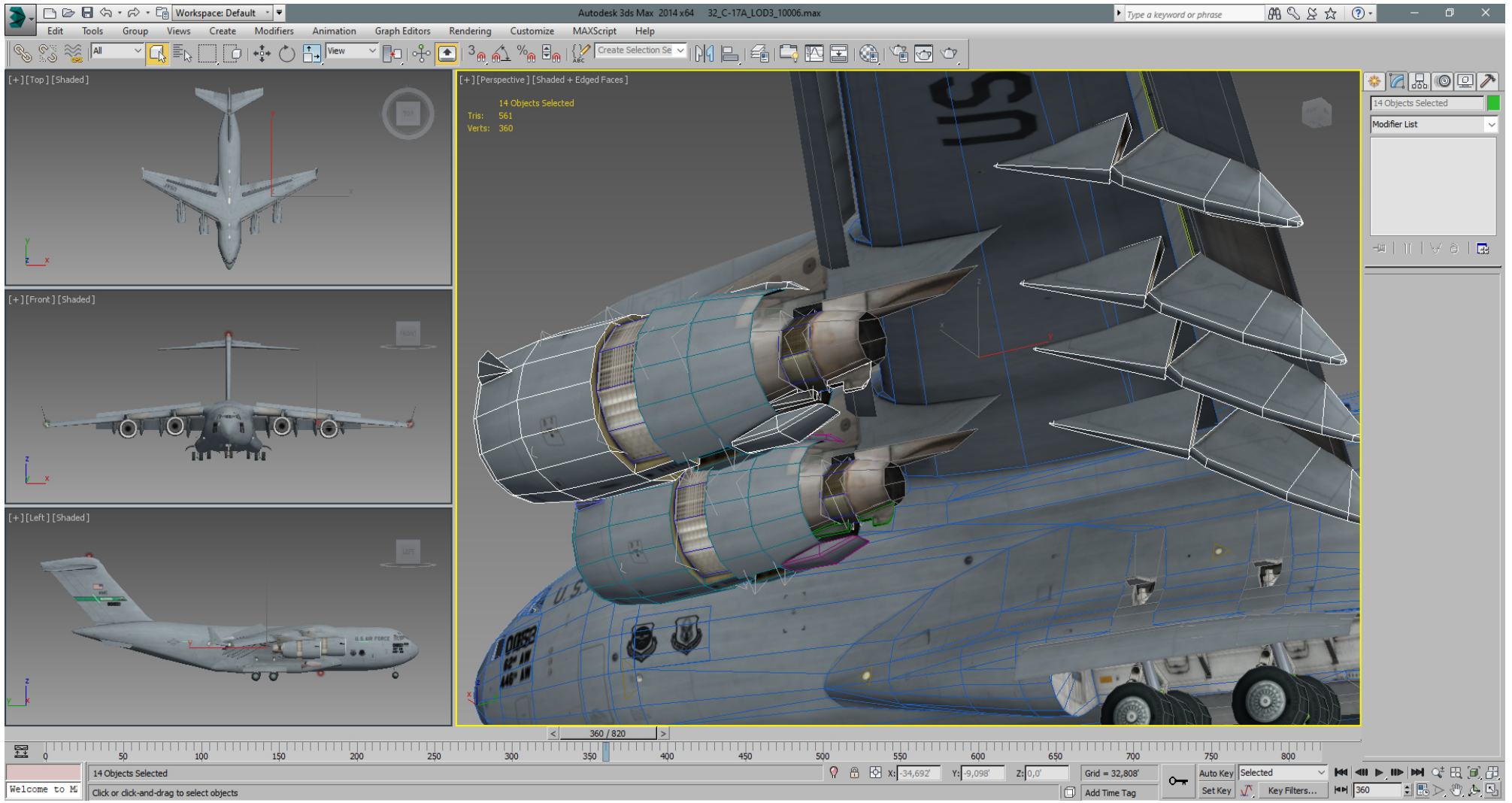


And here is the gear done, where we got also rid of lifting rods including their DOF helpers.
I fear we need to do more on wheels for LOD 3, which could be quickly done.
Let's keep that in mind and let's see where we'll end up with the tri- count first.

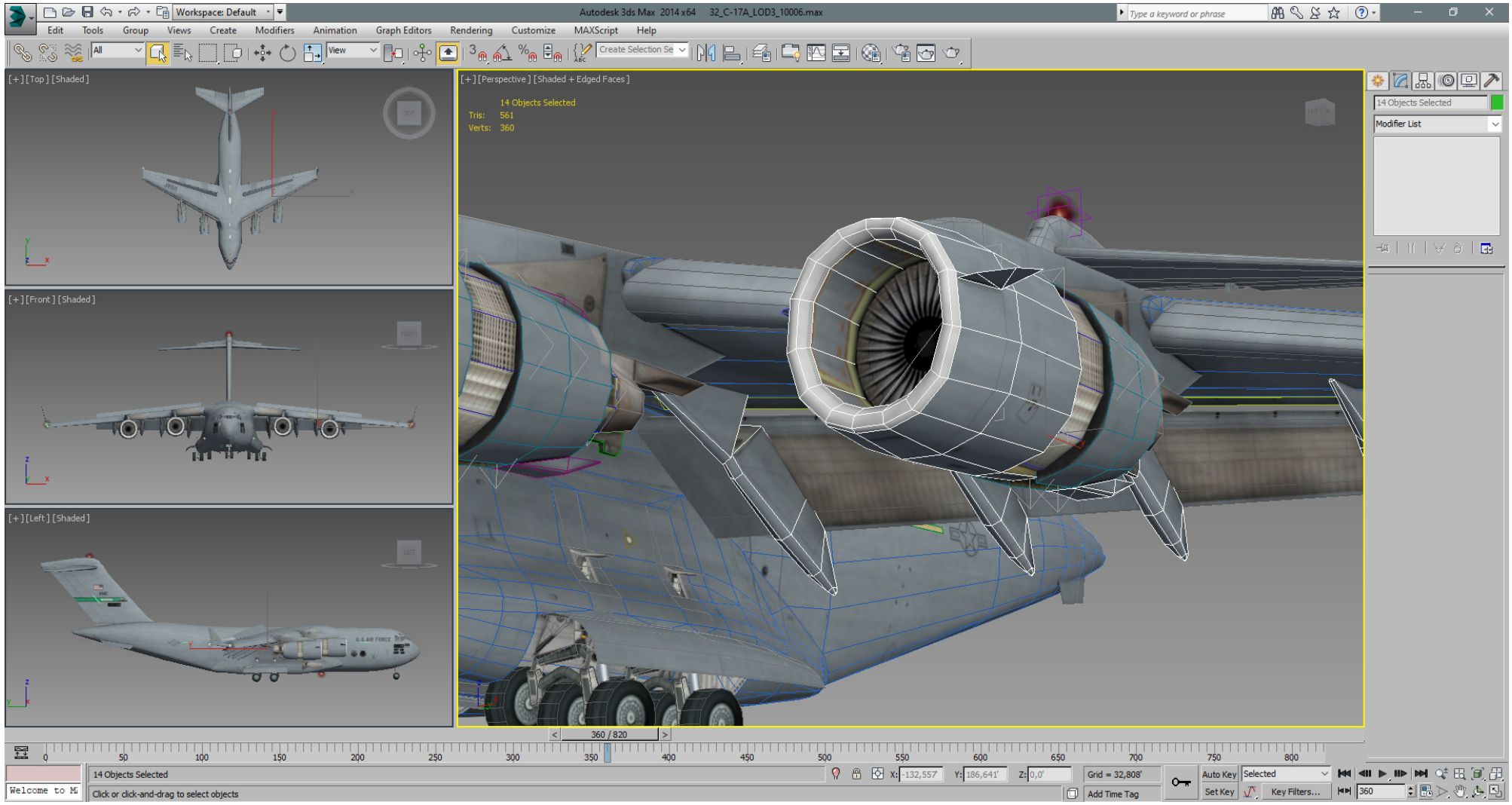


Next we got rid of the flap fairing hydraulic cylinders including their DOF helpers, and simplified the fairings once again.

Then we saved some more triangles on the engines.



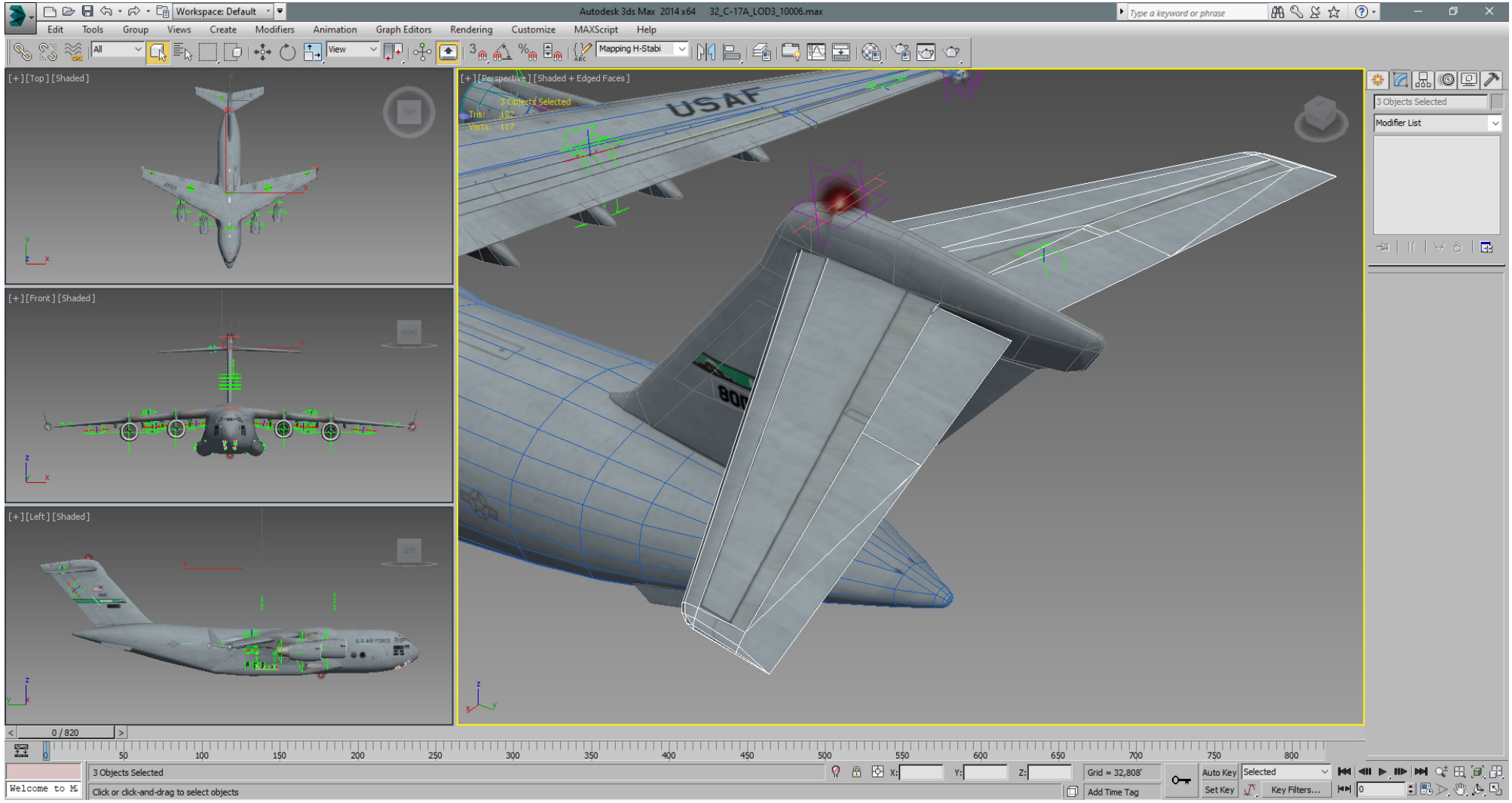
Even the tiny engine wings lost their thickness.



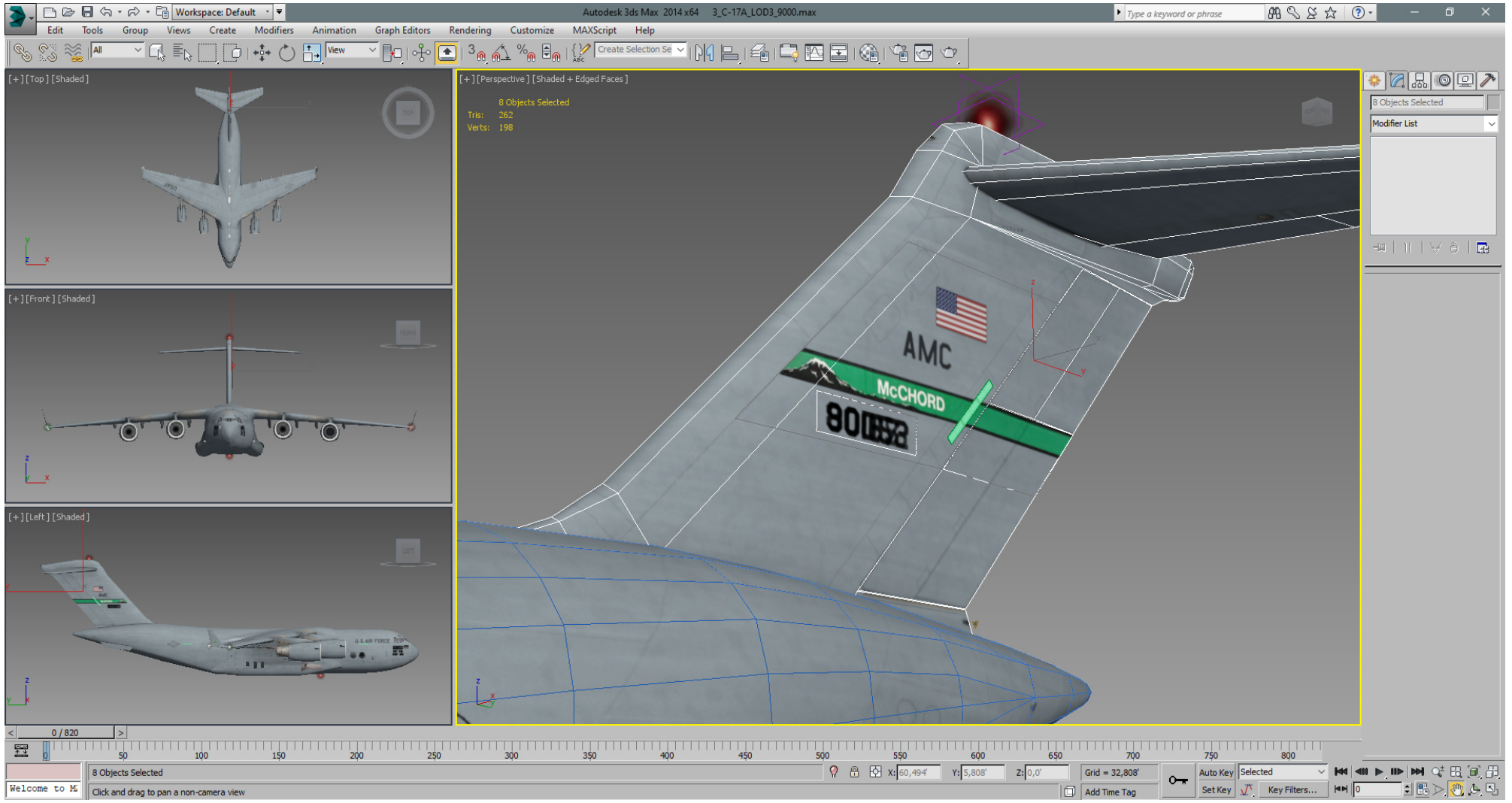
The overall tri- count is reduced to 10006 at this point.

We continue to suppress the little noses of the elevators and the DOF helpers.
Then we got rid of useless tris after.

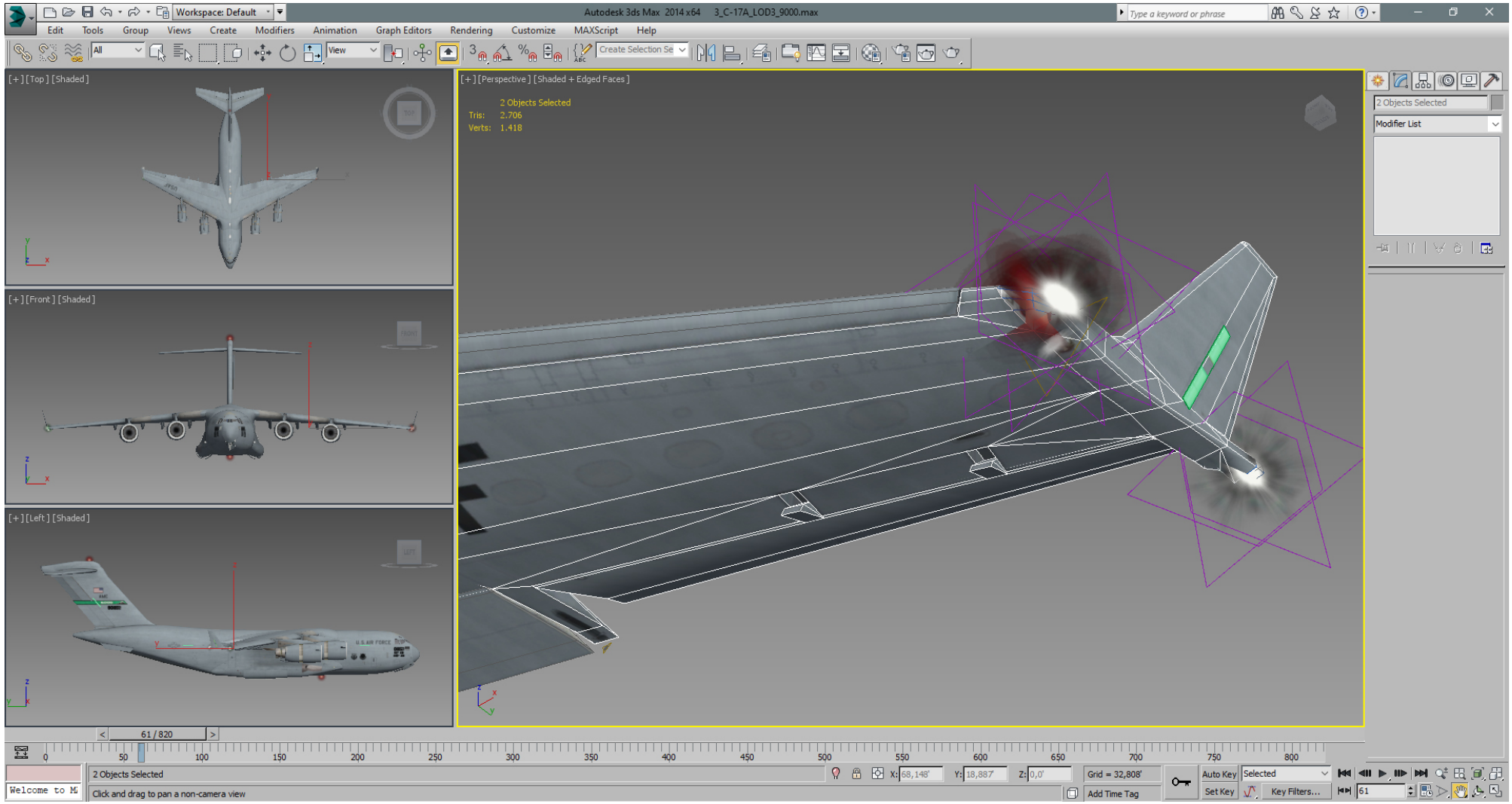
Here is the left side of the horizontally stabilizer and elevator done.



We can do similar with the rudders, change the corner geometry a little and save some tris on the vertically stabilizer.



Next we'll suppress those little noses of the ailerons.



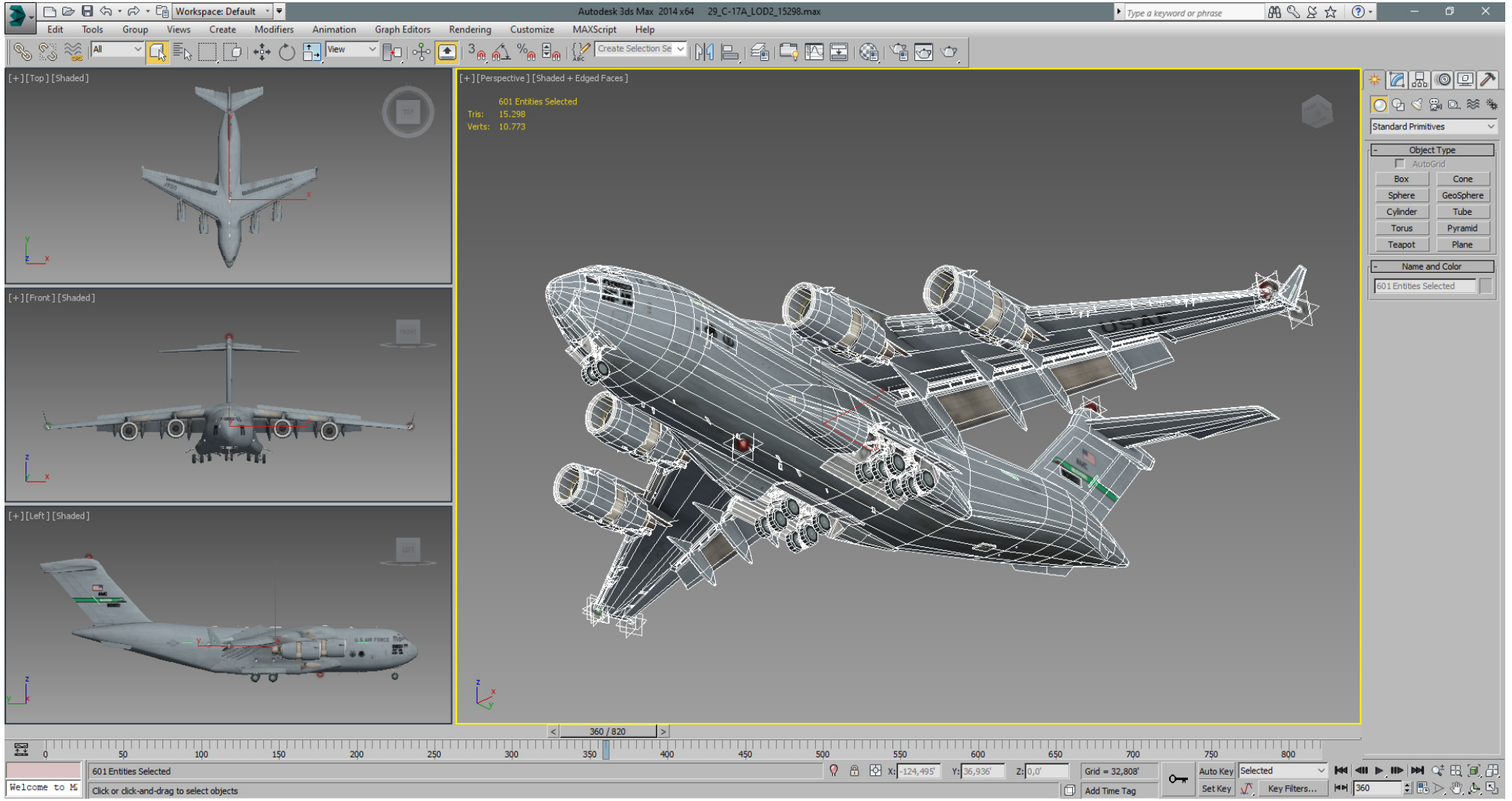
From there we further simplify the wings, winglets, ailerons, flaps. Then gears, wheels, fuselage, cockpit, etc.
In short, we tried to save some tris where ever we can.

This saved us further ~2500 tris, which were really hard- earned ones.

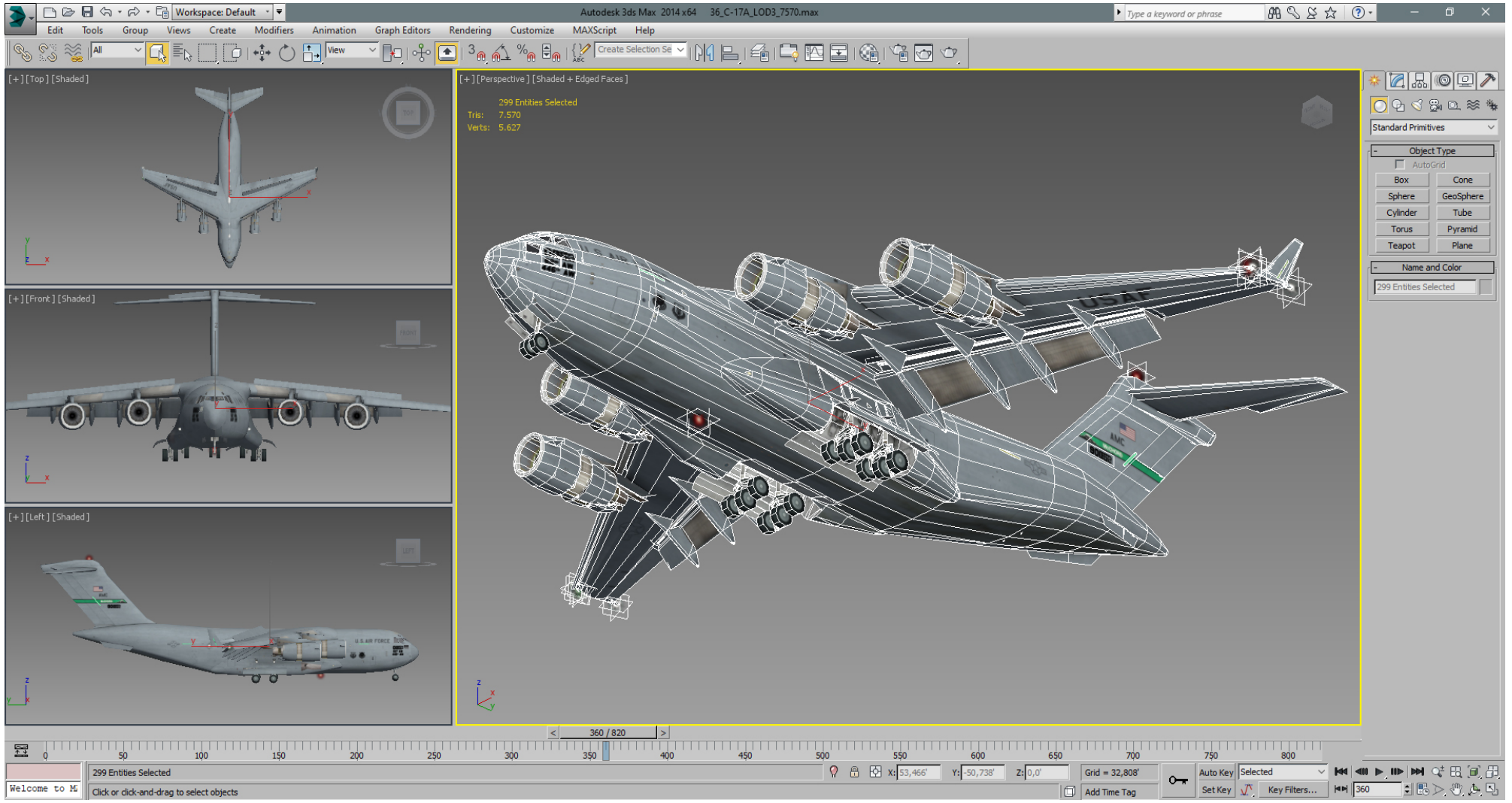
Our overall tri- count is reduced to 7570, which is approximately 50% of our LOD 2.
So LOD 3 is ready.

Ignore animated elevators in those pictures, they are just still 3dsMax animated,
but the DOF helpers for them are removed, so for LOD 3 there is no animation of them insim.

Before (LOD 2):



After (LOD 3):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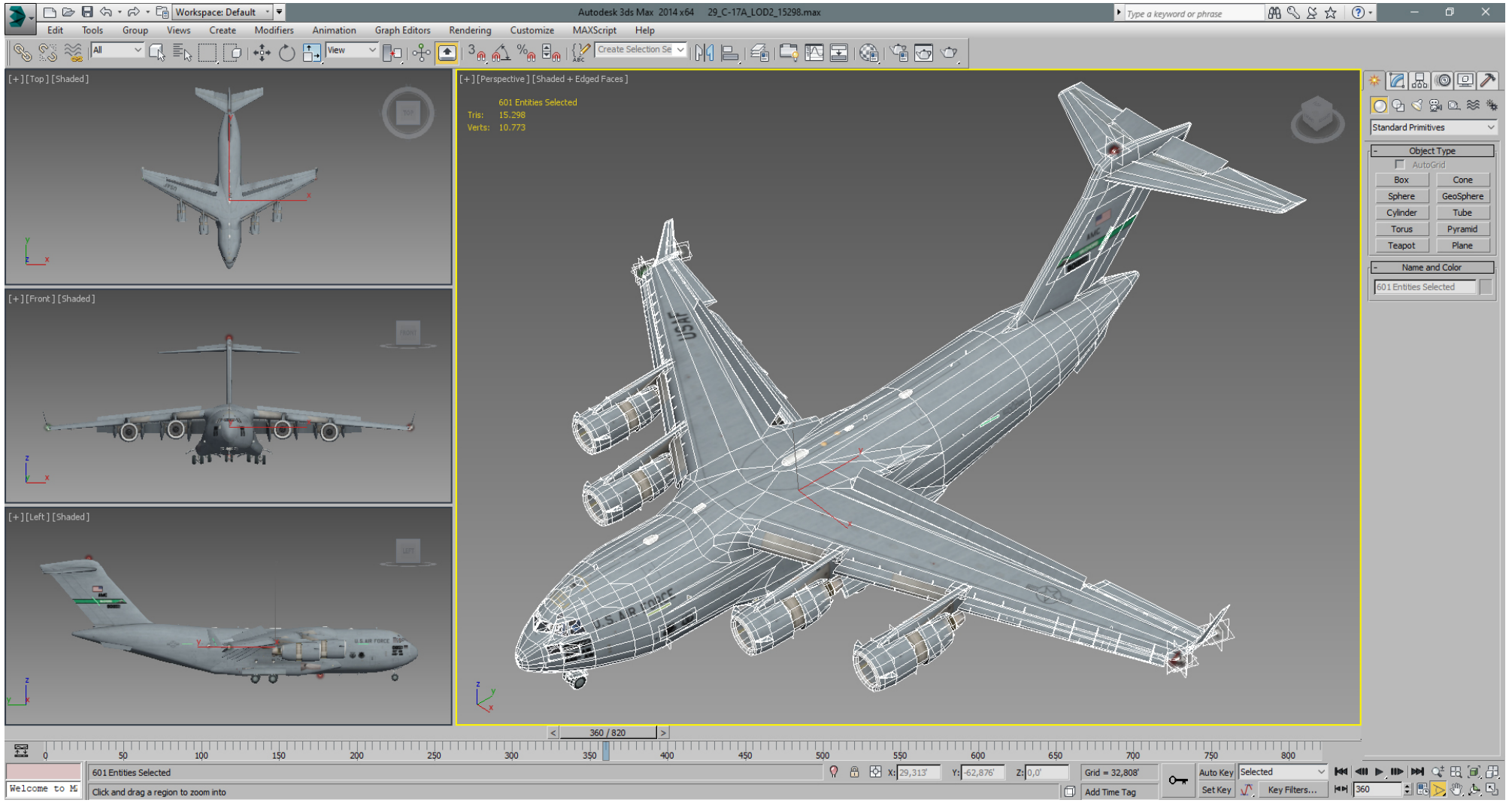
[+][Front][Shaded]
[+][Left][Shaded]
[+][Perspective][Shaded + Edged Faces]
299 Entities Selected
Tris: 7.570
Verts: 5.627
Standard Primitives
Object Type
Box
Cone
Sphere
GeoSphere
Cylinder
Tube
Torus
Pyramid
Teapot
Plane
Name and Color
299 Entities Selected
360 / 820
Click or click-and-drag to select objects
Add Time Tag
Auto Key
Set Key
Key Filters...

Before (LOD 2):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Object Type
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Cone
Sphere
GeoSphere
Cylinder
Tube
Torus
Pyramid
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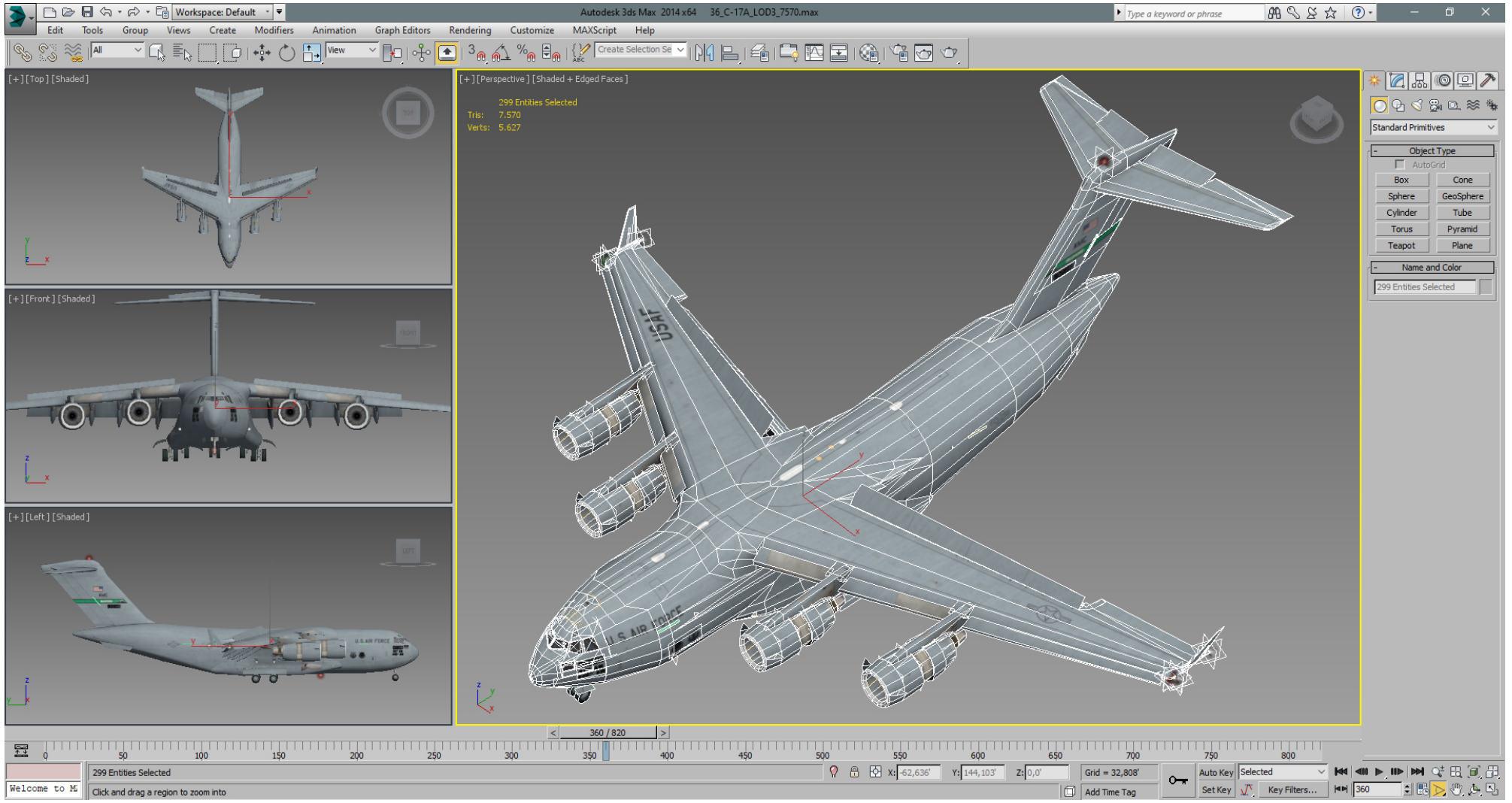
Add Time Tag
Auto Key
Set Key
Key Filters...

After (LOD 3):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Verts: 5.627
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Object Type
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Torus
Pyramid
Teapot
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Add Time Tag
Auto Key
Set Key
Key Filters...

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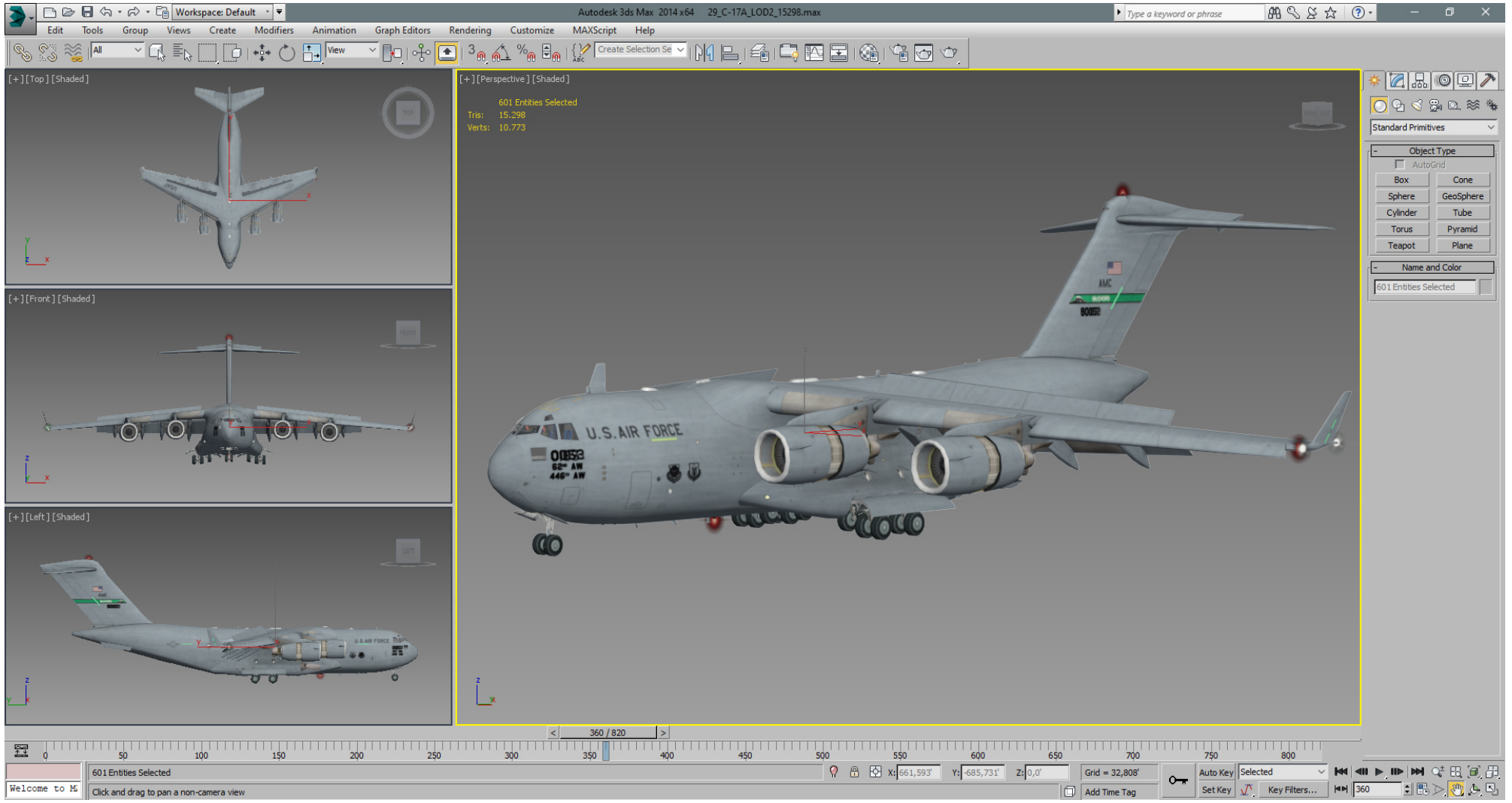
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Verts: 10.773
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Standard Primitives
Object Type
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GeoSphere
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Pyramid
Teapot
Plane
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360 / 820
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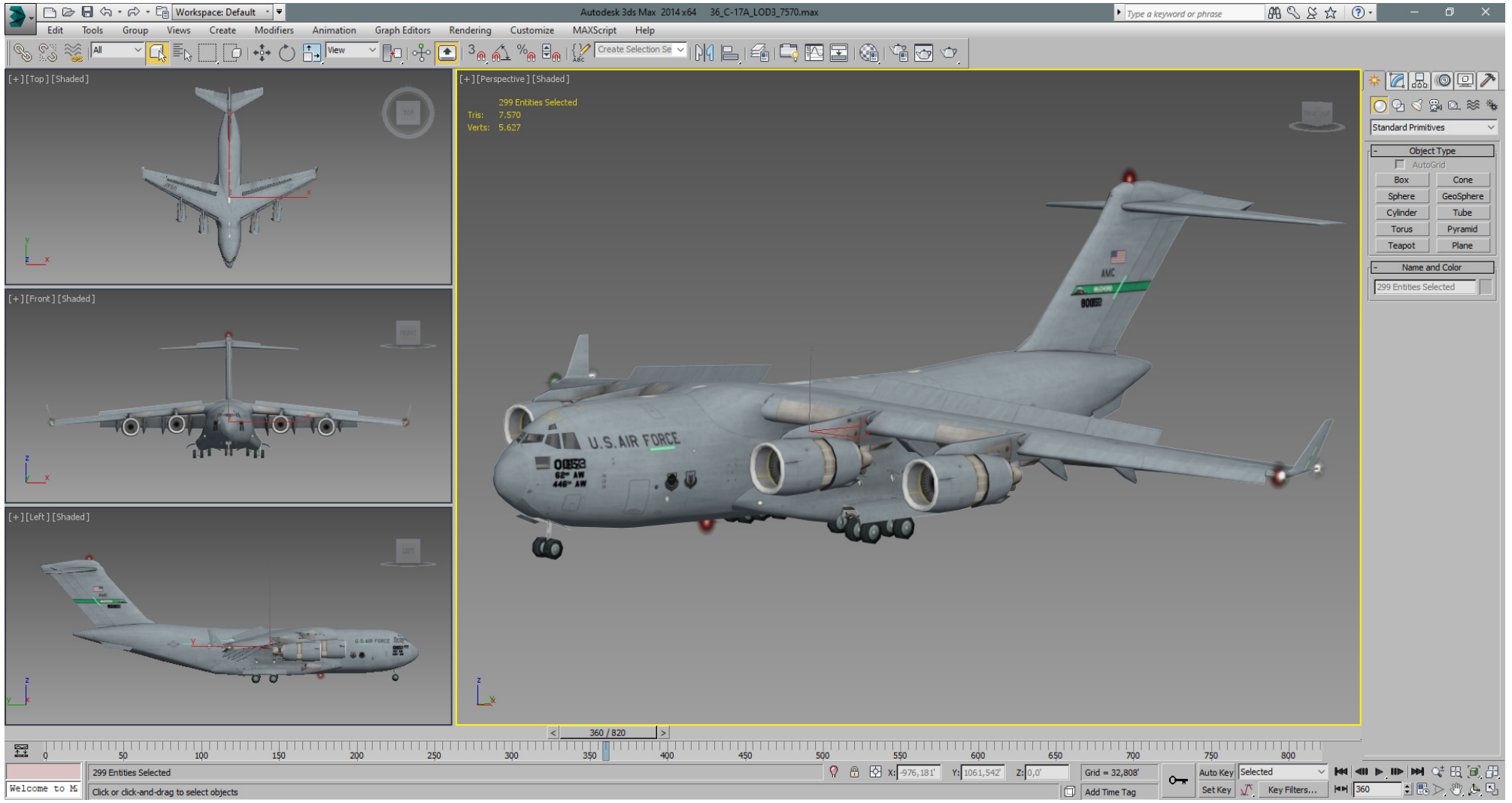
After (LOD 3):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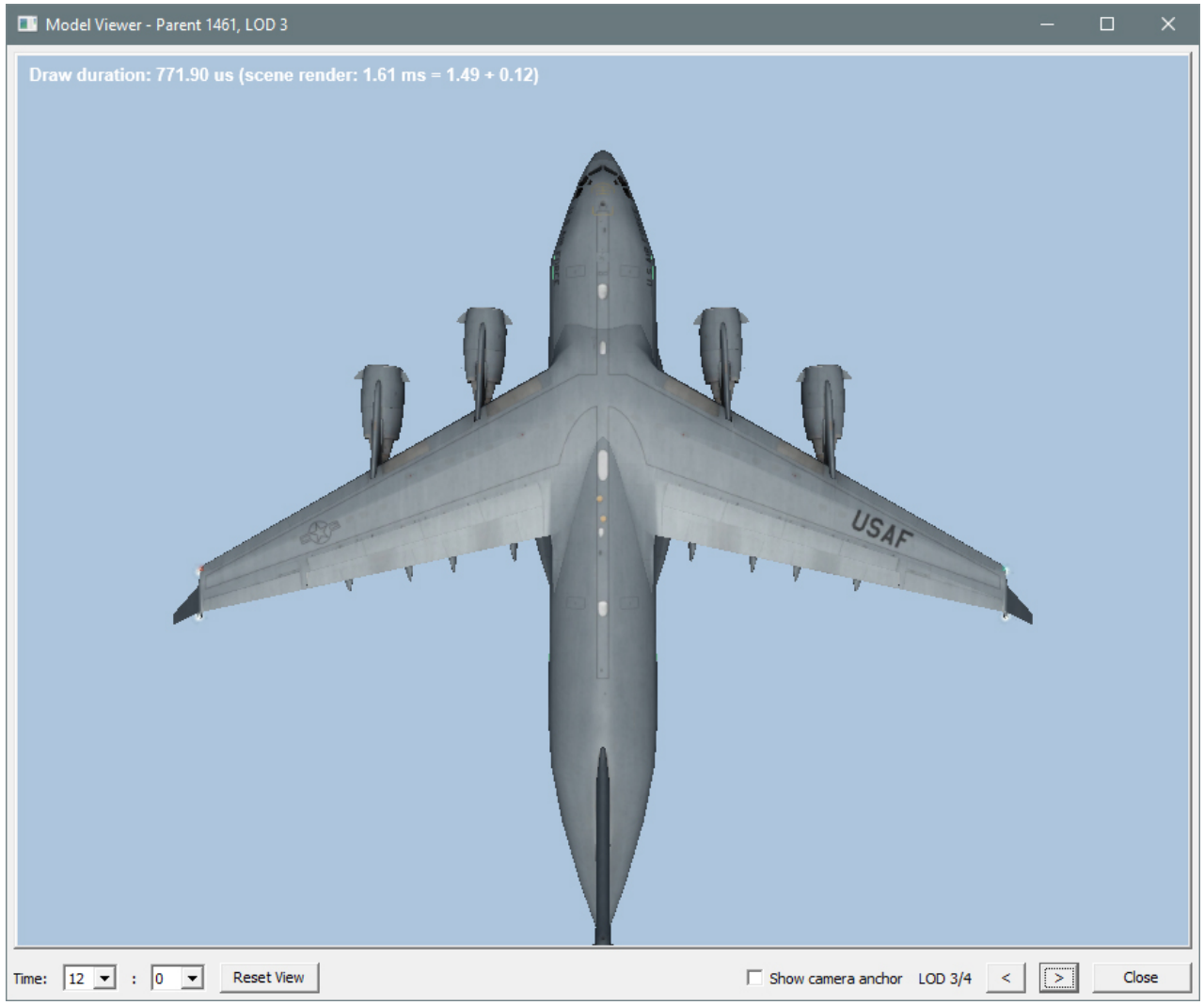
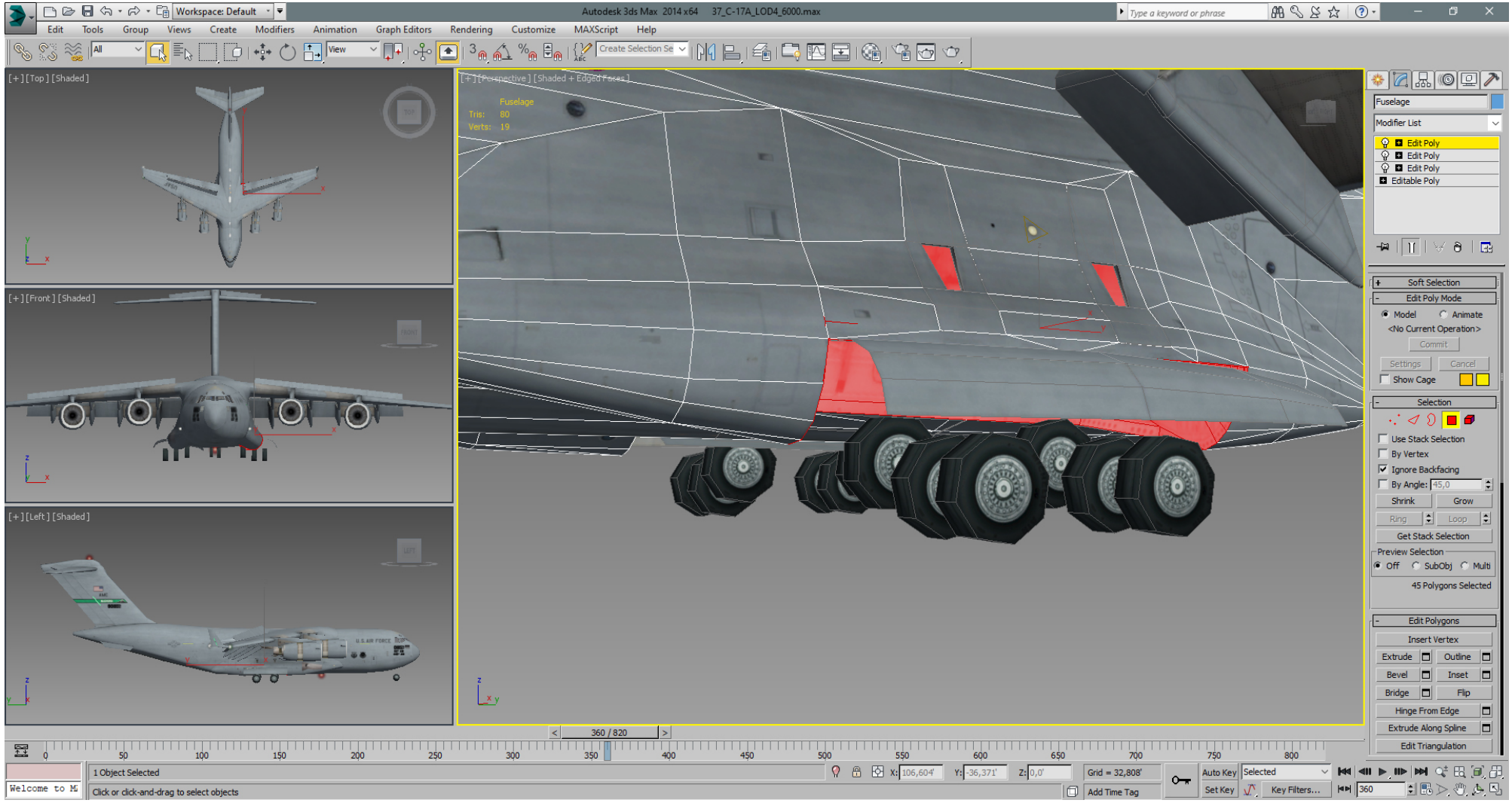
Tris: 7.570
Verts: 5.627
U.S. AIR FORCE
Standard Primitives
Object Type
Box
Cone
Sphere
GeoSphere
Cylinder
Tube
Torus
Pyramid
Teapot
Plane
Name and Color
299 Entities Selected
360 / 820
Click or click-and-drag to select objects
Add Time Tag
Auto Key
Set Key
Key Filters...

After exporting this to .LOD and rebuilding the DB, we can fire up the BMS Editor- Model Viewer and switch to the LOD 3.



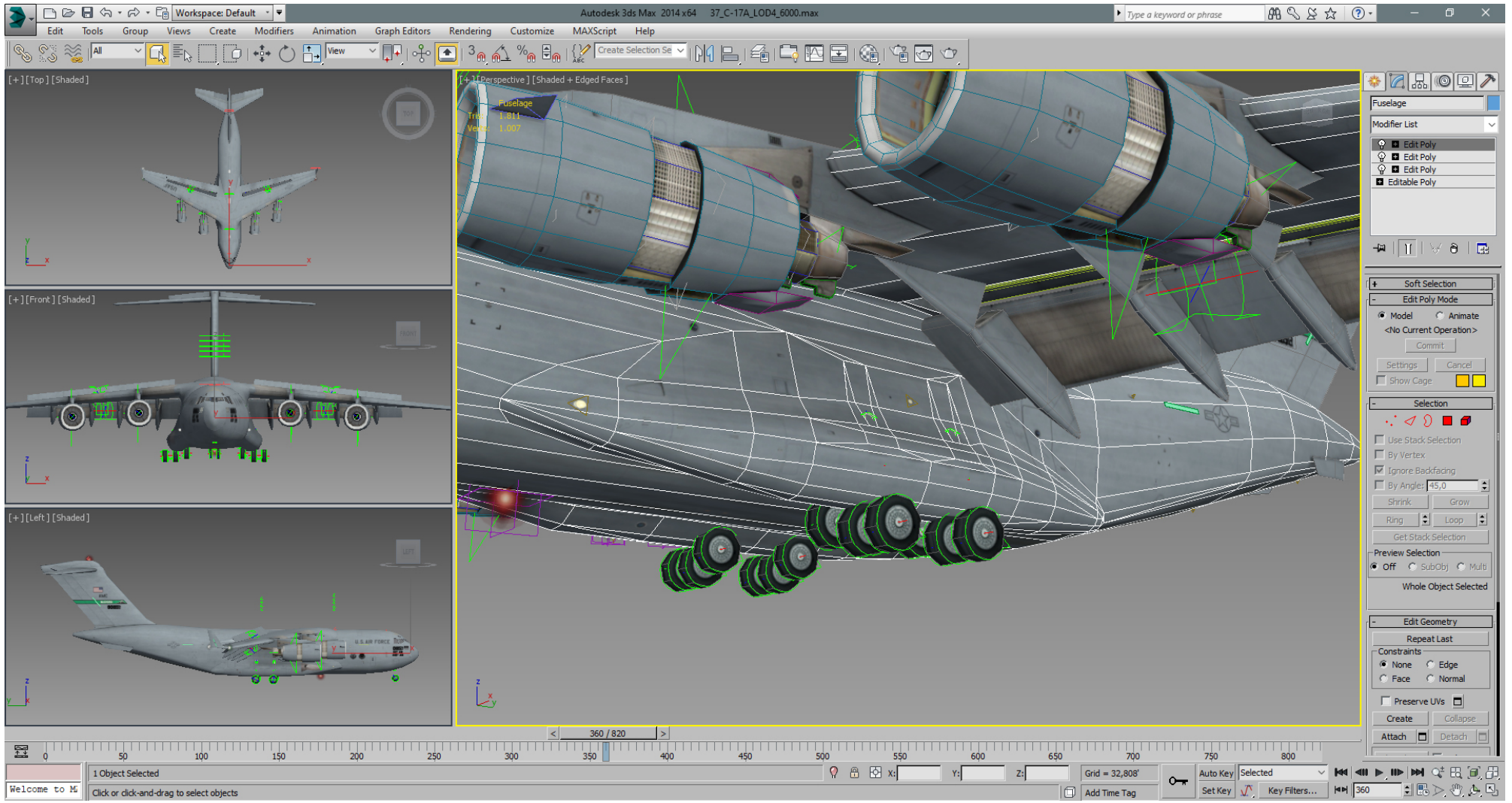
For LOD 4 we can suppress the gear but keep the wheels only.

The gear doors and hatches will be closed and not animated for LOD 4,
so we'll also suppress the gear bay and all the inner tris for gear doors and hatches.

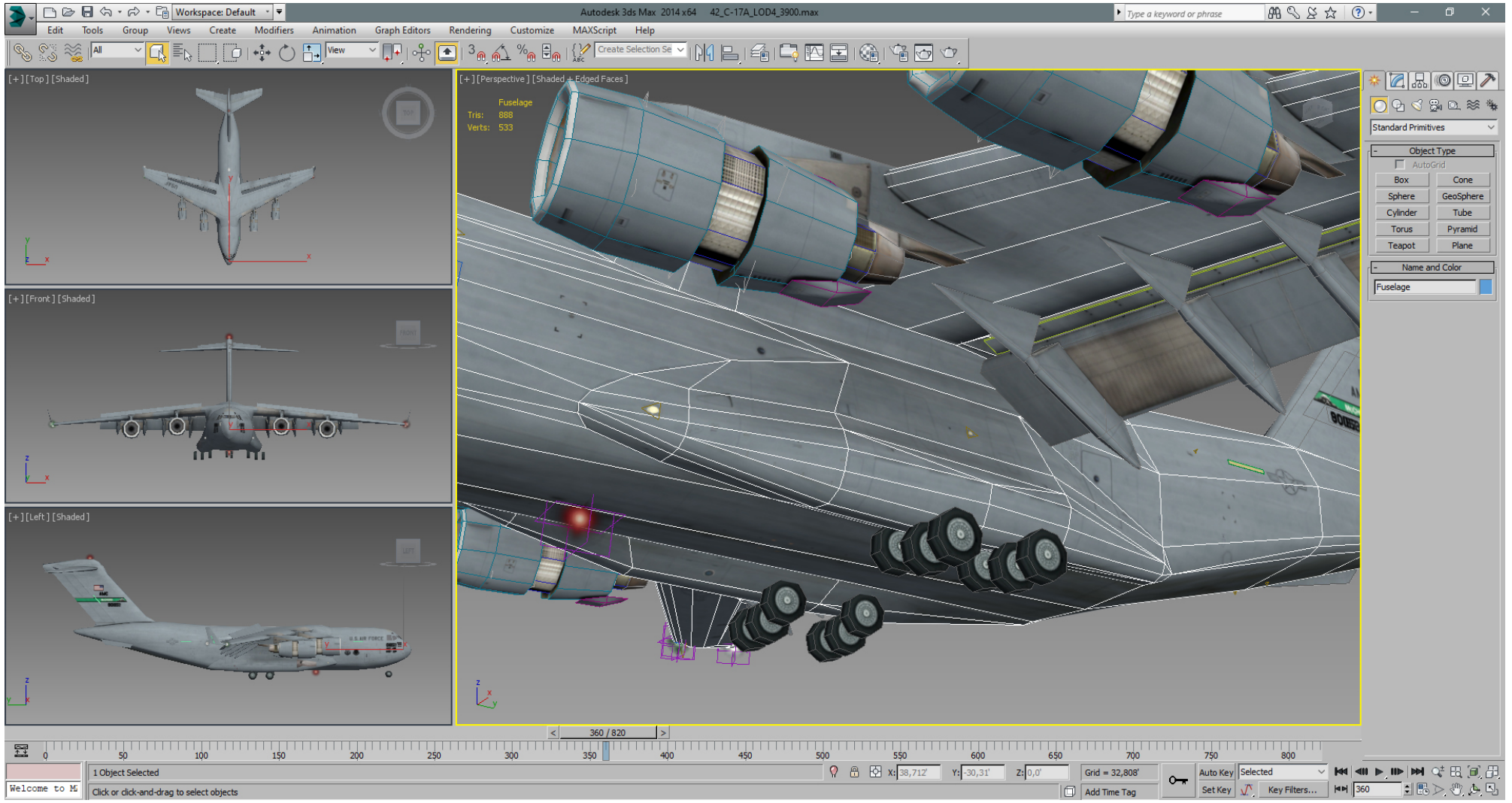


Then we can attach the gear doors and hatches to the fuselage, and get rid of their DOF helpers.

After attaching, we need to weld the vertices and check smoothing groups.



And now we can simplify the sponsons to save some more tris.
Note also more work on engines, wings, slats, fuselage in this picture.



We used a similar workflow for the front gear bay and doors.
Also the slats lost their animation and are part of the wing now.

Next we try to simplify and save more tris wherever we can.

The target here is to get approximately 50% tri count of LOD 3,
which would be 3785 tris overall.

Well, the actually overall tri- count is 3899 tris, but we have
5 switch states for the formation lights, and 4 switch states for the
license plates.

Each of those 9 switch states has a little more than 25 tris,
whereat just 2 of them can be in use at the same time per aircraft.

If we subtract 7x25=175 from the overall 3899 tris, we'll end up
with 3724 tris processed insim.

Therefore I think LOD 4 is done.

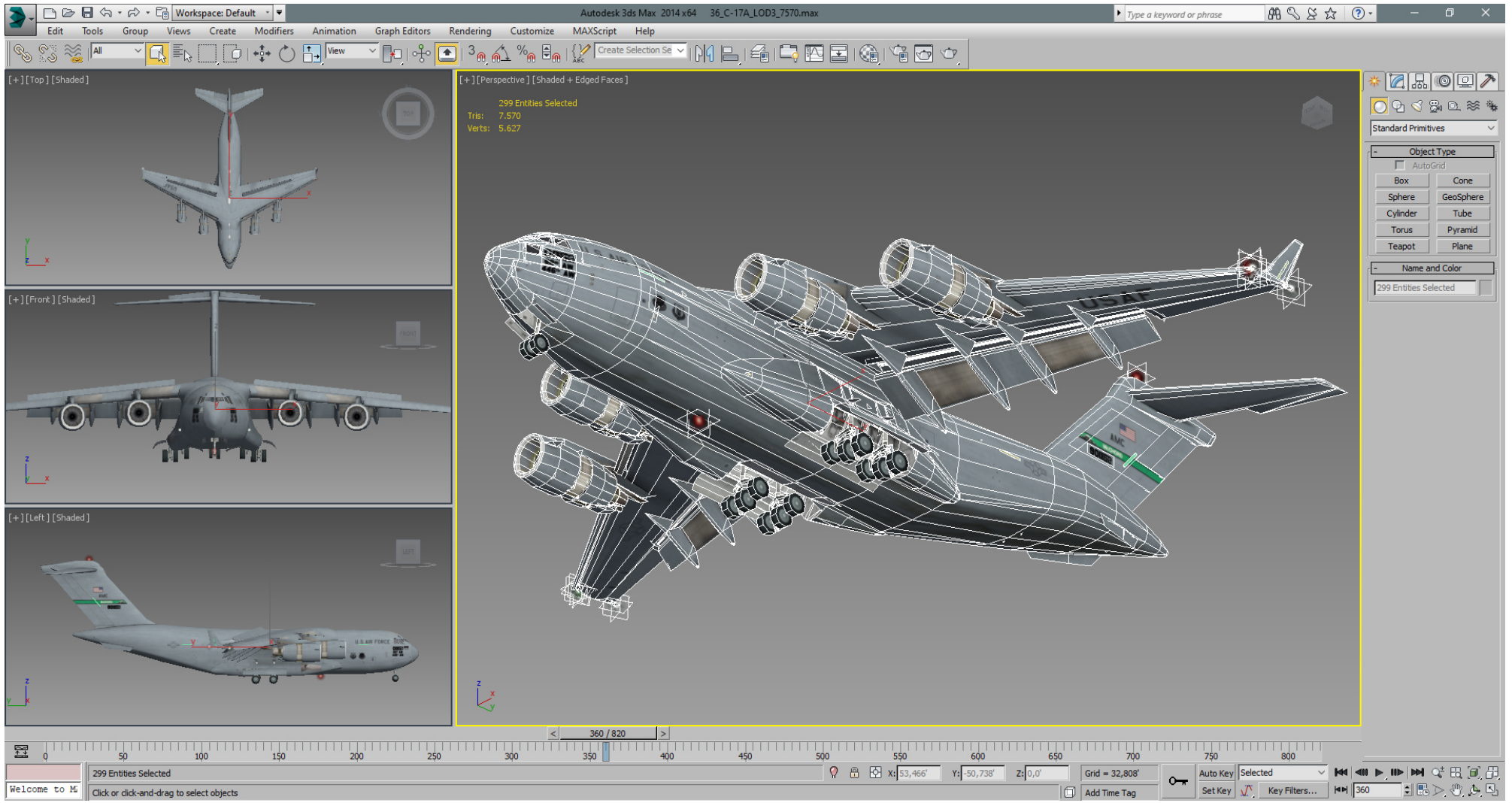
We need to add a line for LOD 4 to our PARENT.DAT..

Dimensions = 124.000000 -73.116997 87.394997 -12.500000 12.500000 -11.263000 9.737000
TextureSets = 1
Switches = 69
Dofs = 93
AddLOD = Model_0.LOD 150.000000
AddLOD = Model_1.LOD 300.000000
AddLOD = Model_2.LOD 600.000000
AddLOD = Model_3.LOD 1200.000000
AddLOD = Model_4.LOD 2500.000000

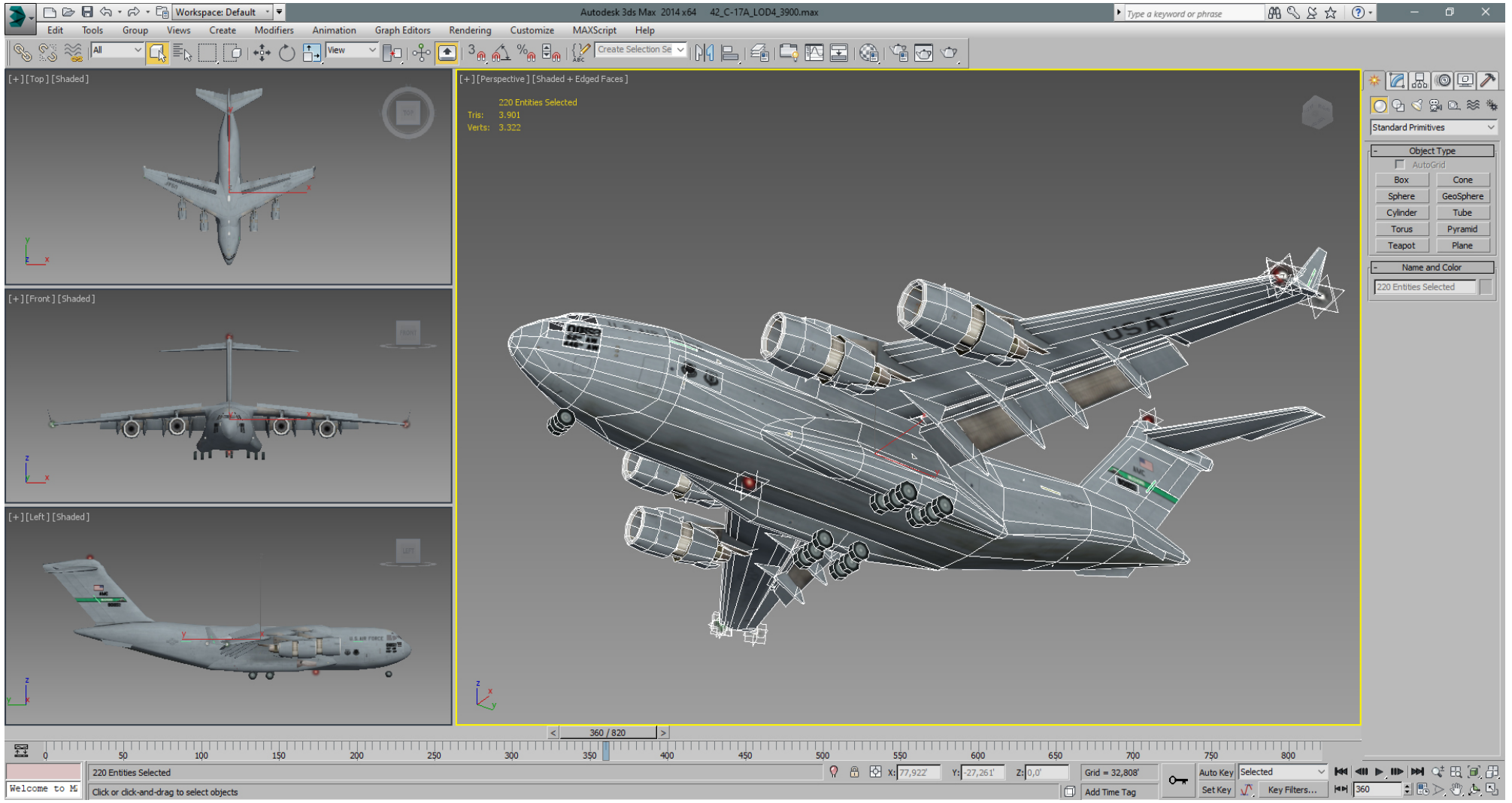
With that last line added, LOD 4 is used from 1200 ft up to 2500 ft distance.

Again, ignore animated elevators in those pictures, they are just still 3dsMax animated.

Before (LOD 3):



After (LOD 4):


Autodesk 3ds Max 2014 x64 42_C-17A_LOD4_3900.max
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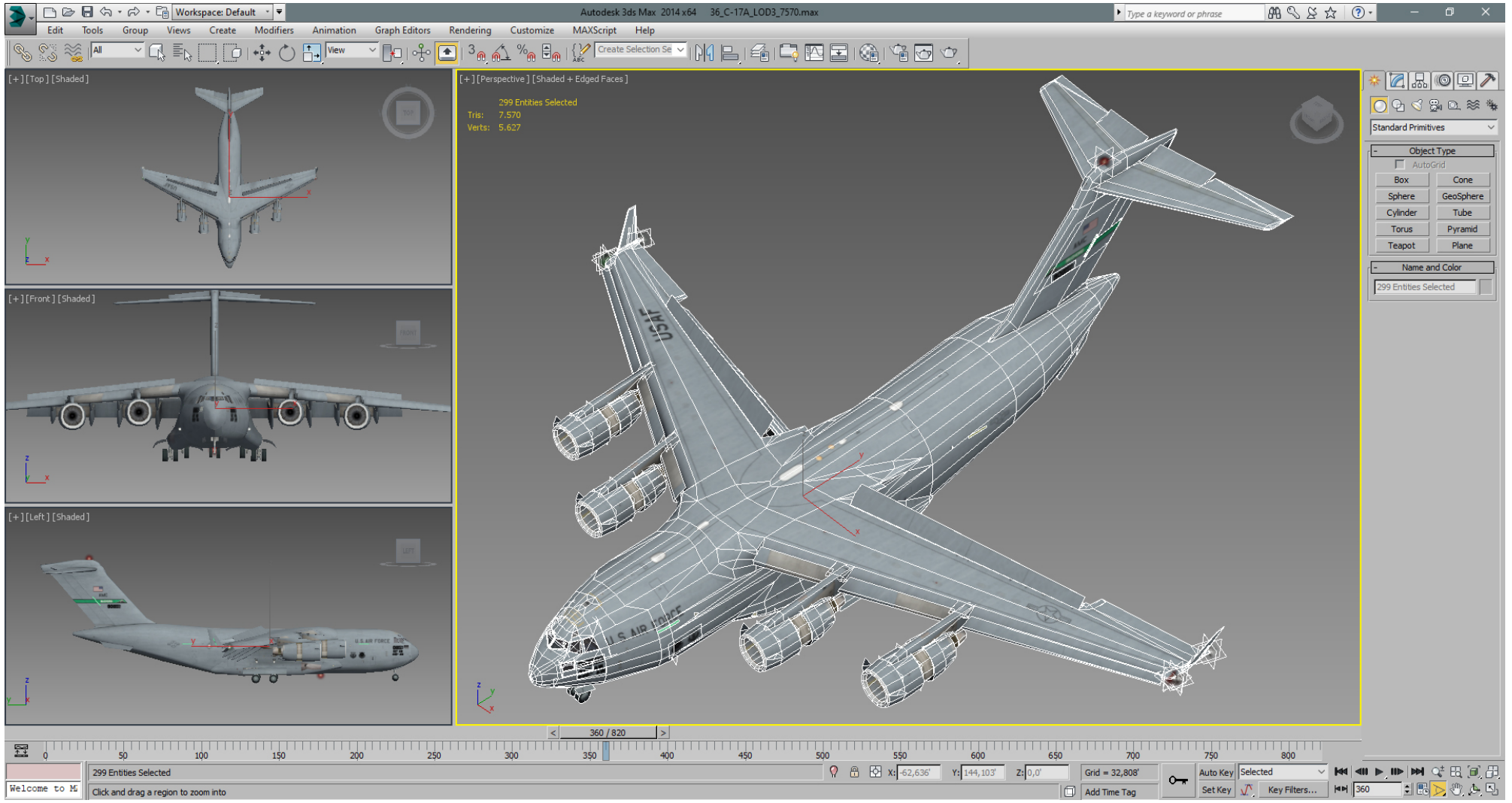
[+][Front][Shaded]
[+][Left][Shaded]
[+][Perspective][Shaded + Edged Faces]
220 Entities Selected
Tris: 3.901
Verts: 3.322
Standard Primitives
Object Type
Box
Cone
Sphere
GeoSphere
Cylinder
Tube
Torus
Pyramid
Teapot
Plane
Name and Color
220 Entities Selected
USAF
360 / 820
Click or click-and-drag to select objects
Add Time Tag
Auto Key
Set Key
Key Filters...

Before (LOD 3):


Autodesk 3ds Max 2014 x64 36_C-17A_LOD3_7570.max
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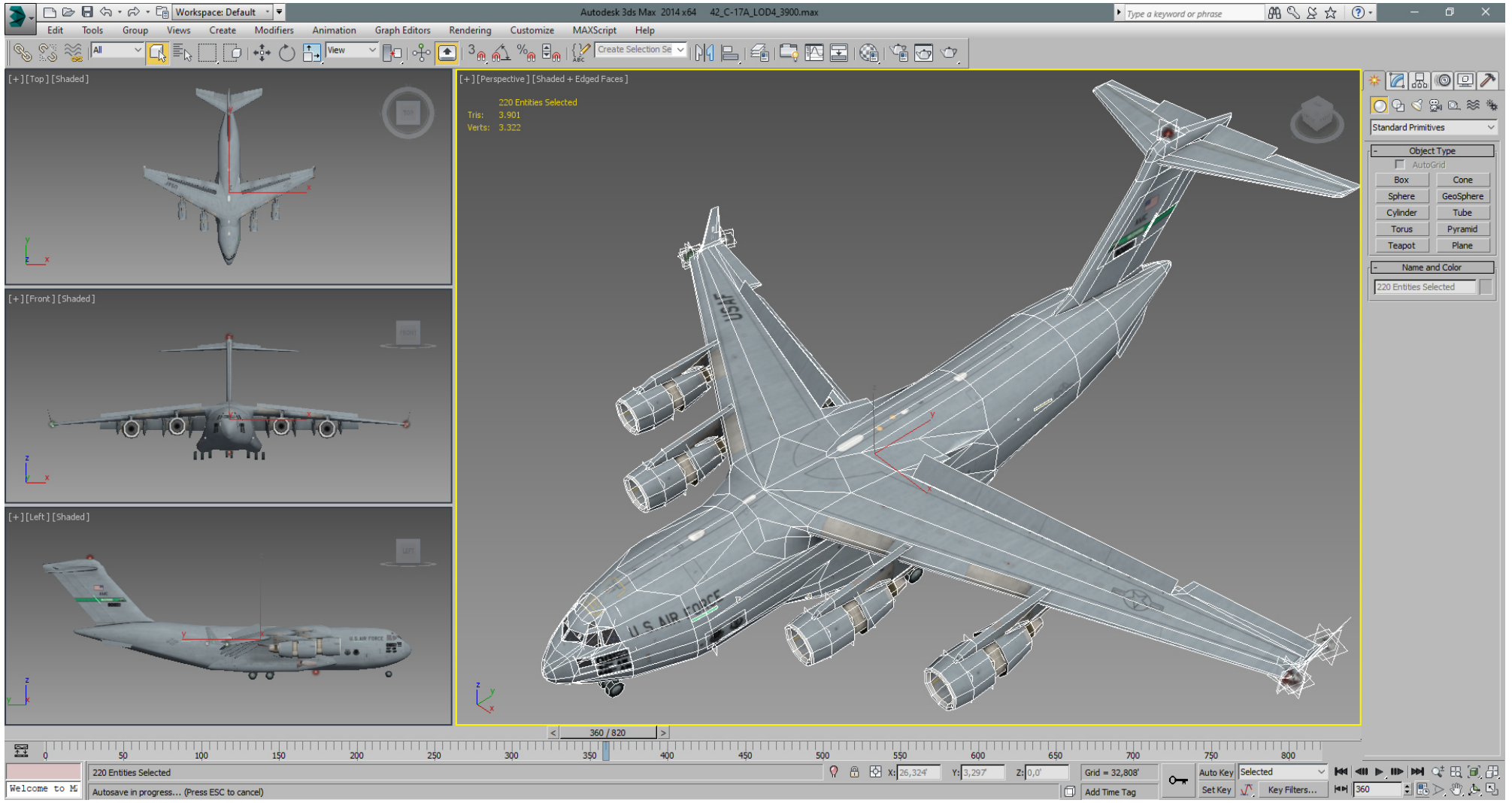
[+][Left][Shaded]
[+][Perspective][Shaded + Edged Faces]
299 Entities Selected
Tris: 7.570
Verts: 5.627
Standard Primitives
Object Type
Box
Cone
Sphere
GeoSphere
Cylinder
Tube
Torus
Pyramid
Teapot
Plane
Name and Color
360 / 820
299 Entities Selected
Click and drag a region to zoom into
Add Time Tag
Auto Key
Set Key
Key Filters...

After (LOD 4):


Autodesk 3ds Max 2014 x64 42_C-17A_LOD4_3900.max
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[+][Left][Shaded]
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220 Entities Selected
Tris: 3.901
Verts: 3.322
Standard Primitives
Object Type
Box
Cone
Sphere
GeoSphere
Cylinder
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Torus
Pyramid
Teapot
Plane
Name and Color
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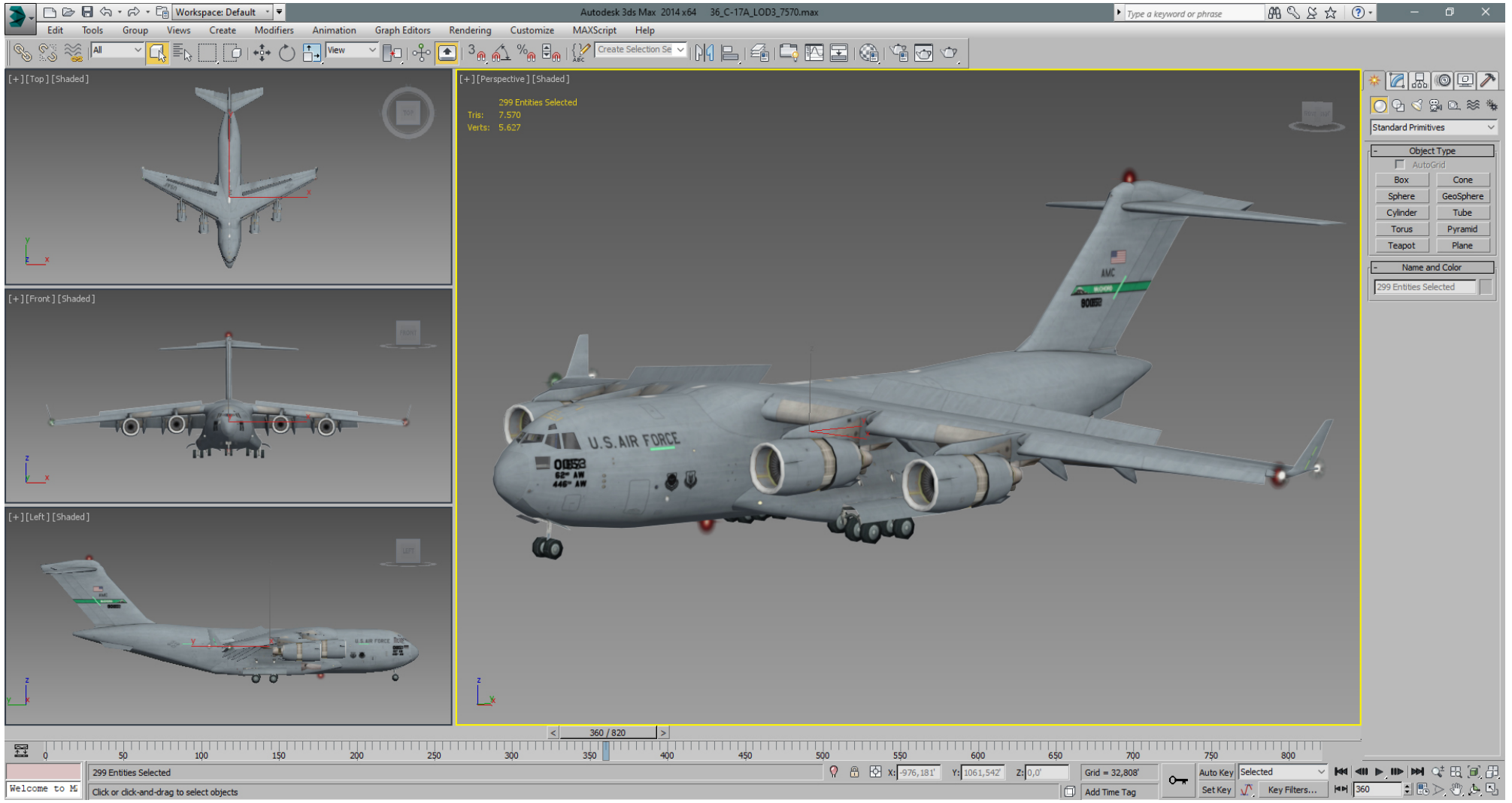
360 / 820
Autosave in progress... (Press ESC to cancel)

Before (LOD 3):


Autodesk 3ds Max 2014 x64 36_C-17A_LOD3_7570.max
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[+][Front][Shaded]
[+][Left][Shaded]
[+][Perspective][Shaded]
299 Entities Selected
Tris: 7.570
Verts: 5.627
U.S. AIR FORCE
Standard Primitives
Object Type
Box
Cone
Sphere
GeoSphere
Cylinder
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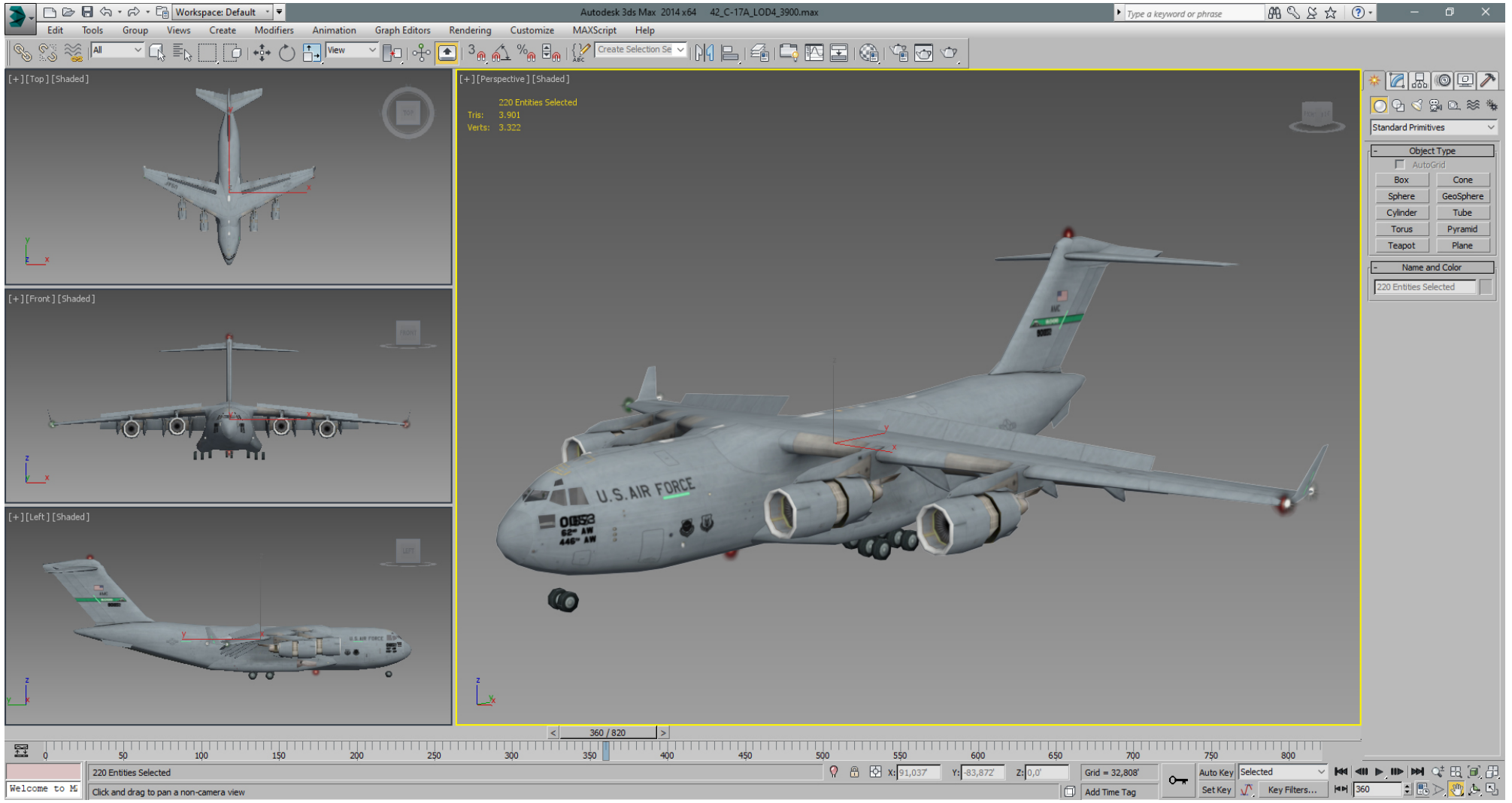
Torus
Pyramid
Teapot
Plane
Name and Color
299 Entities Selected
360 / 820
Click or click-and-drag to select objects

After (LOD 4):


Autodesk 3ds Max 2014 x64 42_C-17A_LOD4_3900.max
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[+][Perspective][Shaded]
220 Entities Selected
Tris: 3.901
Verts: 3.322
U.S. AIR FORCE
Standard Primitives
Object Type
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GeoSphere
Cylinder
Tube
Torus
Pyramid
Teapot
Plane
Name and Color
220 Entities Selected
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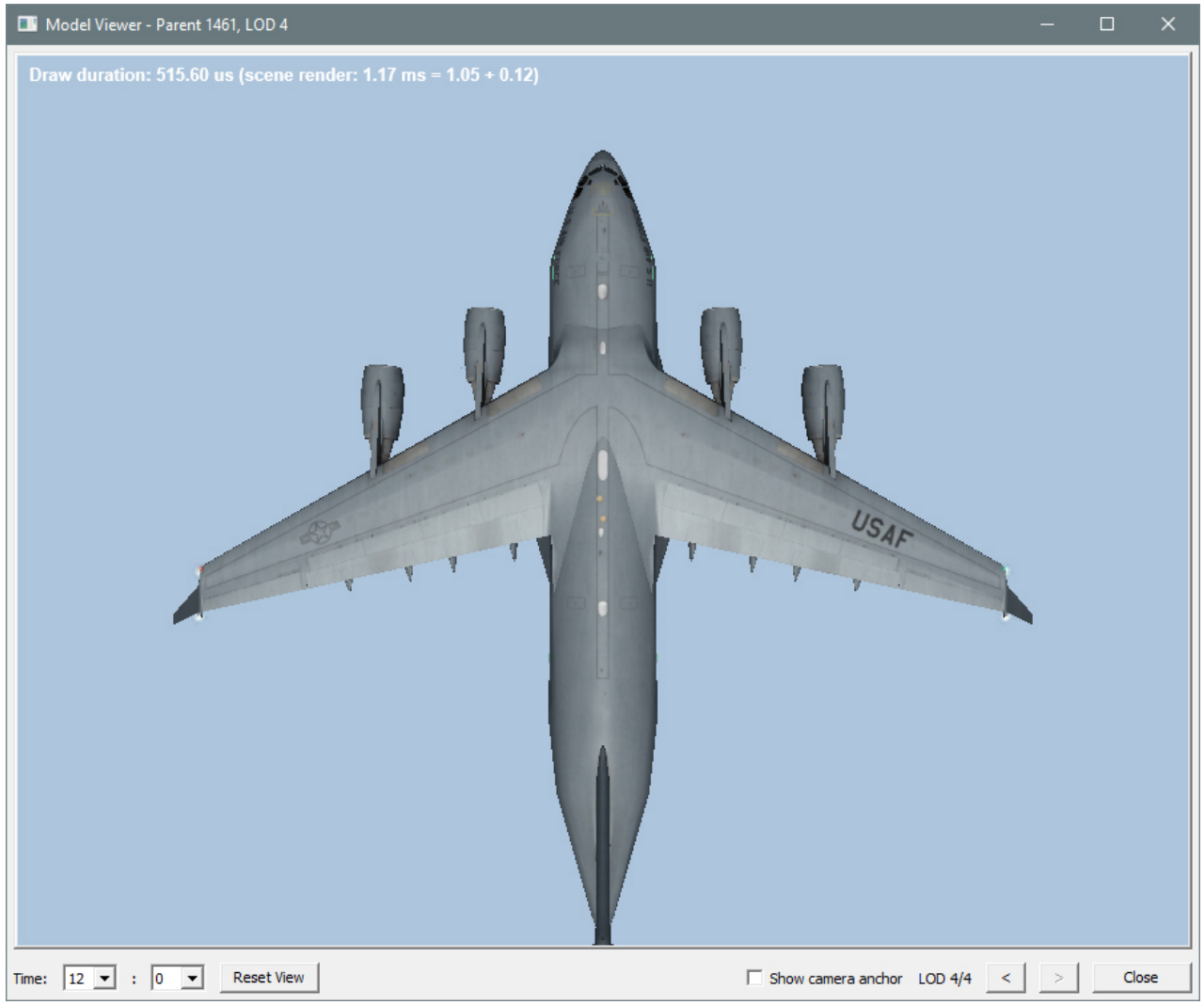
Click and drag to pan a non-camera view

After exporting this to .LOD and rebuilding the DB, we can fire up the BMS Editor- Model Viewer and switch to the LOD 4.



For LOD 5 we add another line to our PARENT.DAT.

Dimensions = 124.000000 -73.116997 87.394997 -12.500000 12.500000 -11.263000 9.737000
TextureSets = 1
Switches = 69
Dofs = 93
AddLOD = Model_0.LOD 150.000000
AddLOD = Model_1.LOD 300.000000
AddLOD = Model_2.LOD 600.000000
AddLOD = Model_3.LOD 1200.000000
AddLOD = Model_4.LOD 2500.000000
AddLOD = Model_5.LOD 10000.000000

With that last line added, LOD 5 is used from 2500 ft up to 10000 ft distance.

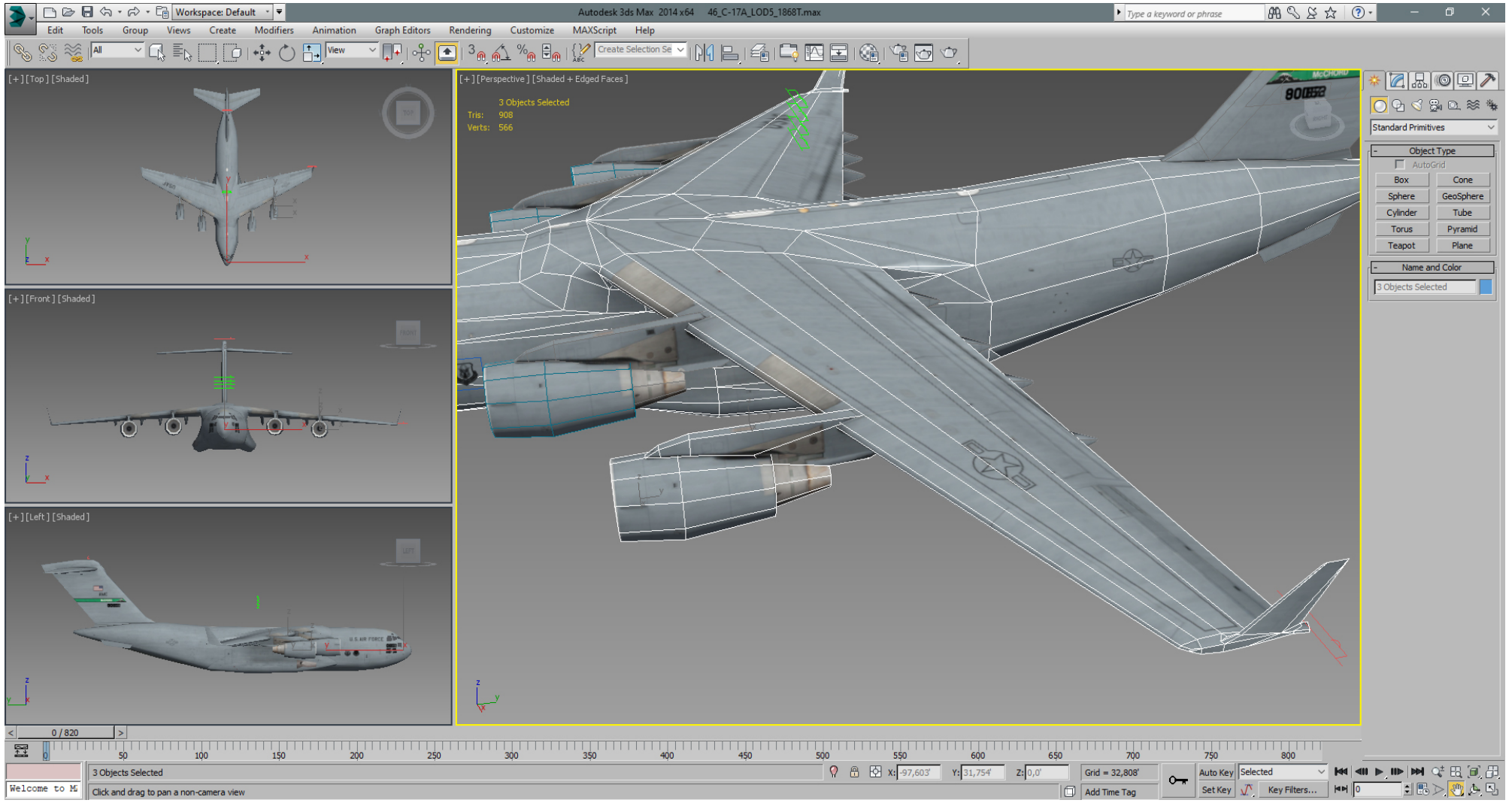
On our 3D model we suppress the cockpit, the thrust reversers, the engine fans and the wheels, including all their DOF helpers for animation.

The flaps and the ailerons became part of the wings again, and their DOF helpers got deleted.
We did similar with the elevators on the horizontally stabilizer and the rudders on the vertically stabilizer.

We got also rid of the wingtip navigation lights glass by deleting useless tris behind the glass first.
Then we have changed that glass tris to "Material ID 1" to use the textured material (pType 9) for them.
Next we "Attach" those to our fuselage/ wing and weld the vertices there.

The engines and pylons became even more simplified.

Note that the UVW mapping on the wing is a little wrong on the control elements area,
because the control elements were UVW mapped individually.
But I think it is not that noticeable at the distance of LOD 5.

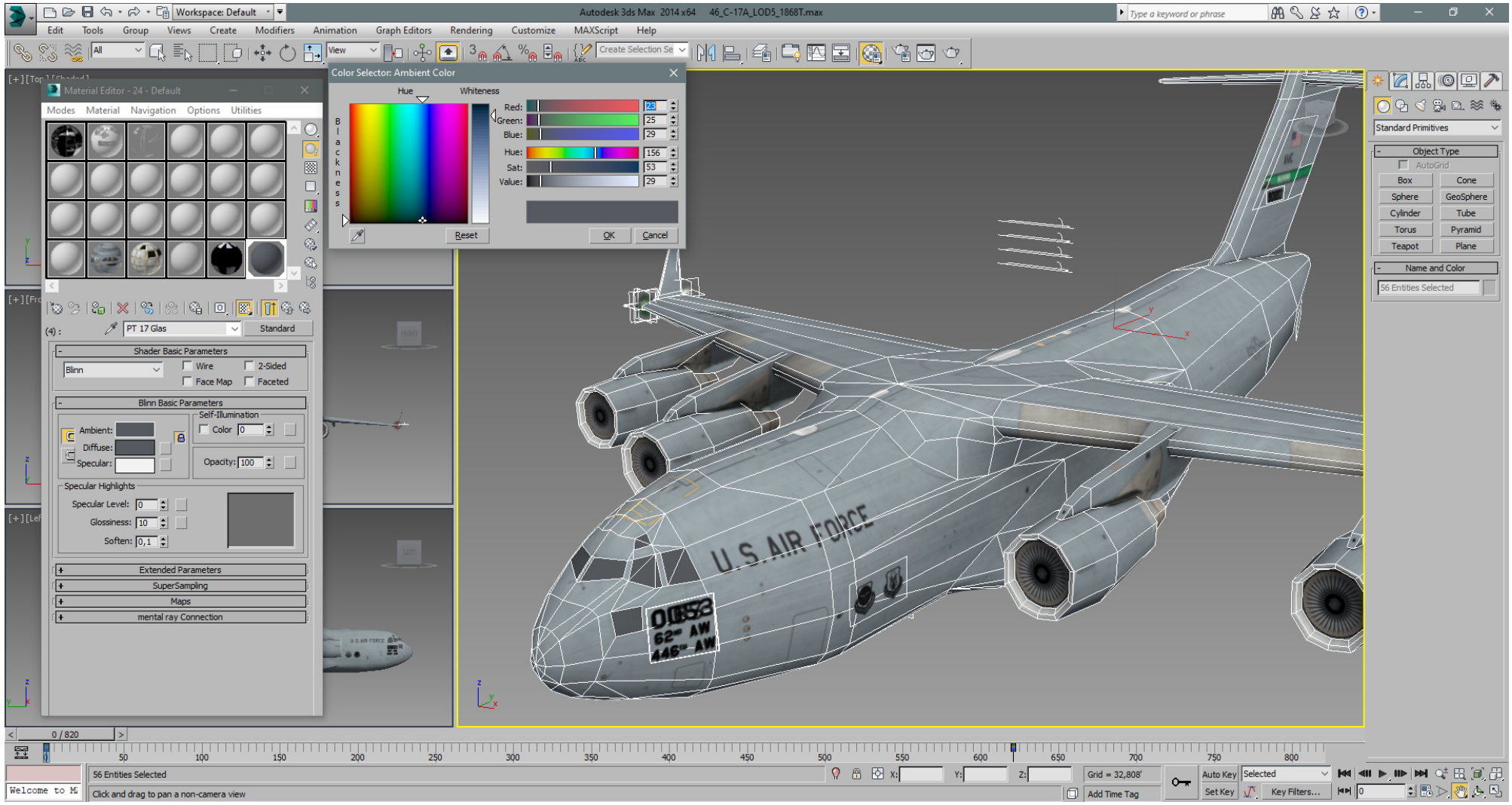


That said, the stabilizers, the bottom flaps and ailerons have been fake- UVW remapped.
Fake means:
- stretched the UVW map of the vertically stabilizer to compensate the missing rudder
- remapped the back end of the horizontally stabilizer to compensate the missing elevators
- remapped the bottom flaps and ailerons in a way that they share the same spot on the texture

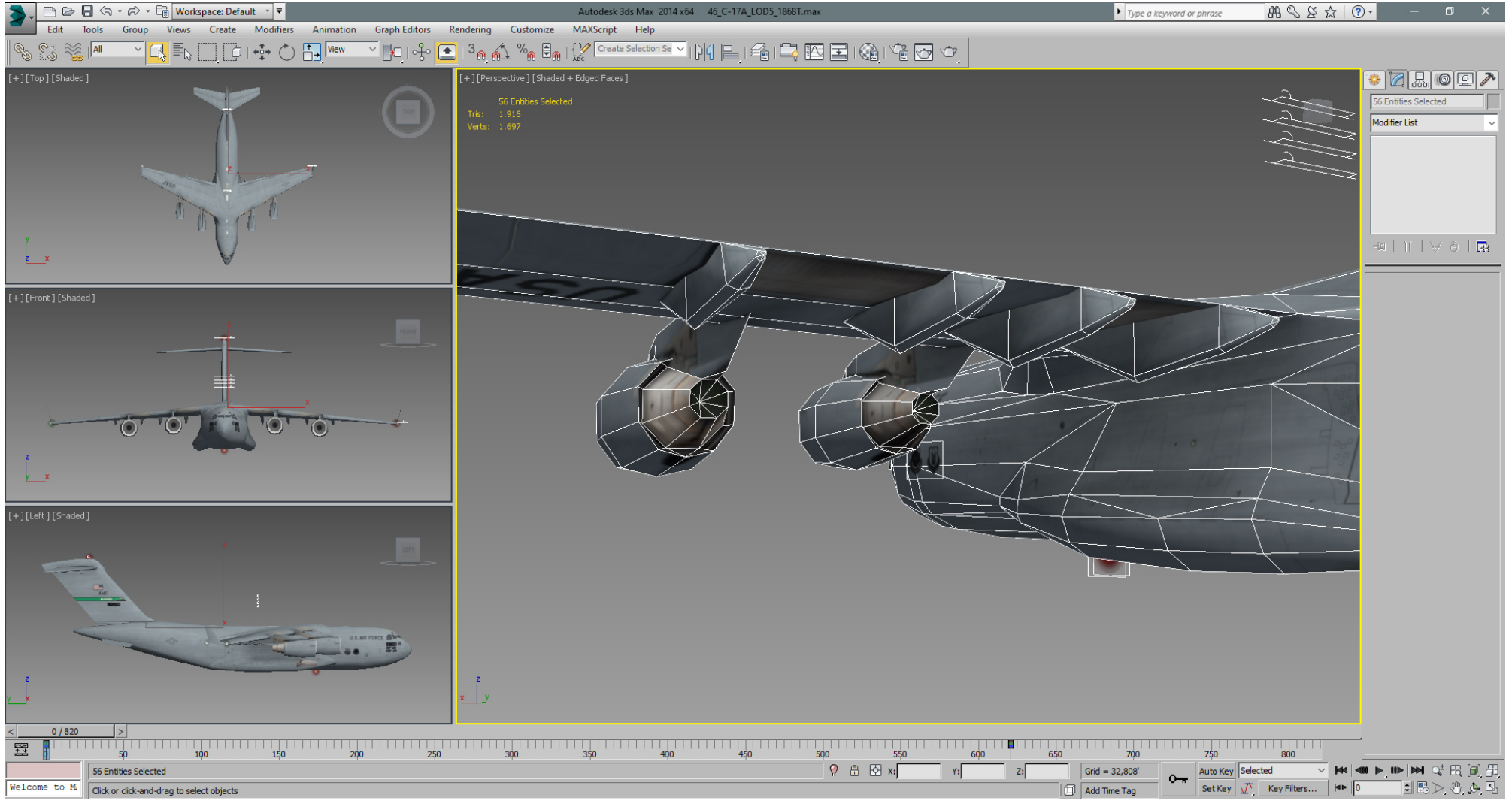
With the cockpit deleted, we want to avoid a see through there.
So we set "Opacity" back to 100, and "Specular Highlights" back to 0, 10, 0, 1 for our glass material.

Next we set the "Ambient" and "Diffuse" color to a dark grey, here RGB 23,25,29.
Our former pType 17 glass material will be exported as pType 5 material now.

Note in this picture that with the animated engine fans deleted, the inner engine tris became the fan.
A smaller copy of the fan texture found place on our main texture for pType 9 therefore.



The back end of the engines has been closed as well to avoid a see through.



And with some more tri saving around the model, the overall total tri- count is 1916 actually.
The target for LOD 5 was 50% of 3750, so 1875 tris.

But we have still the 4 switch states for the license plates, and with only one switch state we are at 1856 tris, including 96 tris of pType 20 lit geometry for navigation lights.

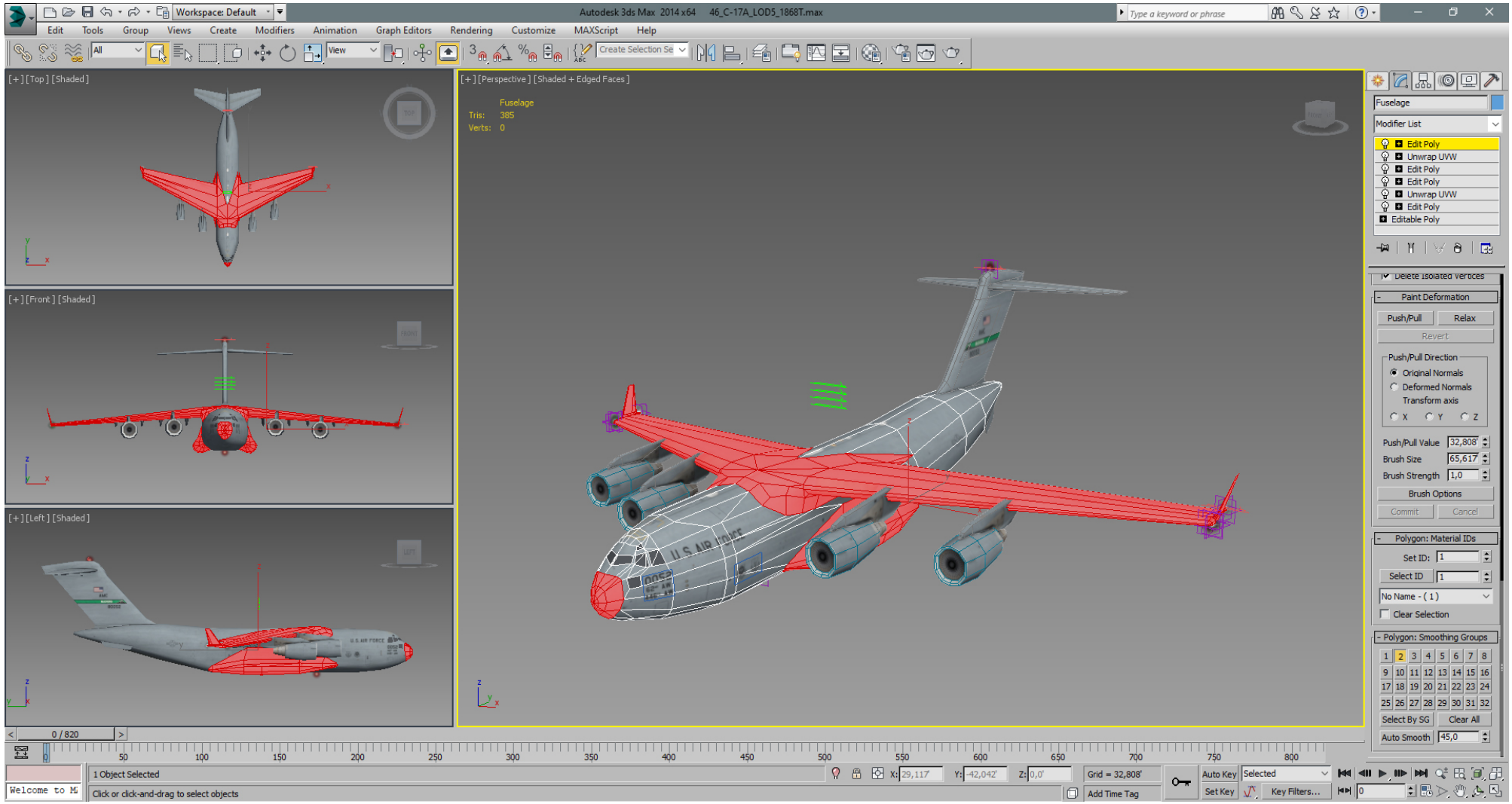
With that tri count and our simplified model, we can optimize the smoothing groups (SG) further.

Remember, for our LOD 0, we have used only SG 1-3.

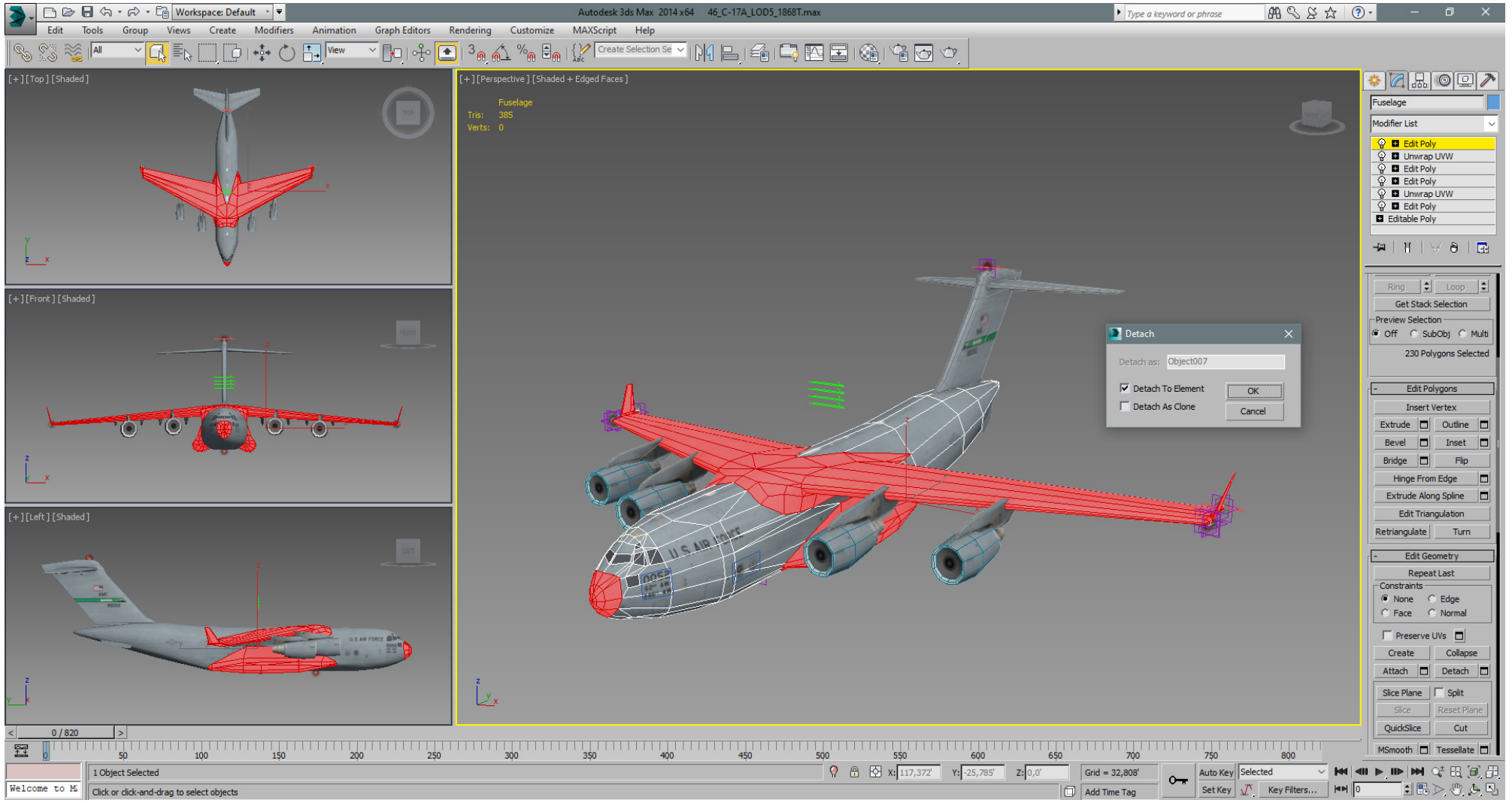
While doing the lower LODs, we had always an eye on the SG, didn't we!
So as a result the LOD 5 is actually using just SG 1-2.

And we can even get rid of SG 2 now without having shading issues.

Therefore it is easy to select polys by SG 2.



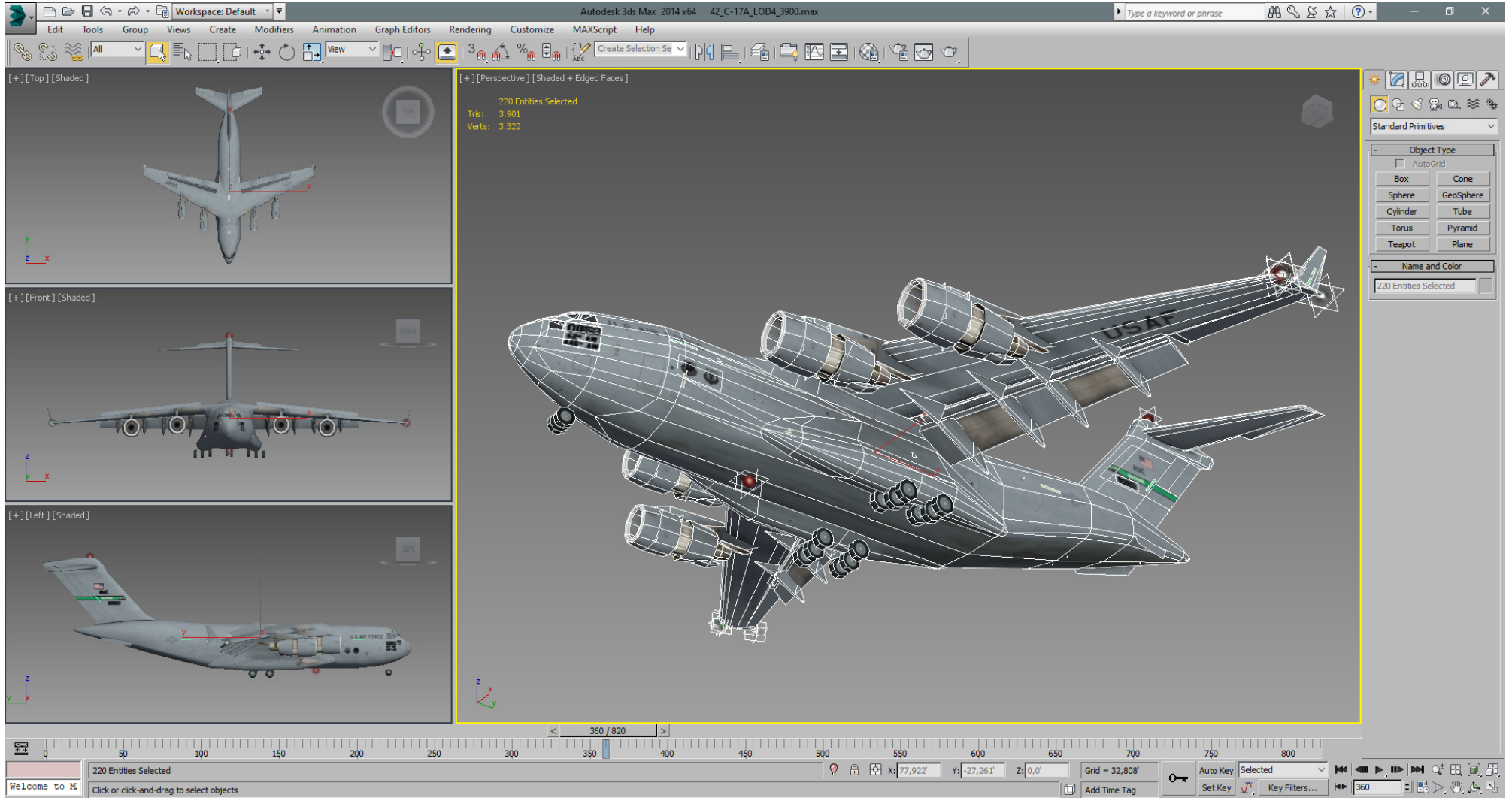
Then we change the SG of the selected polys to 1 and "Detach" selected polys to an "Element".
Such an element has its own vertices and therefore no shading issue.



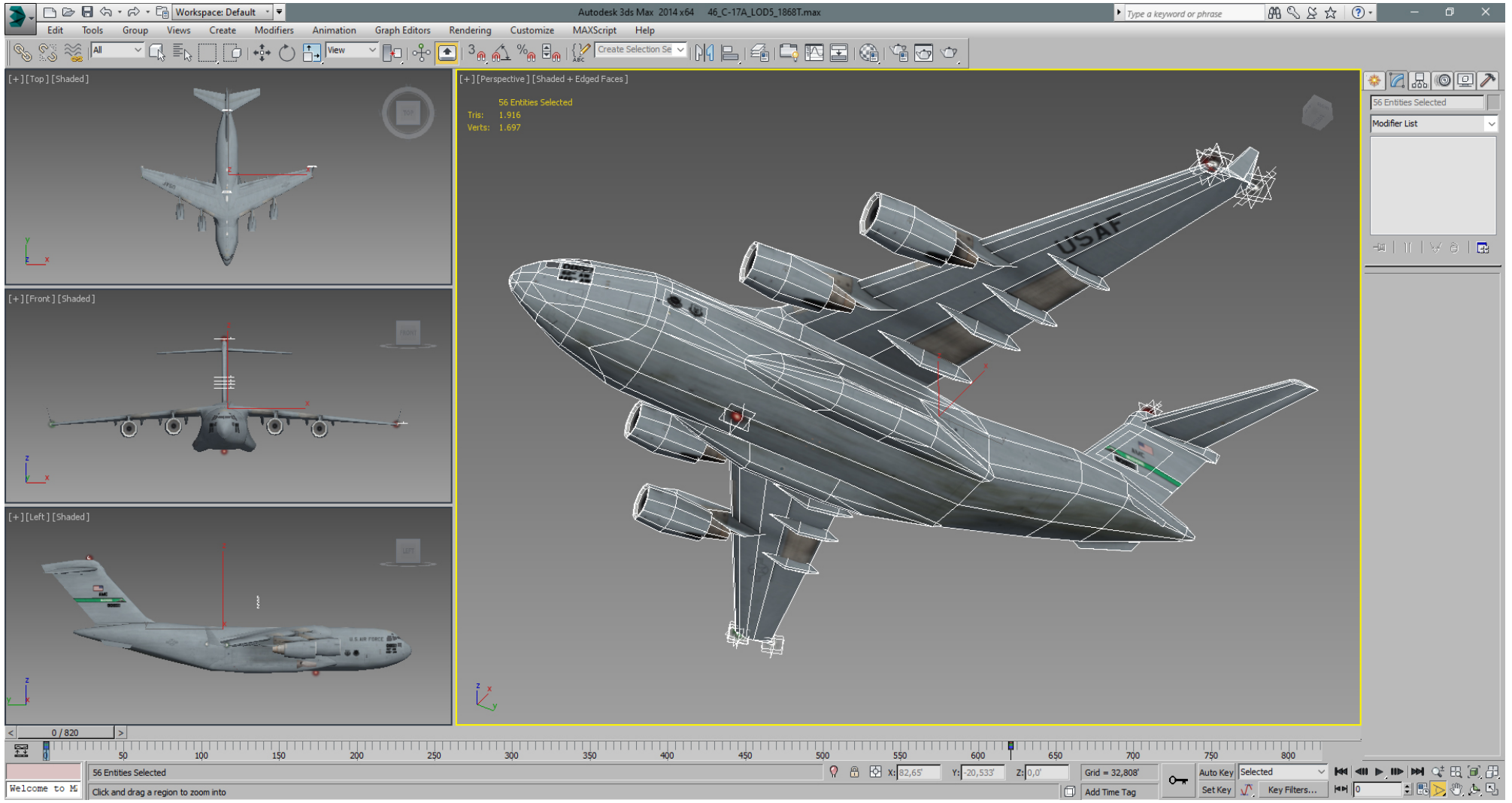
With this workflow, we check the model and set the SG from 2 (or 3) to 1.

Well, I think that is good to go for LOD 5.

Before (LOD 4):



After (LOD 5):


Autodesk 3ds Max 2014 x64 46_C-17A_LOD5_1868T.max
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Edit Tools Group Views Create Modifiers Animation Graph Editors Rendering Customize MAXScript Help
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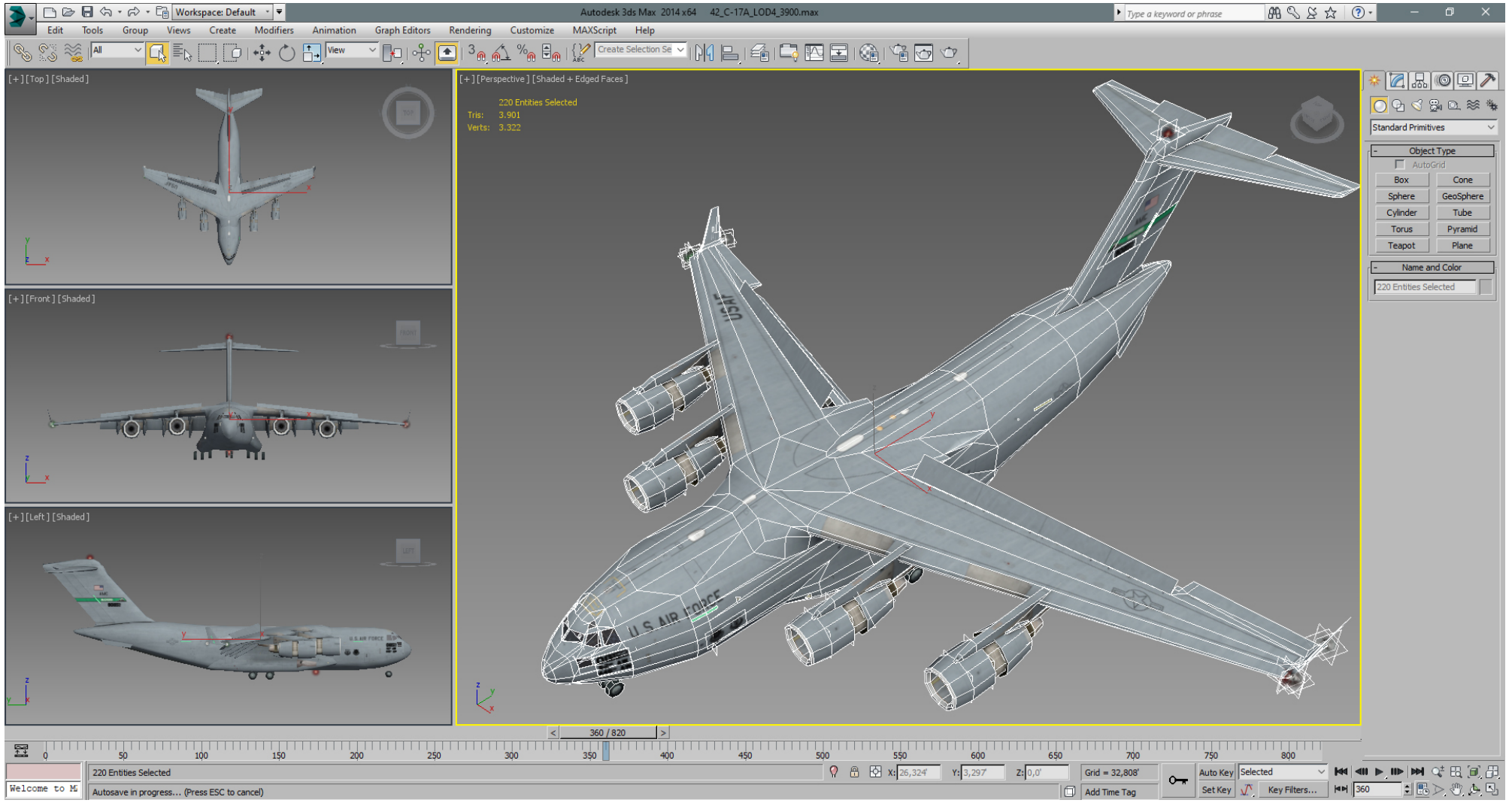
56 Entities Selected
Tris: 1.916
Verts: 1.697
USAF
Modifier List
0 / 820
Welcome to M
Click and drag a region to zoom into
Add Time Tag
Auto Key
Set Key
Key Filters...

Before (LOD 4):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[+][Left][Shaded]
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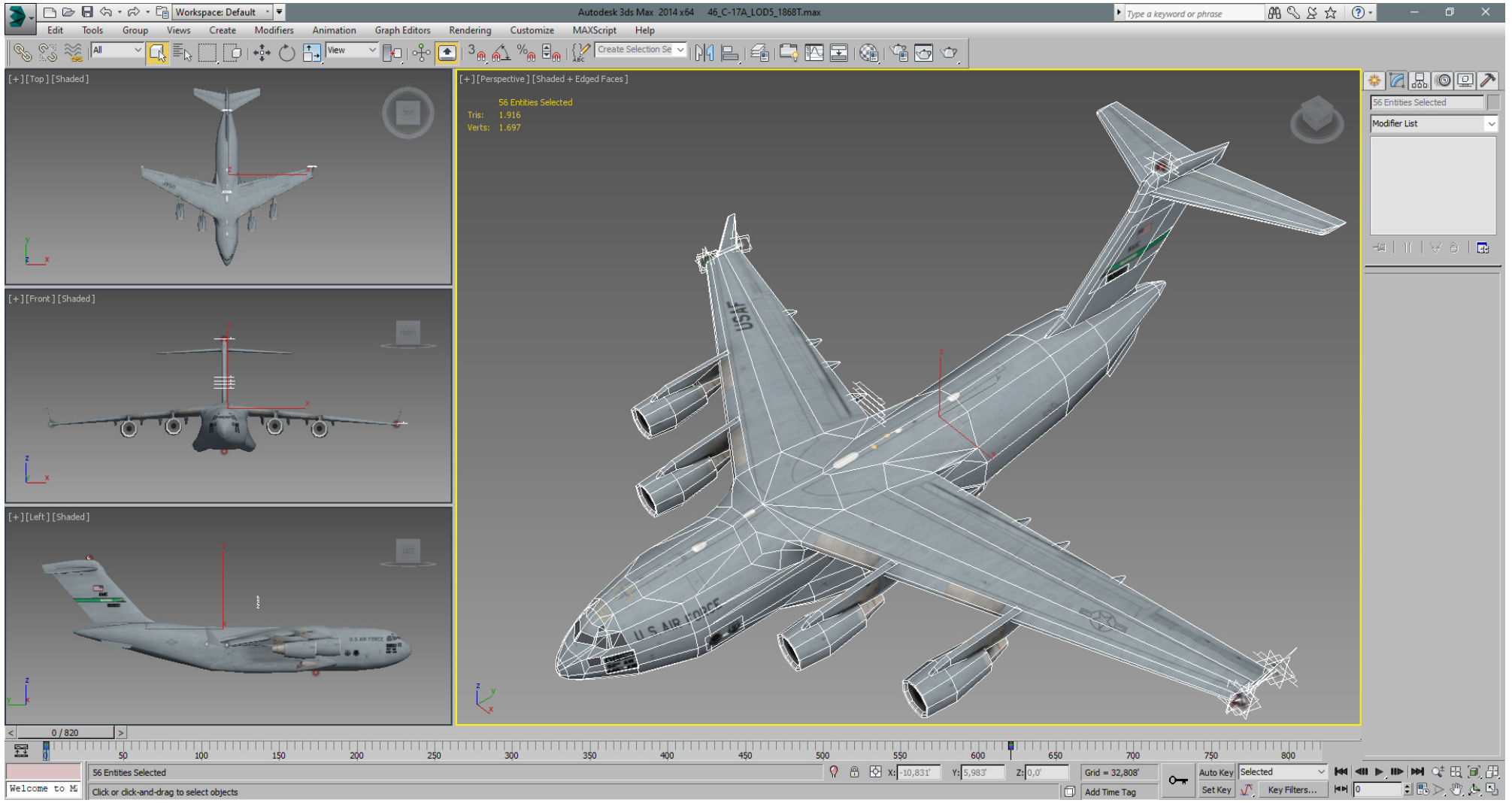
Tris: 3.901
Verts: 3.322
Standard Primitives
Object Type
Box
Cone
Sphere
GeoSphere
Cylinder
Tube
Torus
Pyramid
Teapot
Plane
Name and Color
220 Entities Selected
360 / 820
Autosave in progress... (Press ESC to cancel)

After (LOD 5):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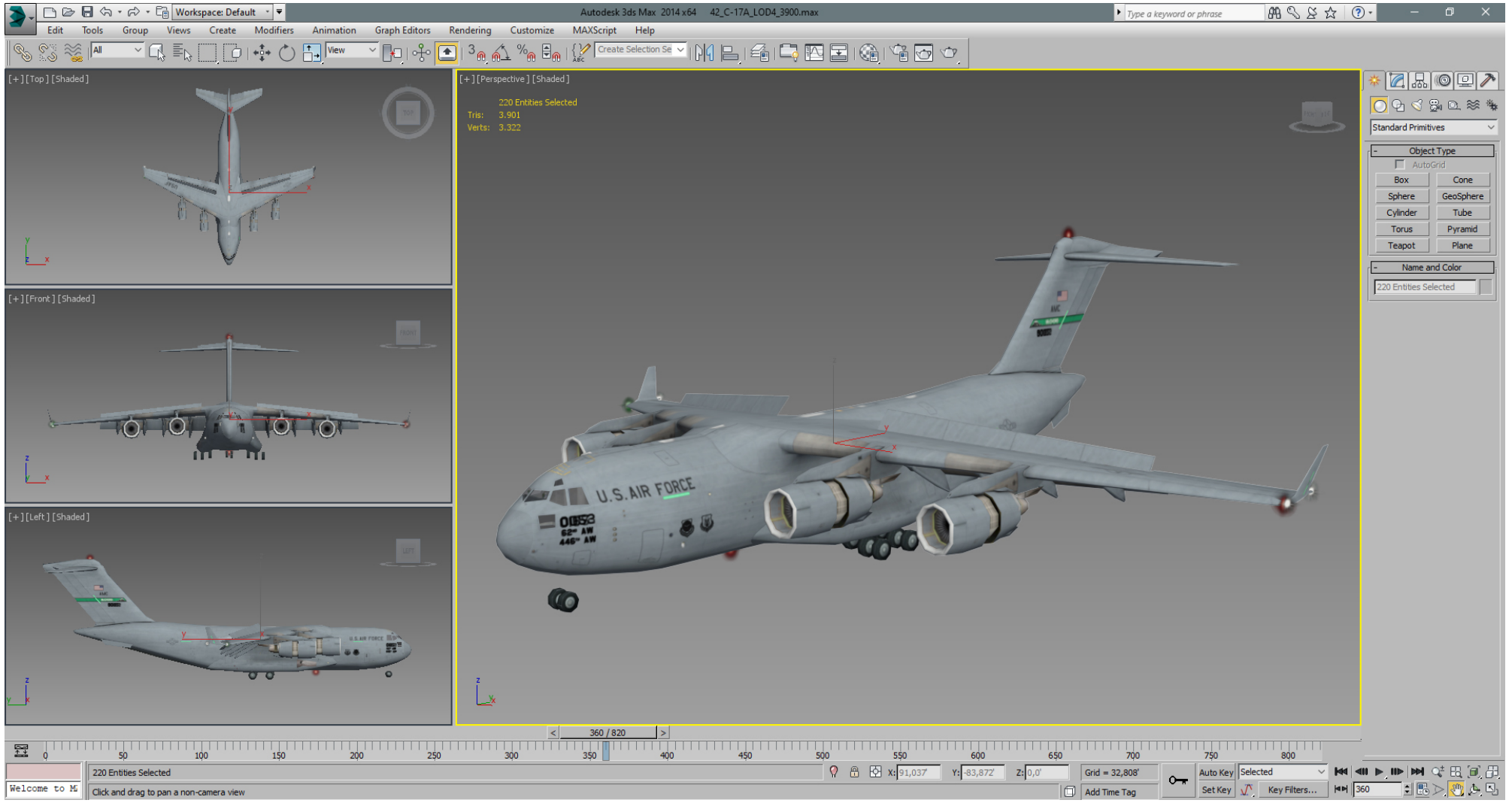
[+][Front][Shaded]
[+][Left][Shaded]
[+][Perspective][Shaded + Edged Faces]
56 Entities Selected
Tris: 1.916
Verts: 1.697
Modifier List
56 Entities Selected
Click or click-and-drag to select objects
Add Time Tag
Auto Key
Set Key
Key Filters...

Before (LOD 4):


Autodesk 3ds Max 2014 x64 42_C-17A_LOD4_3900.max
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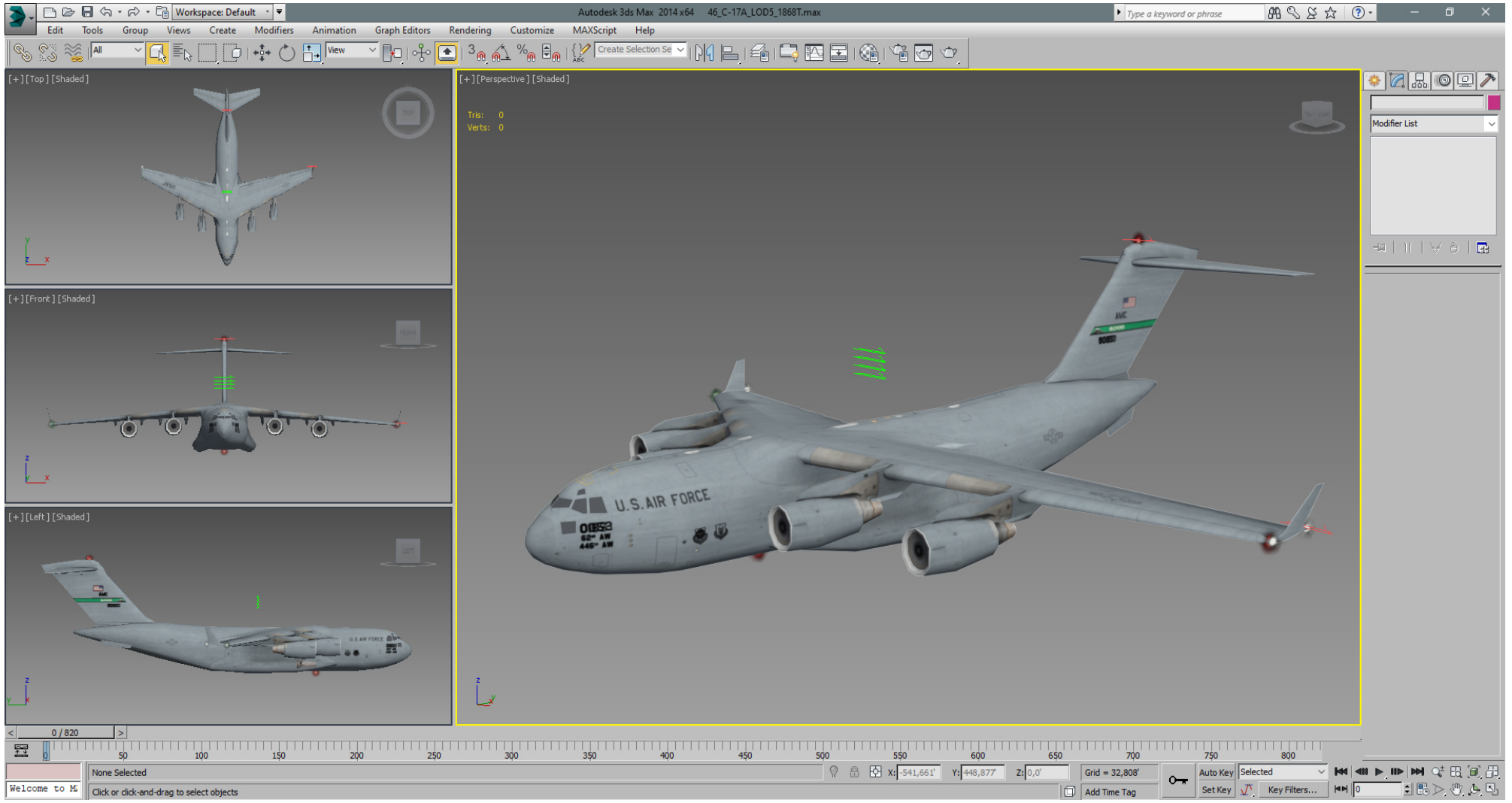
[+][Left][Shaded]
[+][Perspective][Shaded]
220 Entities Selected
Tris: 3.901
Verts: 3.322
U.S. AIR FORCE
Standard Primitives
Object Type
Box
Cone
Sphere
GeoSphere
Cylinder
Tube
Torus
Pyramid
Teapot
Plane
Name and Color
360 / 820
220 Entities Selected
Click and drag to pan a non-camera view
Add Time Tag
Auto Key
Set Key
Key Filters...

After (LOD 5):


Autodesk 3ds Max 2014 x64 46_C-17A_LOD5_1868T.max
Workspace: Default
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Tris: 0
Verts: 0
U.S. AIR FORCE
Modifier List
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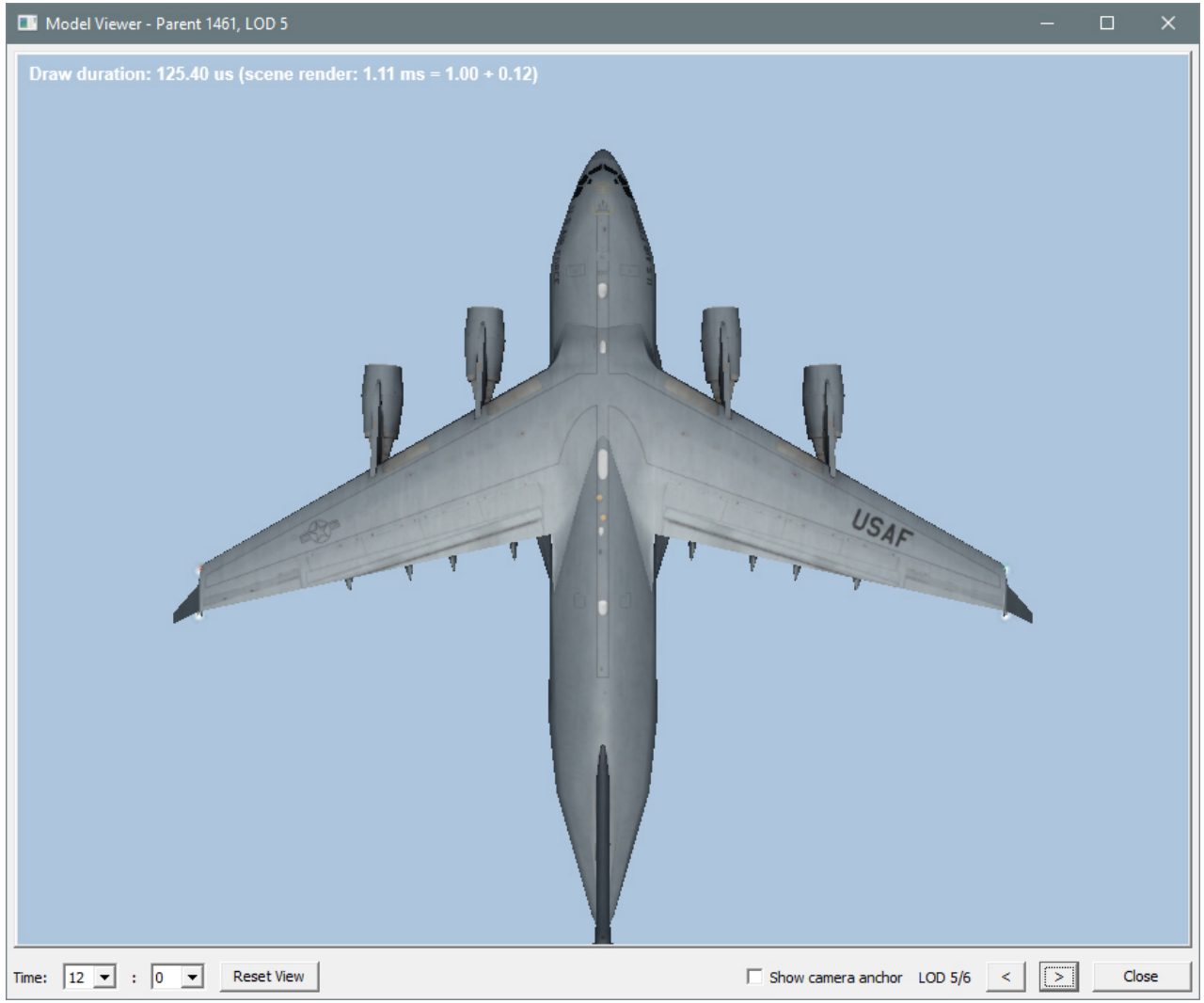
None Selected
Click or click-and-drag to select objects
Add Time Tag
Auto Key
Set Key
Key Filters...

After exporting this to .LOD and rebuilding the DB, we can fire up the BMS Editor- Model Viewer and switch to the LOD 5.



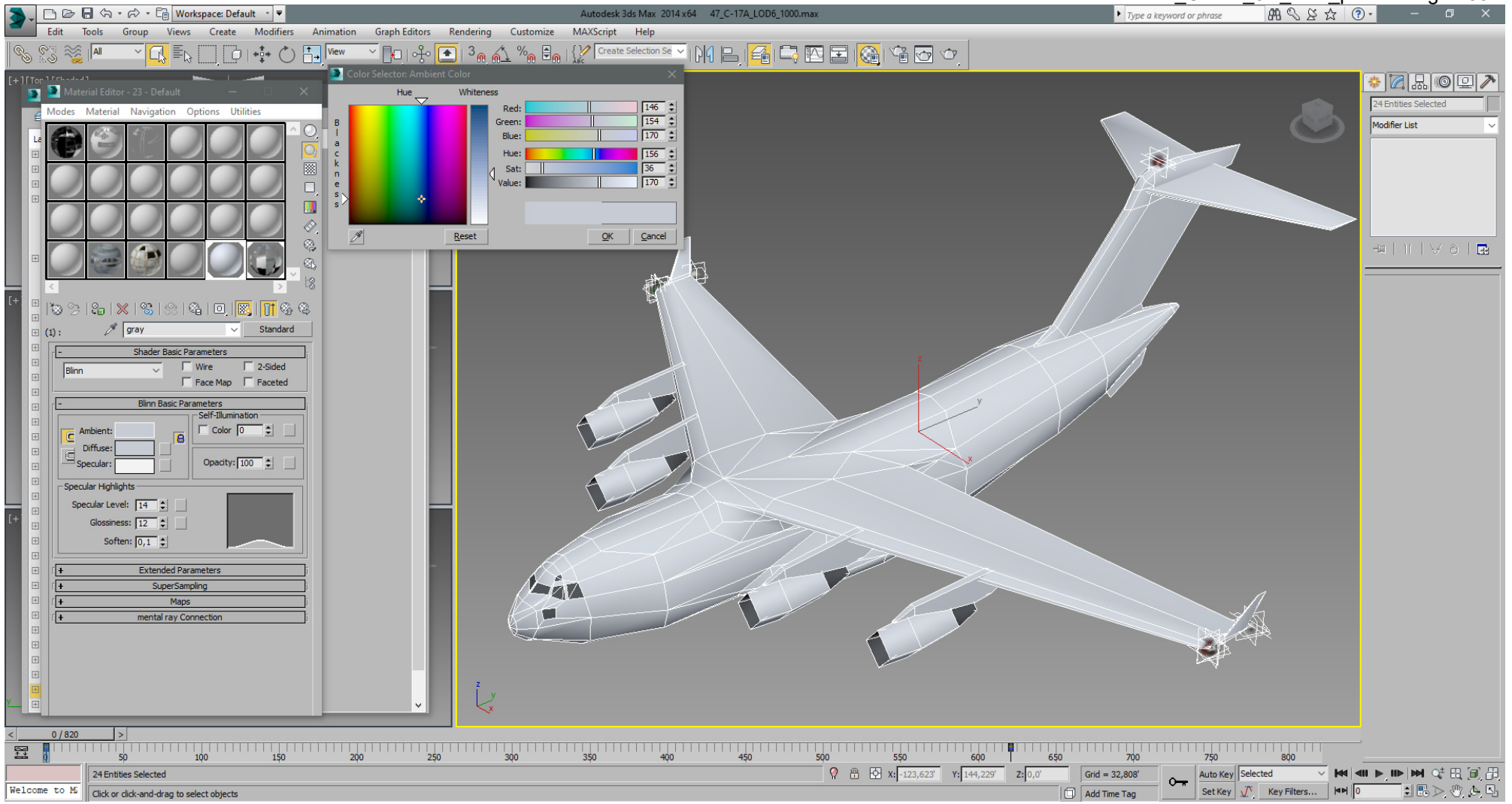
And finally for LOD 6 we add another line to our PARENT.DAT.

Dimensions = 124.000000 -73.116997 87.394997 -12.500000 12.500000 -11.263000 9.737000
TextureSets = 1
Switches = 69
Dofs = 93
AddLOD = Model_0.LOD 150.000000
AddLOD = Model_1.LOD 300.000000
AddLOD = Model_2.LOD 600.000000
AddLOD = Model_3.LOD 1200.000000
AddLOD = Model_4.LOD 2500.000000
AddLOD = Model_5.LOD 10000.000000
AddLOD = Model_6.LOD 15000.000000

With that last line added, LOD 6 is used from 10000 ft up to 15000 ft distance.
15000 ft is the maximum and we don't need a further LOD farther away.

LOD 6 will be untextured, but get a color which matches our texture good as possible.
For this we can create another "Multi Material" with just two colors.
- grey matching our skin color
- darker gray which we already use for the windows since LOD 5

Note: The grey color, here RGB 146,154,170 looks way brighter in 3dsMax than the exported result in OpenGGLGOD viewer, Model Viewer or insim.

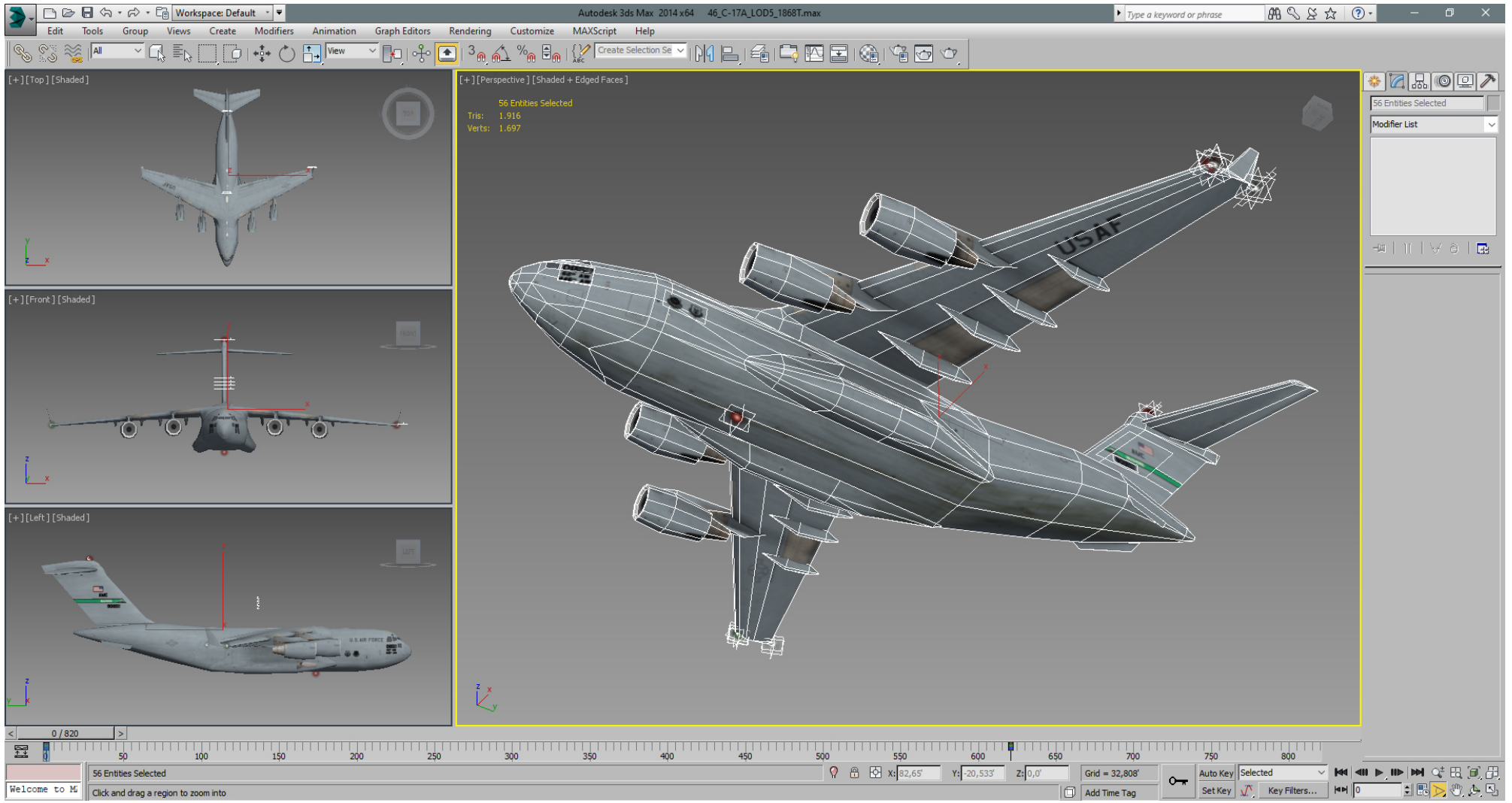


On the 3d model, we suppressed the flap fairings and the license plates.
Then we did a further simplify, where the engines became even 4- sided cylindrical.
Additionally the front and back tris of the engines got the darker grey color.

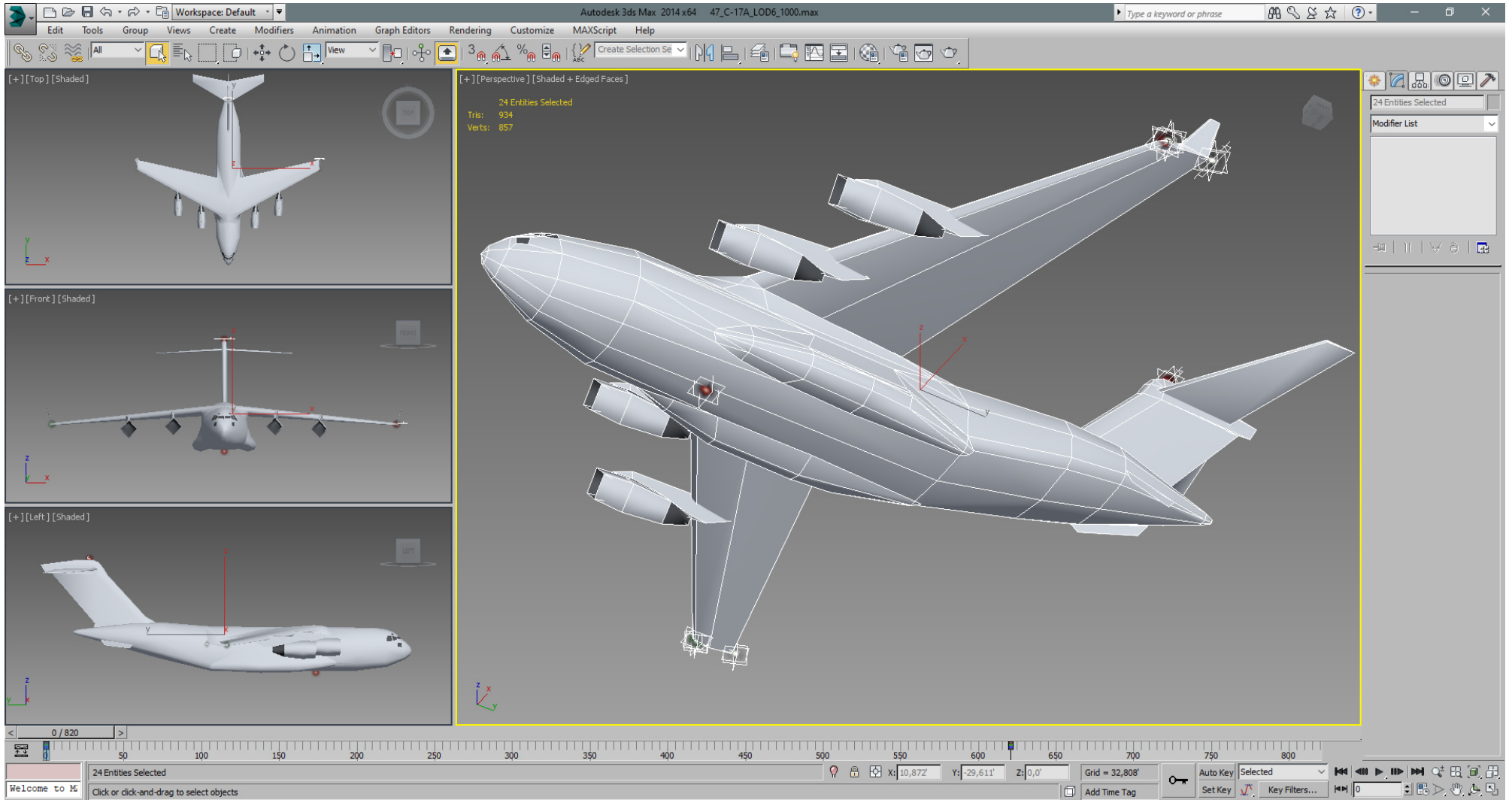
With this done, we are at a total tri- count of 934.
The target for LOD 6 was 50% of 1875, so 937,5 tris.

Note that we kept the 96 tris of pType 20 lit geometry for navigation lights also for this last LOD.

Before (LOD 5):



After (LOD 6):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Workspace: Default
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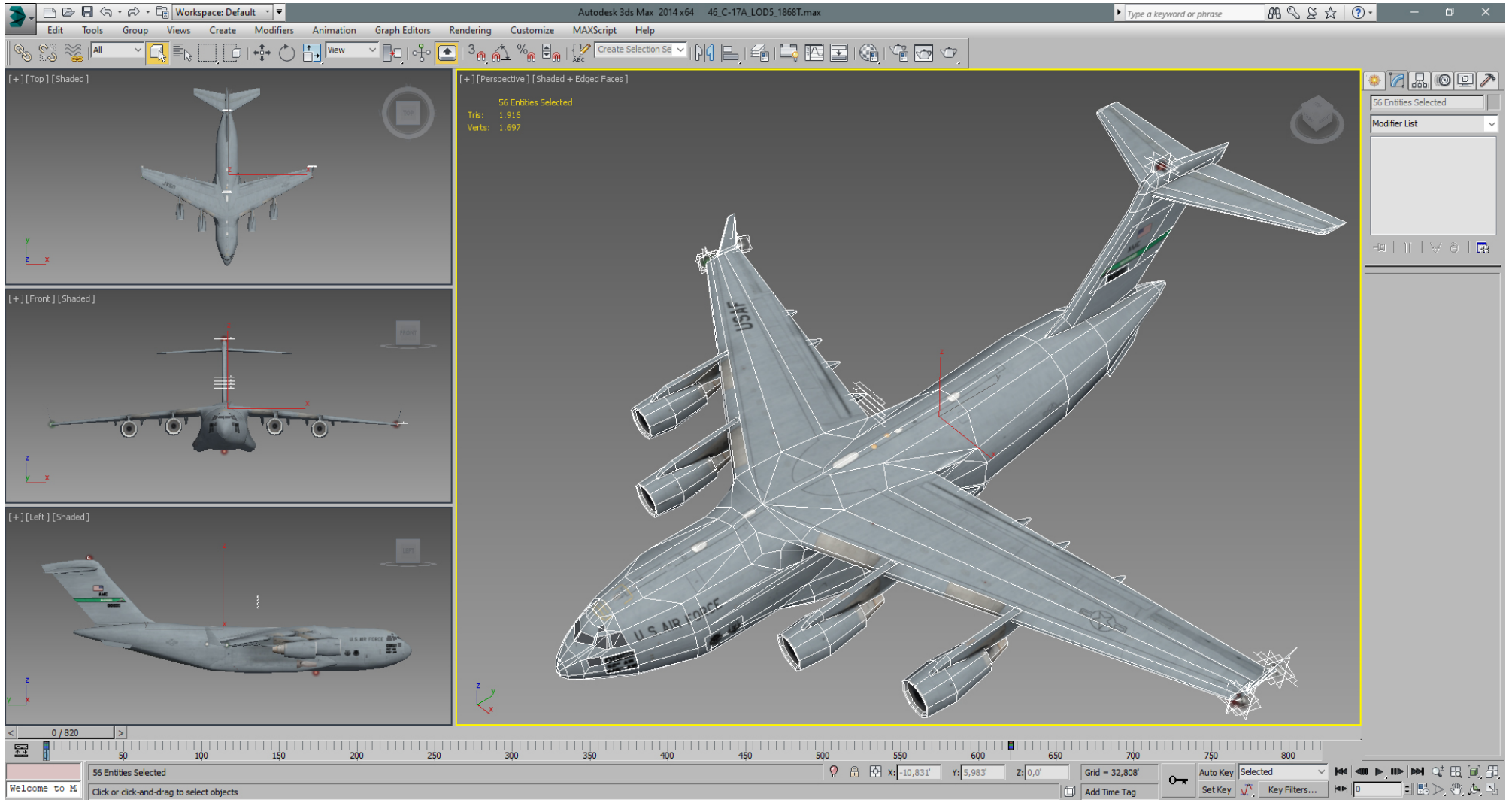
[+][Front][Shaded]
[+][Left][Shaded]
[+][Perspective][Shaded + Edged Faces]
24 Entities Selected
Tris: 934
Verts: 857
Modifier List
0 / 820
24 Entities Selected
Click or click-and-drag to select objects
Add Time Tag
Auto Key
Set Key
Key Filters...

Before (LOD 5):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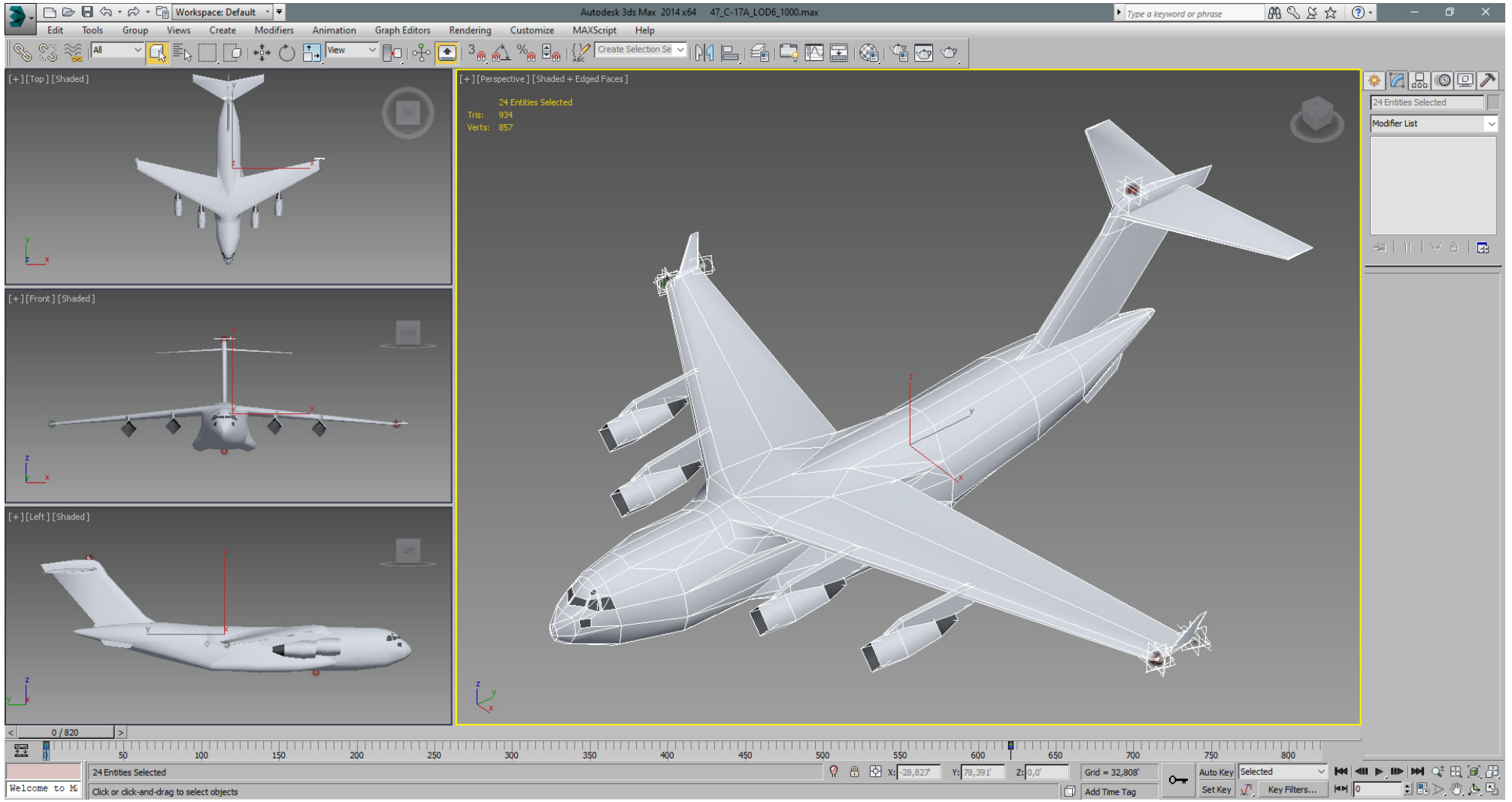
[+][Front][Shaded]
[+][Left][Shaded]
[+][Perspective][Shaded + Edged Faces]
56 Entities Selected
Tris: 1.916
Verts: 1.697
U.S. AIR FORCE
USAF
56 Entities Selected
Click or click-and-drag to select objects

After (LOD 6):


Autodesk 3ds Max 2014 x64 47_C-17A_LOD6_1000.max
Workspace: Default
Edit Tools Group Views Create Modifiers Animation Graph Editors Rendering Customize MAXScript Help
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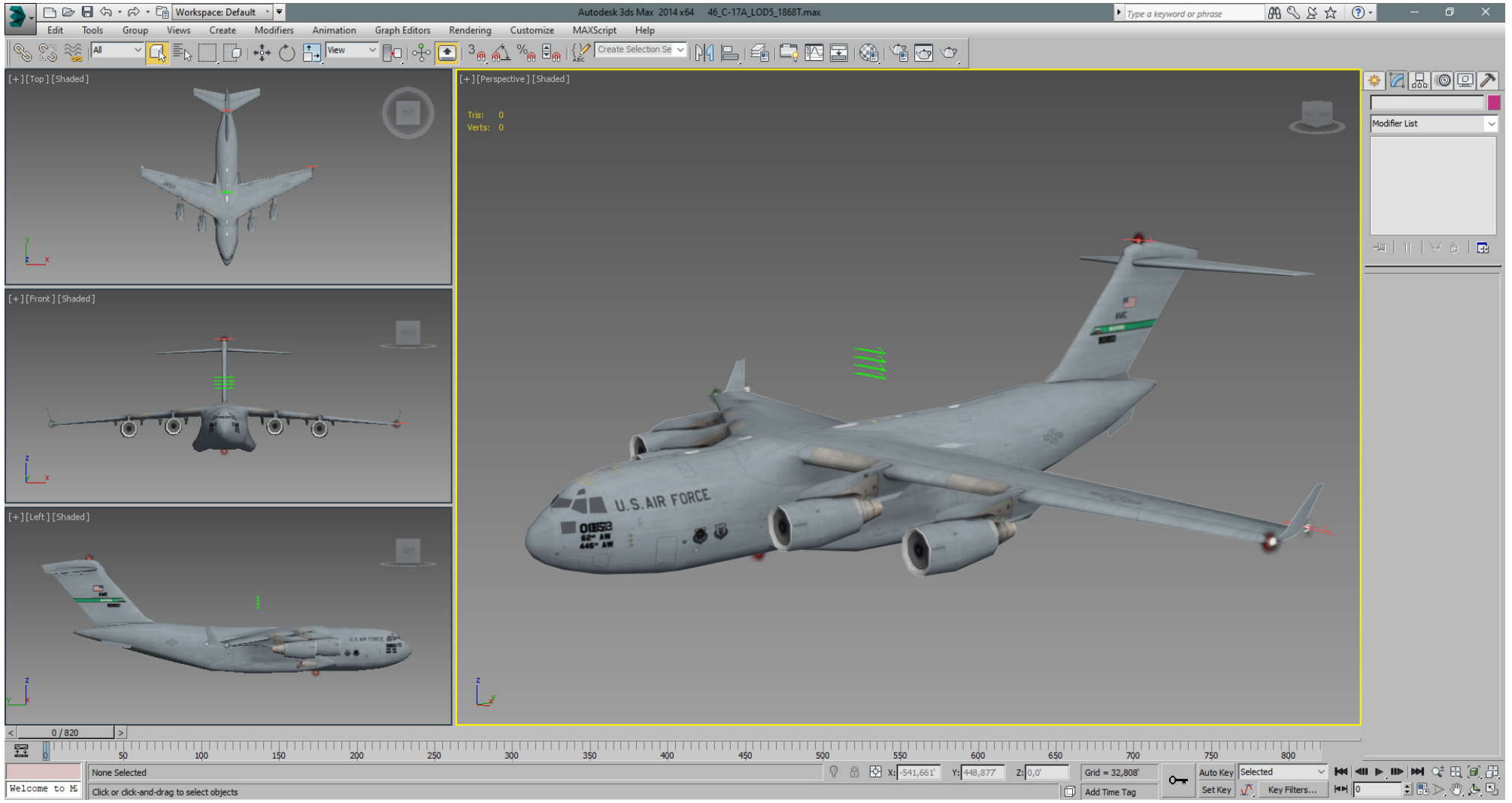
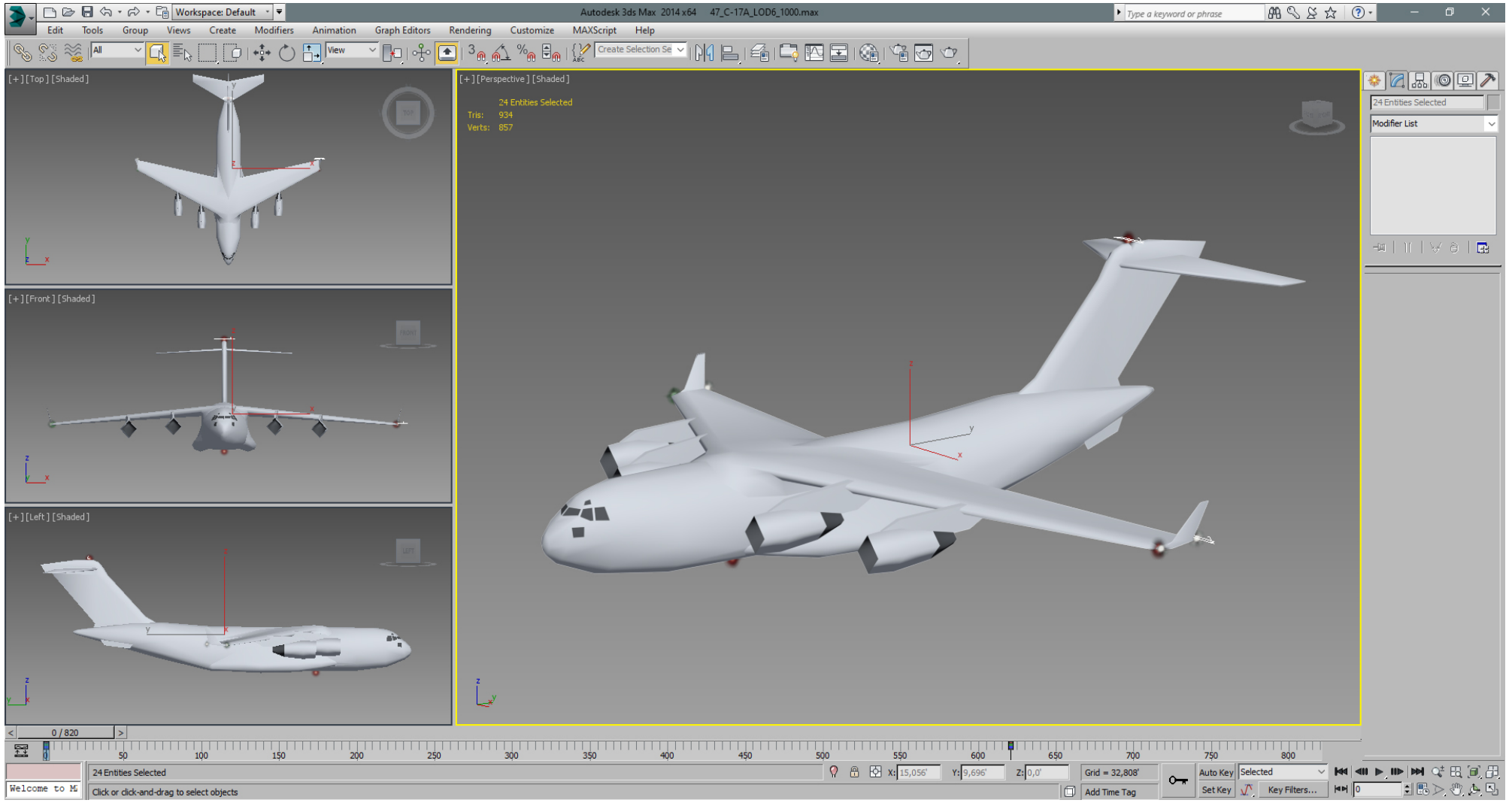
[+][Left][Shaded]
[+][Perspective][Shaded + Edged Faces]
24 Entities Selected
Tris: 934
Verts: 857
Modifier List
0 / 820
24 Entities Selected
Click or click-and-drag to select objects
Add Time Tag
Auto Key
Set Key
Key Filters...

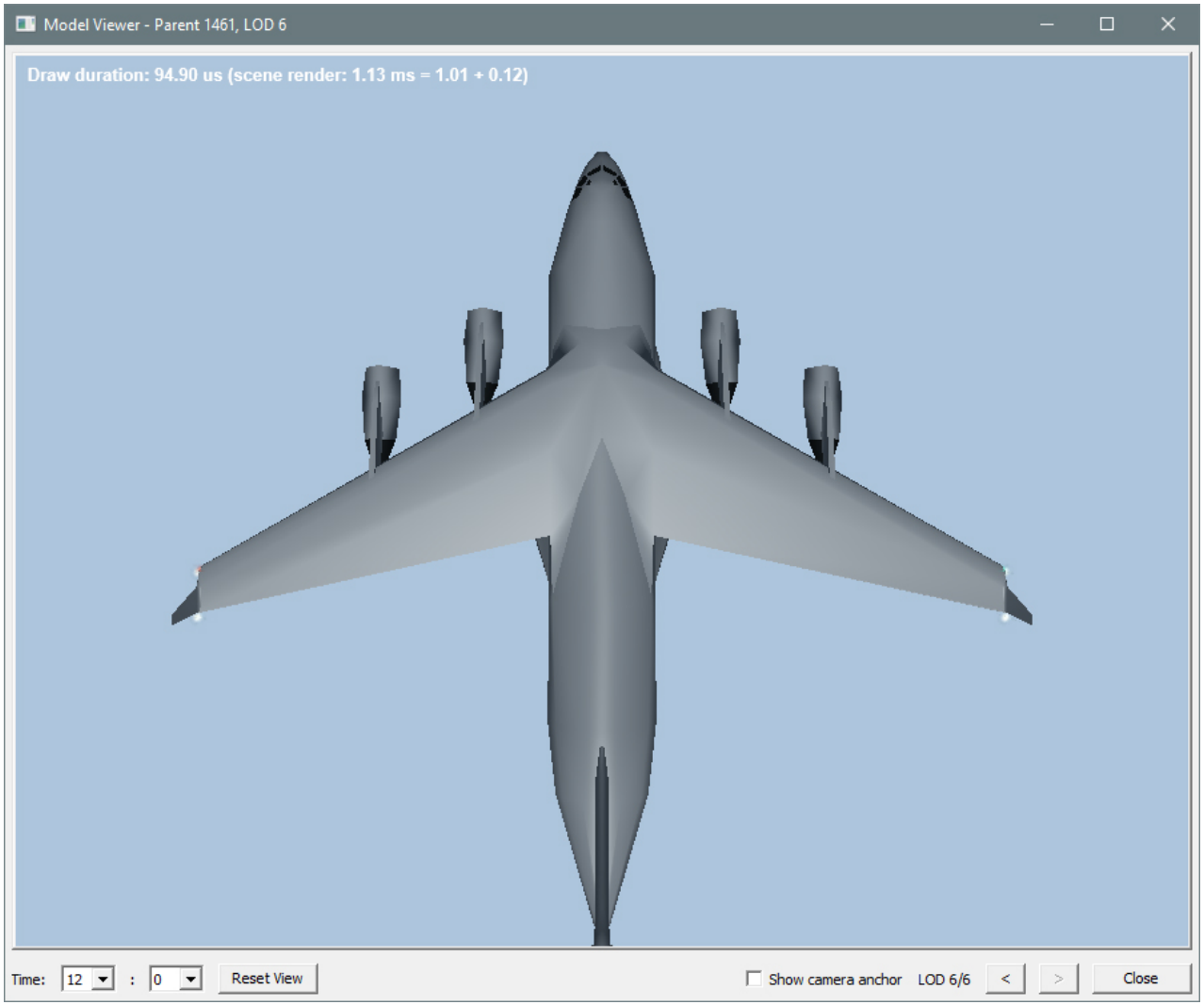
Before (LOD 5):


Autodesk 3ds Max 2014 x64 46_C-17A_LOD5_1868T.max
Workspace: Default
Edit Tools Group Views Create Modifiers Animation Graph Editors Rendering Customize MAXScript Help
[+][Top][Shaded]
[+][Front][Shaded]
[+][Left][Shaded]
[+][Perspective][Shaded]
Tris: 0
Verts: 0
U.S. AIR FORCE
Modifier List
0 / 820
None Selected
Click or click-and-drag to select objects
Add Time Tag
Auto Key
Set Key
Key Filters...

After (LOD 6):

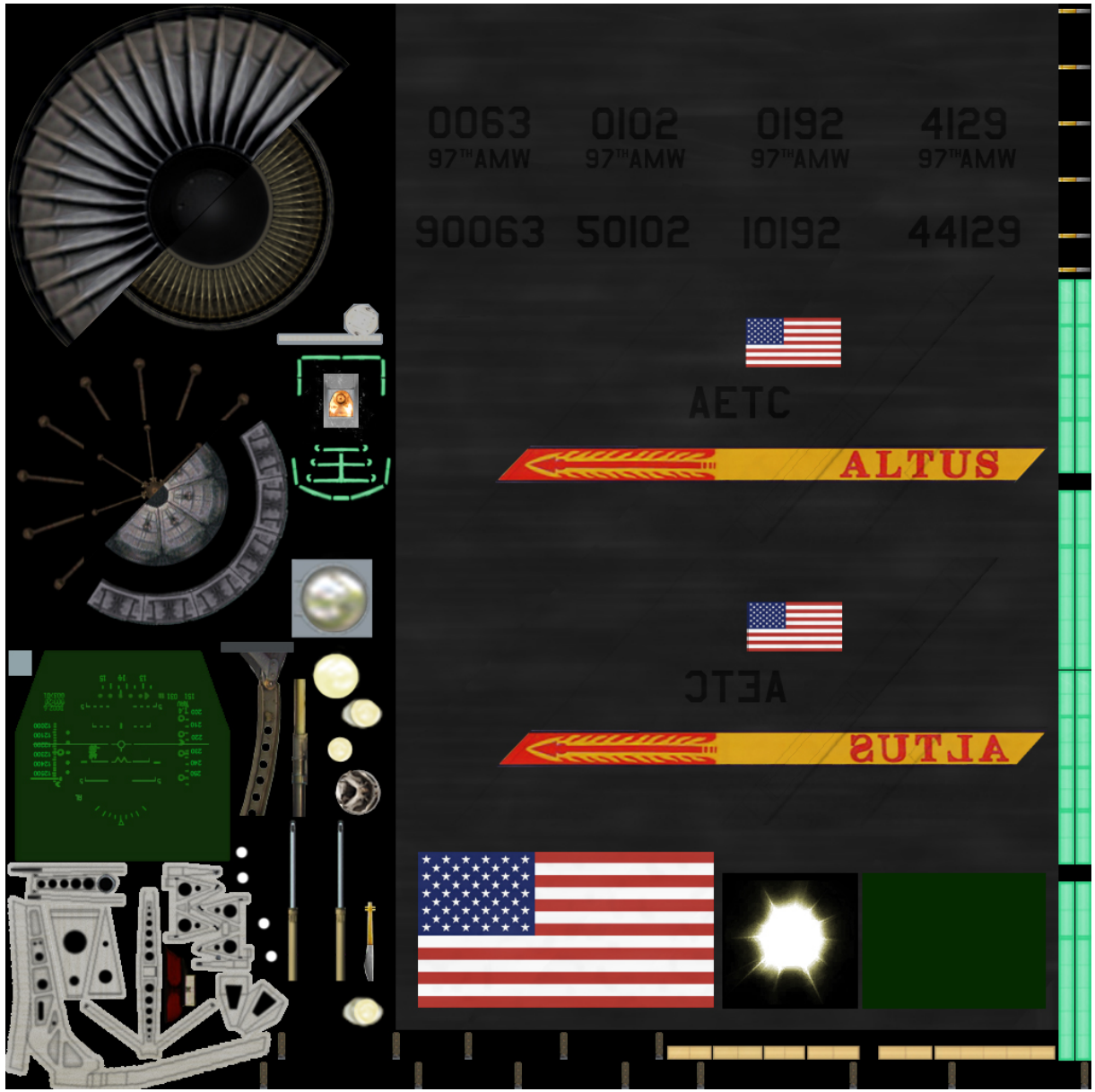

Workspace: Default
Autodesk 3ds Max 2014 x64 47_C-17A_LOD6_1000.max
Edit Tools Group Views Create Modifiers Animation Graph Editors Rendering Customize MAXScript Help
[+][Top][Shaded]
[+][Front][Shaded]
[+][Left][Shaded]
[+][Perspective][Shaded]
24 Entities Selected
Tris: 934
Verts: 857
Modifier List
0 / 820
24 Entities Selected
Click or click-and-drag to select objects
Add Time Tag
Auto Key
Set Key
Key Filters...

After exporting this to .LOD and rebuilding the DB, we can fire up the BMS Editor- Model Viewer and switch to the LOD 6.

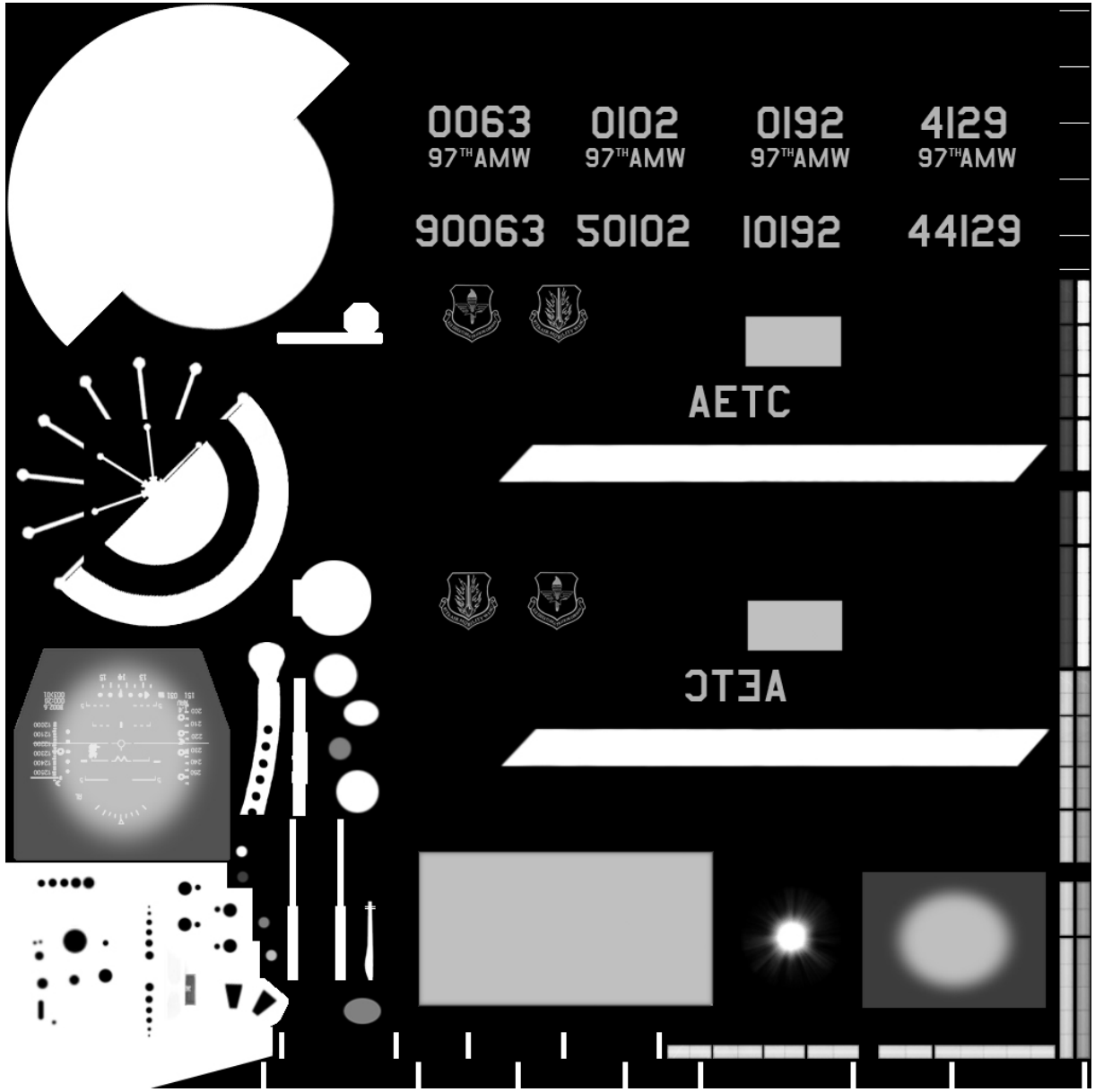


I think the lower LODs are done now, and we can play with LOD distances in Parent.dat anytime.

After the lower LODs done, we can continue with creating the license plates textures for the differently squadrons and tail bands.
Therefore we copy our DTX3 source texture, which holds the "McChord" colors and change the tailband and numbers to those of "ALTUS".
Here is the RGB channel:



And here the Alpha channel:



Then we did the same for "CHARLESTON".

And so we have 3 differently license plates textures at the moment.

"McChord" use aircraft serials:
80052
80053
90167
90165


PAUSED
ORBIT CAMERA: BMS
Flaps 20 LEFs 25
U.S. AIR FORCE
0052
62ND AW
446TH AW
AMC
80052

"CHARLESTON" use aircraft serials:
33124
00221
77182
88204


Flaps 20 LEFs 25
ORBIT CAMERA: BMS
U.S. AIR FORCE
3124
437TH AW
315TH AW
AMC
CHARLESTON
3124

"ALTUS" use aircraft serials:
90063
50102
10192
44129


Flaps 20 LEFs 25
ORBIT CAMERA: BMS
U.S. AIR FORCE
0063
97TH AMW
AETC
90063

It's time to ask the DB manager for free texture numbers we can use.

We got 173.dds, 174.dds, 175.dds and 176.dds for use with the C-17.
So we can prepare the textures and the models for final.

Until now our model is using texture 1598.dds for the main DXT1 and 1599.dds for the license plates DXT3 textures.

Now we can save the final HiRes textures from Photoshop, or rename existing 1598.dds and 1599.dds
173.dds - 4096² DXT1 - including all mipmaps - main texture
174.dds - 1024² DXT3 - including all mipmaps - license plates texture "McChord"
175.dds - 1024² DXT3 - including all mipmaps - license plates texture "Charleston"
176.dds - 1024² DXT3 - including all mipmaps - license plates texture "Altus"

Then we copy those 4 HiRes textures to \Data\TerrData\Objects\KoreaObj_HiRes.

For the LowRes textures, we resize our original Photoshop 4096² file to 2048² pixels and save it again as DXT1, including all mipmaps.

Similar, we resize our original Photoshop 1024² file to 512² pixels and save it again as DXT3, including all mipmaps.

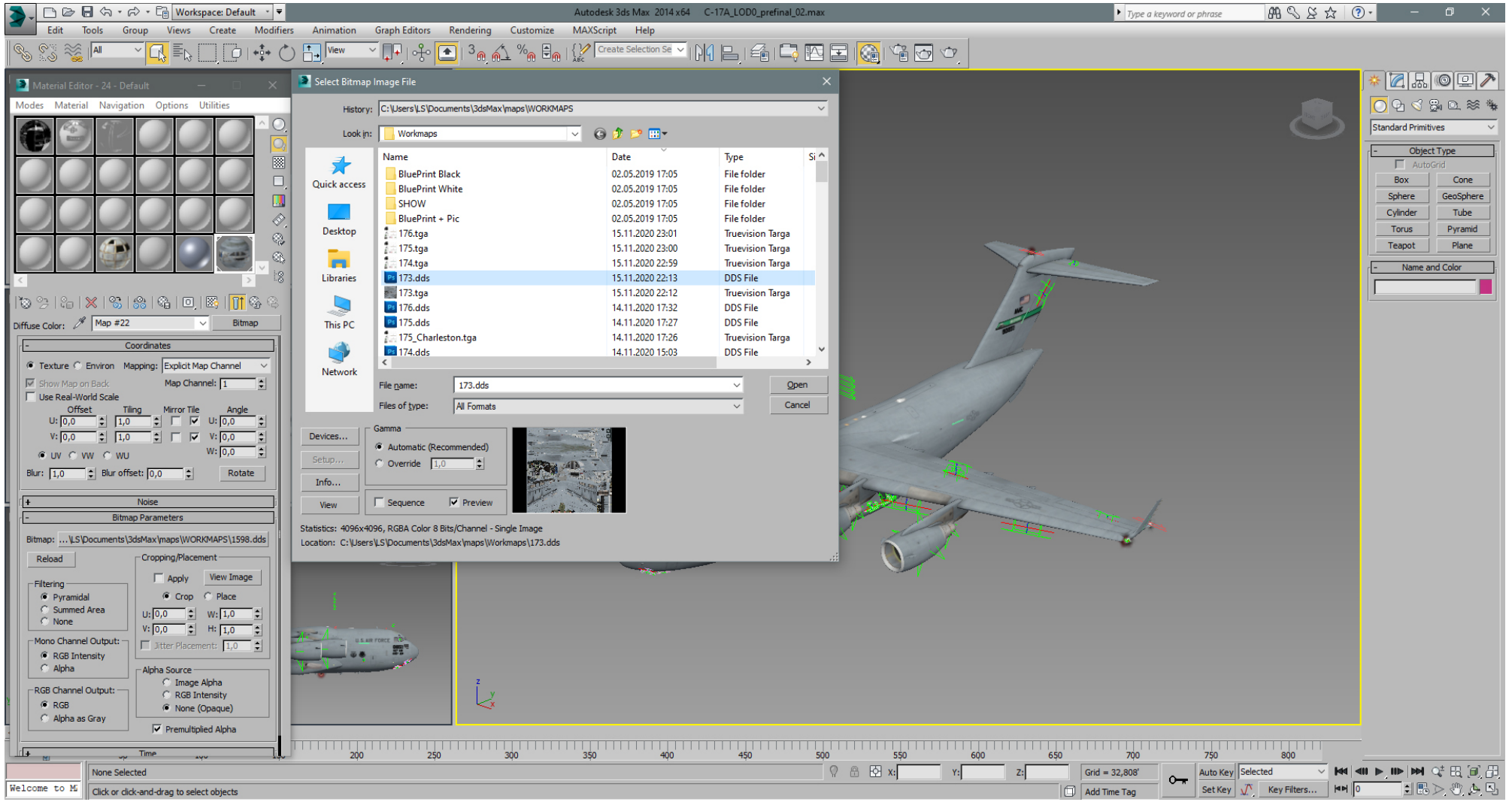
It looks like this for the LowRes textures:
173.dds - 2048² DXT1 - including all mipmaps - main texture
174.dds - 512² DXT3 - including all mipmaps - license plates texture "McChord"
175.dds - 512² DXT3 - including all mipmaps - license plates texture "Charleston"
176.dds - 512² DXT3 - including all mipmaps - license plates texture "Altus"

Then we copy those 4 LowRes textures to \Data\TerrData\Objects\KoreaObj.

Remember, we always do lower resolution skins from the original Photoshop hires source,
never from lossy compressed files like .dds.

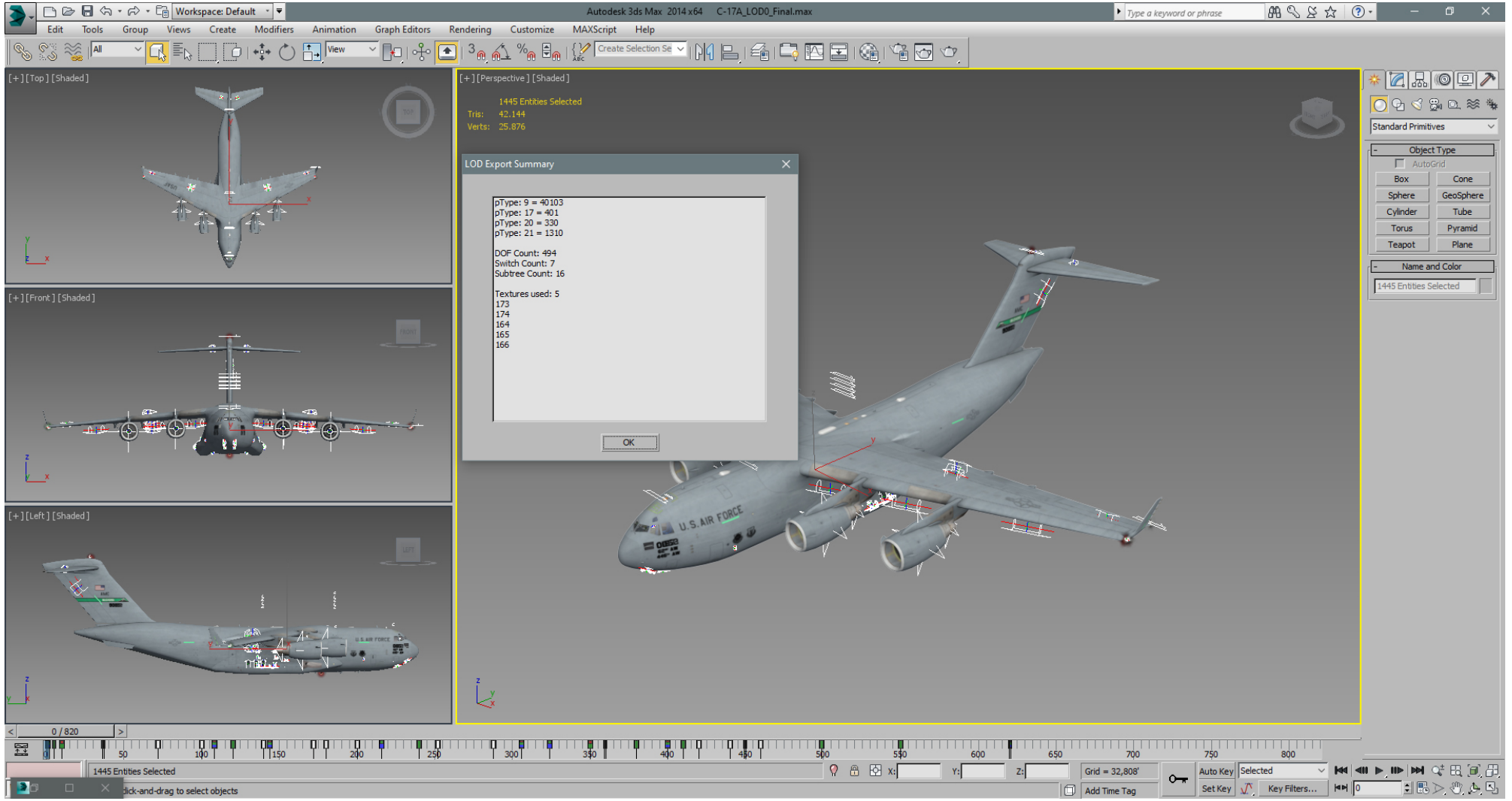
Next we need to prepare our 3D models to use the changed texture numbers.

Starting with LOD 0, we simply change the used DXT1 texture in the "Material Editor" from 1598.dds to 173.dds for our pType 9 material.



We do similar for our pType 20 (glow) and pType 21 (transparent) material and change the used DXT3 texture from 1599.dds to 174.dds.
Note: we don't change the textures for the NAV- light pType 20 (glow) material, which use 164.dds, 165.dds and 166. dds.

When done, we export the model a last time to Model_0.LOD and check the "LOD Export Summary".
Only 4 pTypes and 5 textures with the corrected texture numbers used.



If OpenGLLOD shows the wrong textures on the model, remember to copy the correct textures to where our .LOD resist.

To get rid of the now unused old texture numbers, stored within the "UVW unwrap" modifiers,
we can use a little script which takes care of this.

Clear All unused UVW Unwrap Textures.ms
Code:
for i in getClassInstances Unwrap_UVW do i.texMapList = #()

Subsequently we save this one as C-17A_LOD0_Final.max

We do the same to change texture numbers for all the other LODs except last untextured LOD.

For LOD6 we can do better, because beside the needed NAV- lights textures 164.dds, 165.dds and 166.dds, the old textures are still listed on the "LOD Export Summary", although we have the material set as a pType 5 (untextured).

The problem here is the "Multi- Material" which includes also the material and textures for the NAV- lights
at "Material ID" 5, 6 and 7.

To fix this, we need to create a "Standard" material for them.

Therefore we can simply drag and drop the pType 20 NAV- lights materials from the "Multi- Material"
to 3 free slots in the "Material Editor" as a copy.

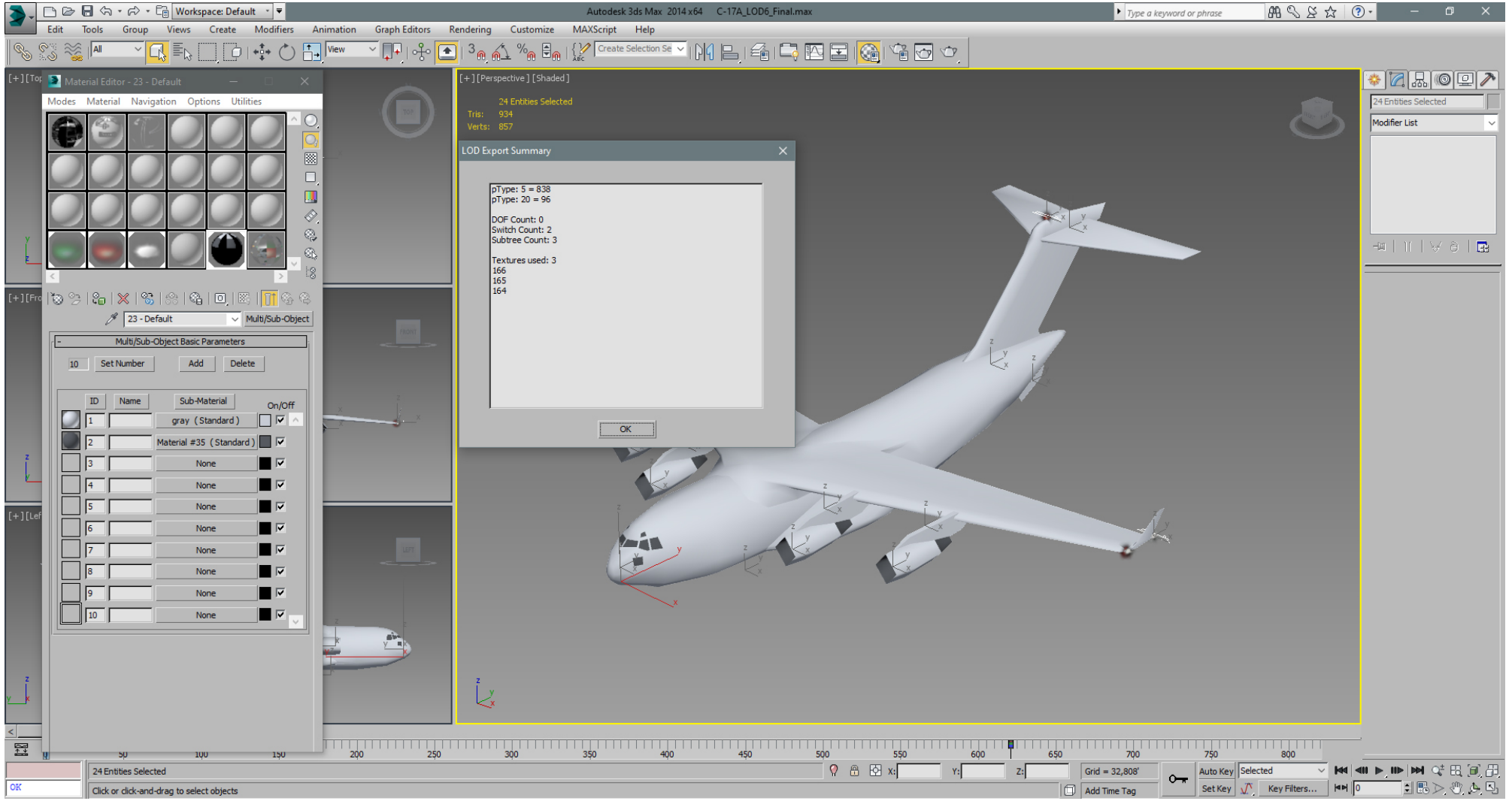
Before we can assign the "Standard" materials to the NAV- lights geometry, we best add an "Edit Poly" modifier
below the "Vertex Paint" modifier, and change the "Material ID" back to 1 in "Polygon" sub- mode.

Now we can assign the "Standard" materials to the NAV- lights geometry.

If we export the model to LOD again, then there are just 3 NAV- lights textures listed.

Note also another "Multi- Material" in the Material Editor, with just 2 colors.
Main gray and darker gray for painting the windows and engine.

On the left bottom of the Material Editor we see the "Standard - Materials" for the NAV- lights.
On the most right bottom of the Material Editor there is our LOD0 - LOD5 "Multi- Material", which is unused for LOD6.



OK, the LODs are nearly ready for final, but we need to assign our Texture Sets.

Texture Sets are needed to be able to switch between them, when we click "Change Skin" in the weapons load screen insim.

That way one 3D model can use multiple completely differently liveries by using differently textures.

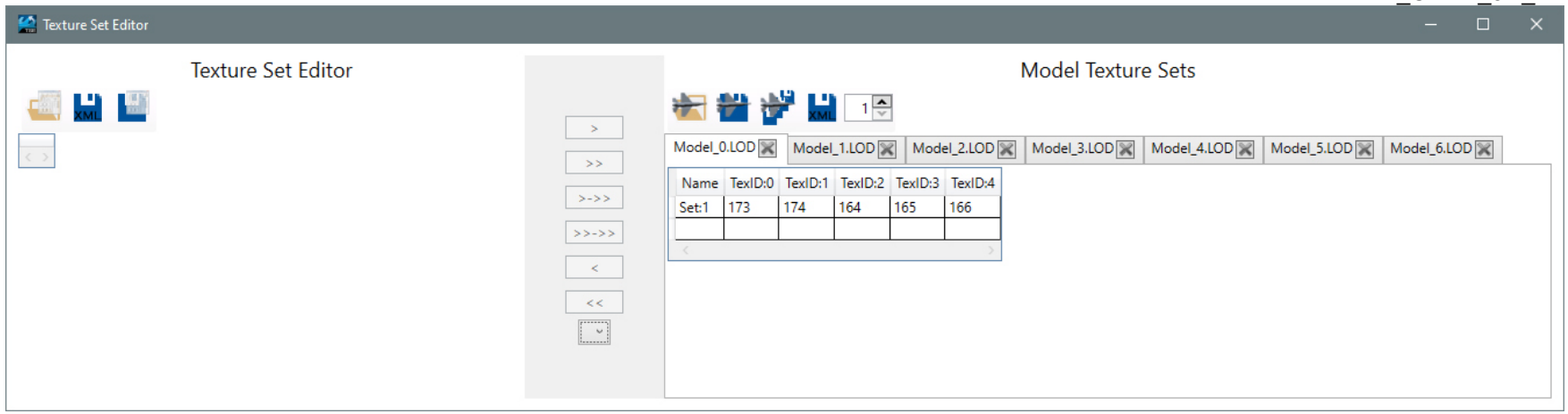
At the moment, our lately exported LODs use 1 Texture Set.
173.dds DXT1 main
174.dds DXT3 license plates "McChord"
164.dds DXT3 green light
165.dds DXT3 red light
166.dds DXT3 white light

To add more texture sets to our LODs, we need the "Texture Set Editor" tool, which can be found nearby the 3dsMax LOD Exporter downloads.
https://1drv.ms/u/s!AphmZaA4AU1FgQi7...NHyUO?e=h9fgwg

I suggest to read the manual carefully first !!!

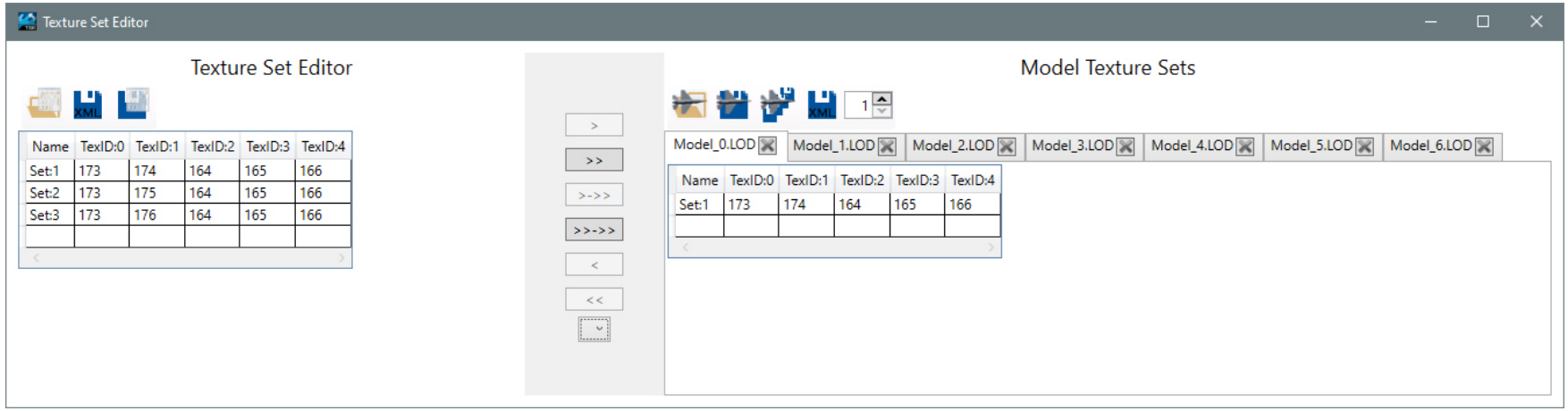
After the install we can open LODs or a Parent.dat file.

In our case, the latest LODs and the Parent.dat resist already in our \Parents\1461 folder.
So we open the Parent.dat from there, which loads all the associated LODs 0 - 6.



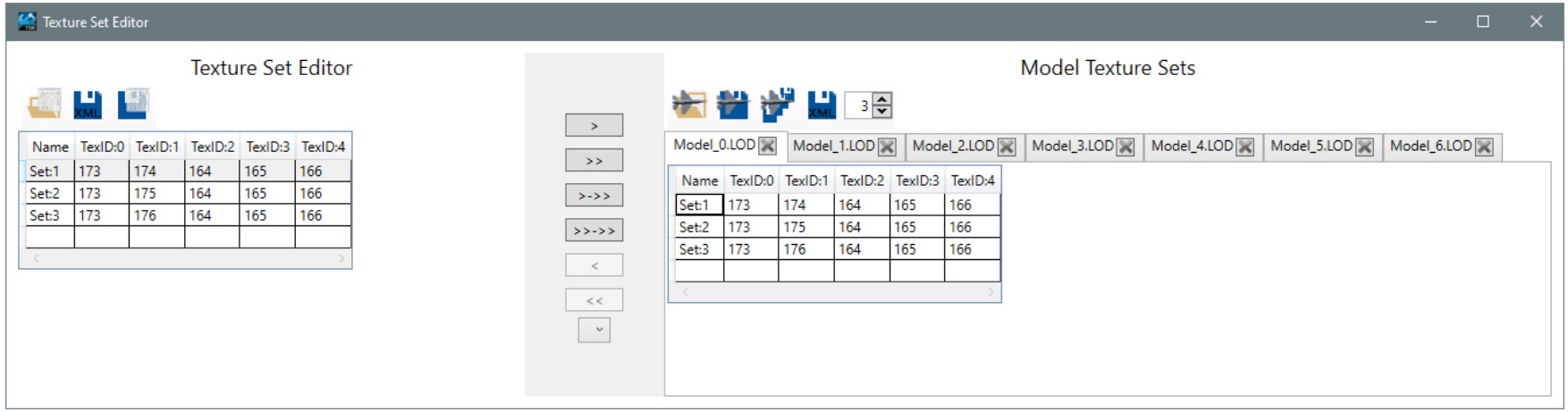
From here we can already "Save as XML Texture Set". Then we can load that .xml and add 2 more Texture Sets.
In our case, we keep all Texture IDs in the sets the same, except for our DXT3 license plates textures.

We just want to switch between the license plates textures only.
174.dds DXT3 "McChord"
175.dds DXT3 "Charleston"
176.dds DXT3 "Altus"



After setting the "Master Row", we can use the "Copy all texture sets to all models" function,
and the "Model Texture Sets" will be updated accordingly.

Next we "Save All Models" and we are done here.



The textures to use for all Texture Sets are now all stored within the LODs
but the number of Texture Sets must be defined in our Parent.dat.

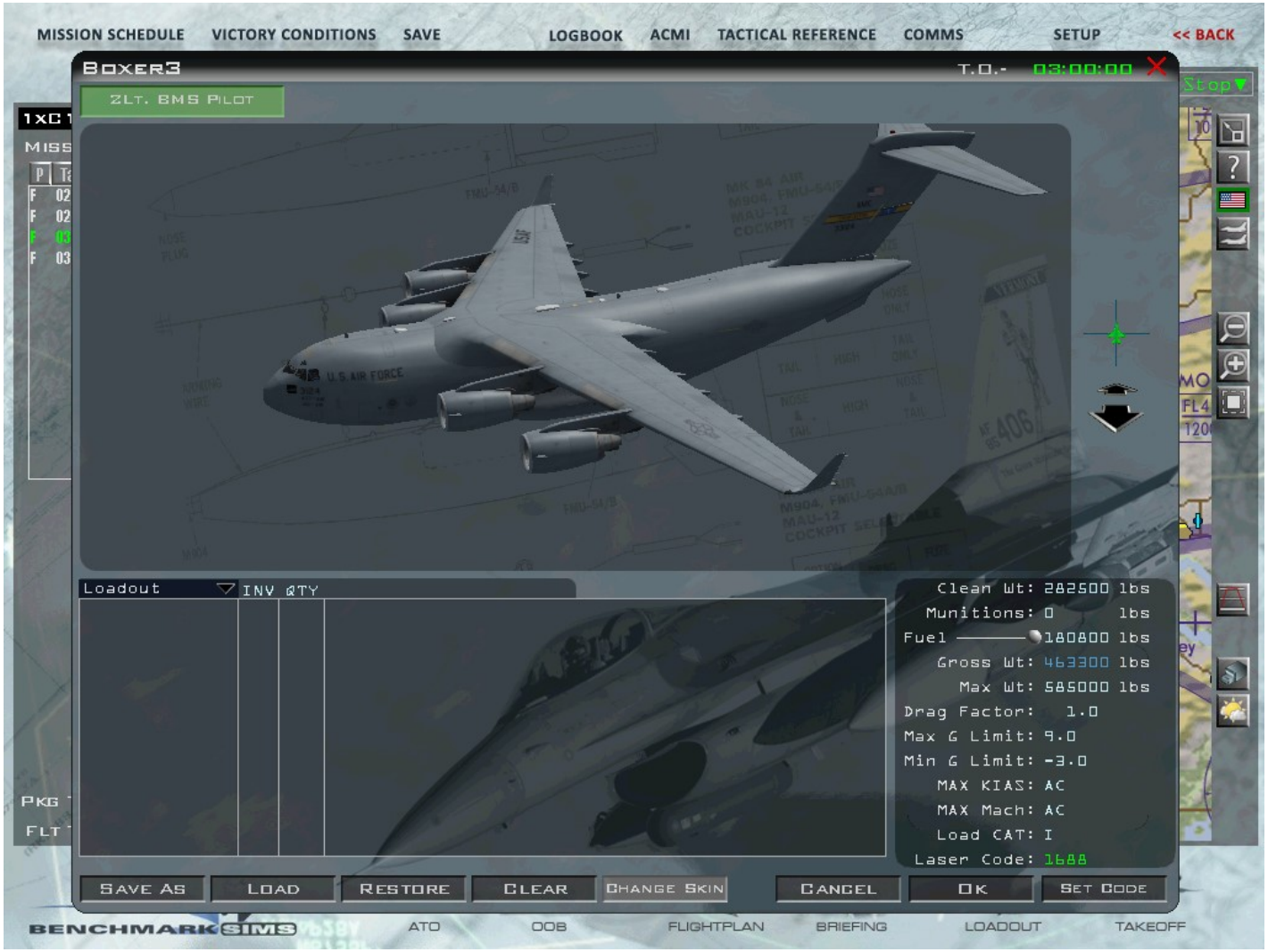
And while our LODs use now 3 Texture Sets, we set TextureSets from 1 to 3.

Dimensions = 124.000000 -73.116997 87.394997 -12.500000 12.500000 -11.263000 9.737000
TextureSets = 3
Switches = 69
Dofs = 93
AddLOD = Model_0.LOD 100.000000
AddLOD = Model_1.LOD 200.000000
AddLOD = Model_2.LOD 600.000000
AddLOD = Model_3.LOD 1200.000000
AddLOD = Model_4.LOD 2500.000000
AddLOD = Model_5.LOD 10000.000000
AddLOD = Model_6.LOD 15000.000000

Now we can rebuild the DB and check the results insim.

Can we switch between "McChord", "Charleston" and "Altus" liveries in the "Weapon load" screen, using the "Change Skin" button?

Yes we can!



It's time for latest tests insim and fine tune.

So we can change the timing of the main landing gear to get them a little asynchrony to extend/retract as often seen in RL.

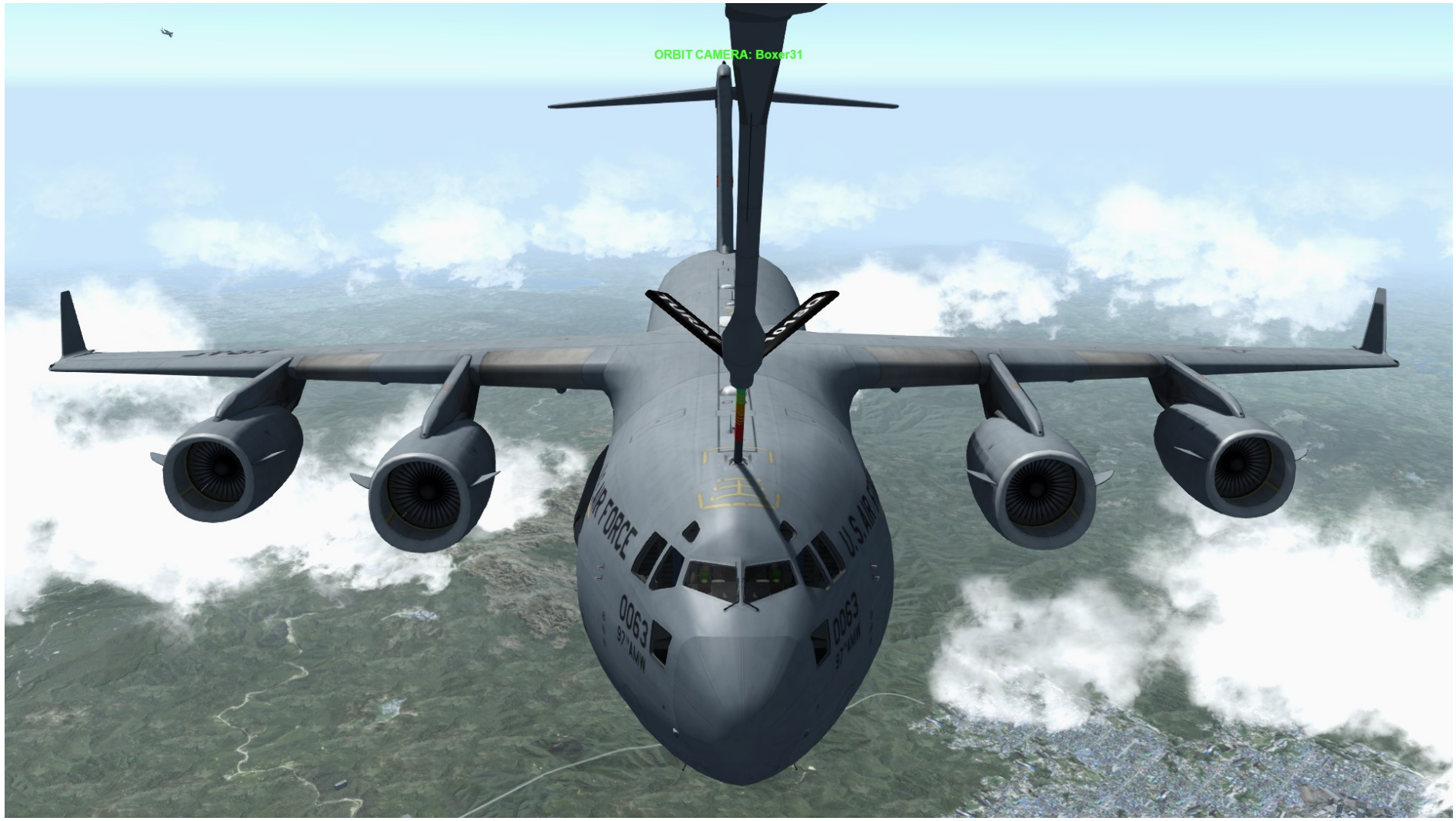
We use a slightly delay in the gear section of our C-17.dat for gear 2, 3 and 4.

GearDelayDown1 0.00
GearDelayDown2 0.90
GearDelayDown3 0.60
GearDelayDown4 0.30
GearDelayDown5 0.00

GearDelayUp1 0.00
GearDelayUp2 0.90
GearDelayUp3 0.60
GearDelayUp4 0.30
GearDelayUp5 0.00

During tests, we'll still find some things to improve, so we're forced to modify the .max files,
export to LODs, set the Texture Sets, and rebuild the DB for testing multiple times again.

With the last created AAR TE, we can check the refuel position, and it looks like we are spot on.



We could already stop here, but decided to improve further instead, so …

The AAR lights have been added lately to LOD 0 and LOD 1.

The AAR lights come from two sources.
- AAR Probe Spot Light.
- AAR LIT geometry and texture

To activate the AAR Probe Spot Light we set AARProbeSpotLight 1 in AC.dat.

```
#--------------------------------------------------
# Air-Air Refuel
#--------------------------------------------------
AARProbeSpotLight 1
```

Note that the AARProbeSpotLight set to 1 supersedes any numAARLightLevels and sets numAARLightLevels 1
in order to trigger flood light as well in the same time.

This means for now, if you decide to use AARProbeSpotLight you can not in the same time use a variable AARLightLevel spot light.

Now we can simply define the spot light parameters at the bottom of AC.dat.
The definition works the same as the spot lights Landing/Taxi.

With these settings, we light up just a small spot around the AAR door at night.
The AAR Probe Spot Light is not active at daytime.

```
#--------------------------------------------------
# Spot Lights AAR
#--------------------------------------------------
SpotProbeLightColor 0.25 0.23 0.13 # color of the light
SpotProbeLightPosition 58.60 0.00 -16.42 # the light's position
SpotProbeLightLookAt 58.60 0.00 -13.42 # position in model space at which the light should point
SpotProbeLightAttenuation 0.050000 # attenuation of the light
SpotProbeLightInnerConeDeg 0.100 # inner cone angle in degrees
SpotProbeLightOuterConeDeg 12.000 # outer cone angle in degrees
```

In the earlier explained huge modifications on the AC.dat, we have also talked about the lights and there we can read this line:

Type 7 : AAR flood light -67 // Switch to lit the AAR
Number of posits defined in dat file (auxaeroData->numAARLightLevels)
But in fact AAR flood light- Switch #67 is just for flood light network message , and not to use it for a 3D model.
The Probe Spot light is associated with the AARDoor Switch #13.

For the AAR lit geometry and texture let's start with the texture.

In the last picture of our DXT3 texture, we can already see a placeholder of the AAR lit stuff.

And in the next picture we will see that this area on the texture has been rotated and scaled to get a higher resolution of that area.

The green color in RGB channel might look a little sloppy here, but it is the alpha channel
which is relevant and restricting the color and frame insim.

The geometry is just a copy of the fuselage, with all useless triangles deleted.
After we have assigned our DXT3 texture and did the UVW mapping, we remove the smoothing groups
and add a "Vertex Paint" modifier for this object, to get it exported as pType 20.

Then this geometry has been lifted up slightly to be above the fuselage and the already existing AAR door geometry.

We have now AAR lit geometry and texture done, but how to make it work as expected insim?

As yet we have linked our already existing unlit AAR door to Switch #13.
To activate our AAR lit stuff, we can use the Switch #62 (Formation Lights)

But to get it working, we need further info.

Before, the rule for AI Formation Lights was lights on at night, 100% over friendly territory,
50% over enemy territory (no friendly objective nearby within 25 km), 0% if AI is in engagement with enemy...

Actually with 4.36 the rule seems to be lights on at night, 100% on departure and approach, else 50%,
(0% if AI is in engagement with enemy...???)

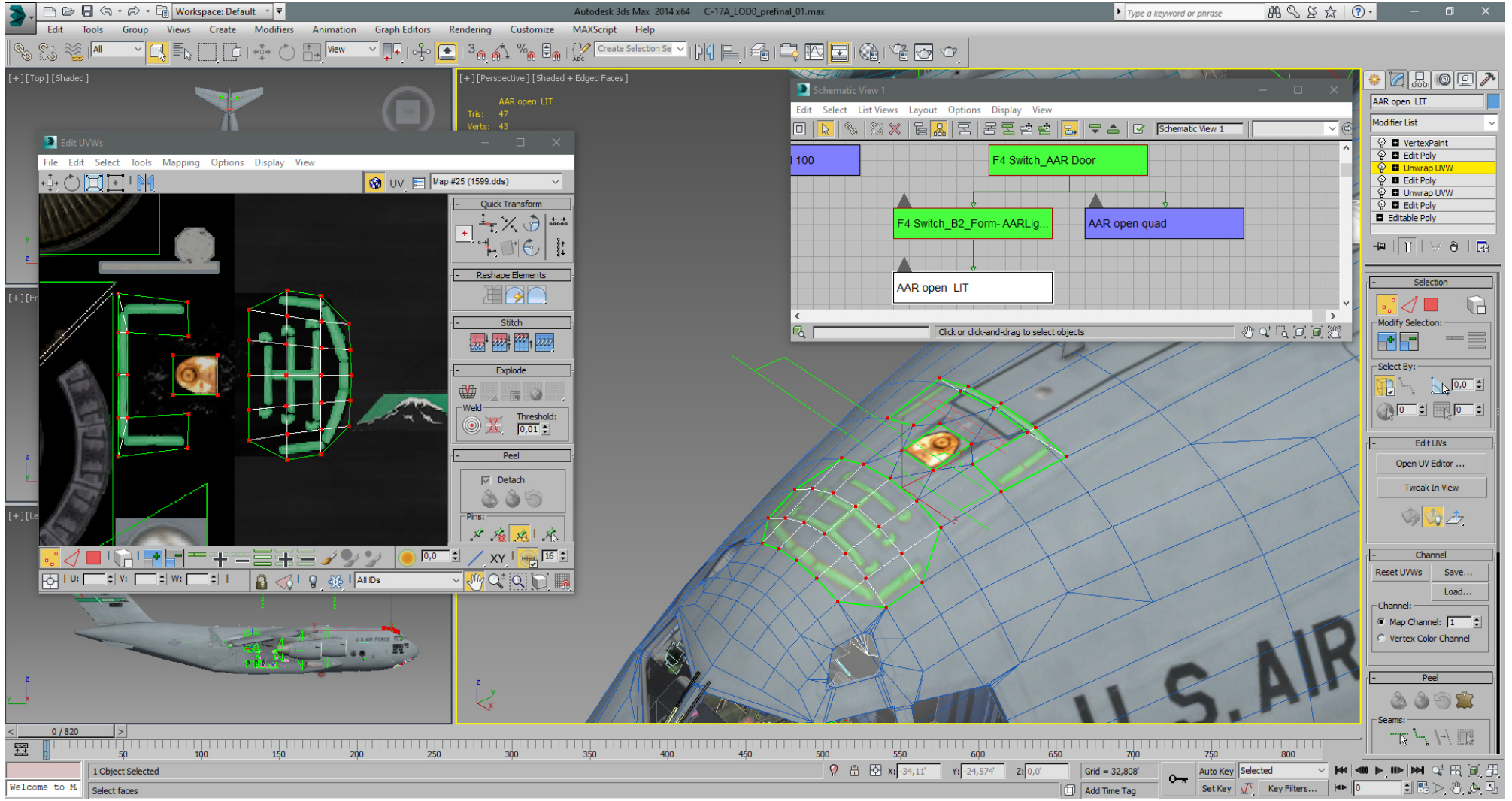
So even at night AAR, the formation lights are set to 50%.

With this information, we can copy the existing Switch #62 of "Branch 2" we already use for the formation lights 50%,
and link it to the AAR door Switch #13.

Finally we link our AAR lit geometry to that copied formation lights Switch.

That way, the AAR lit geometry is triggered with the formation lights 50% and only if AAR door is opened.

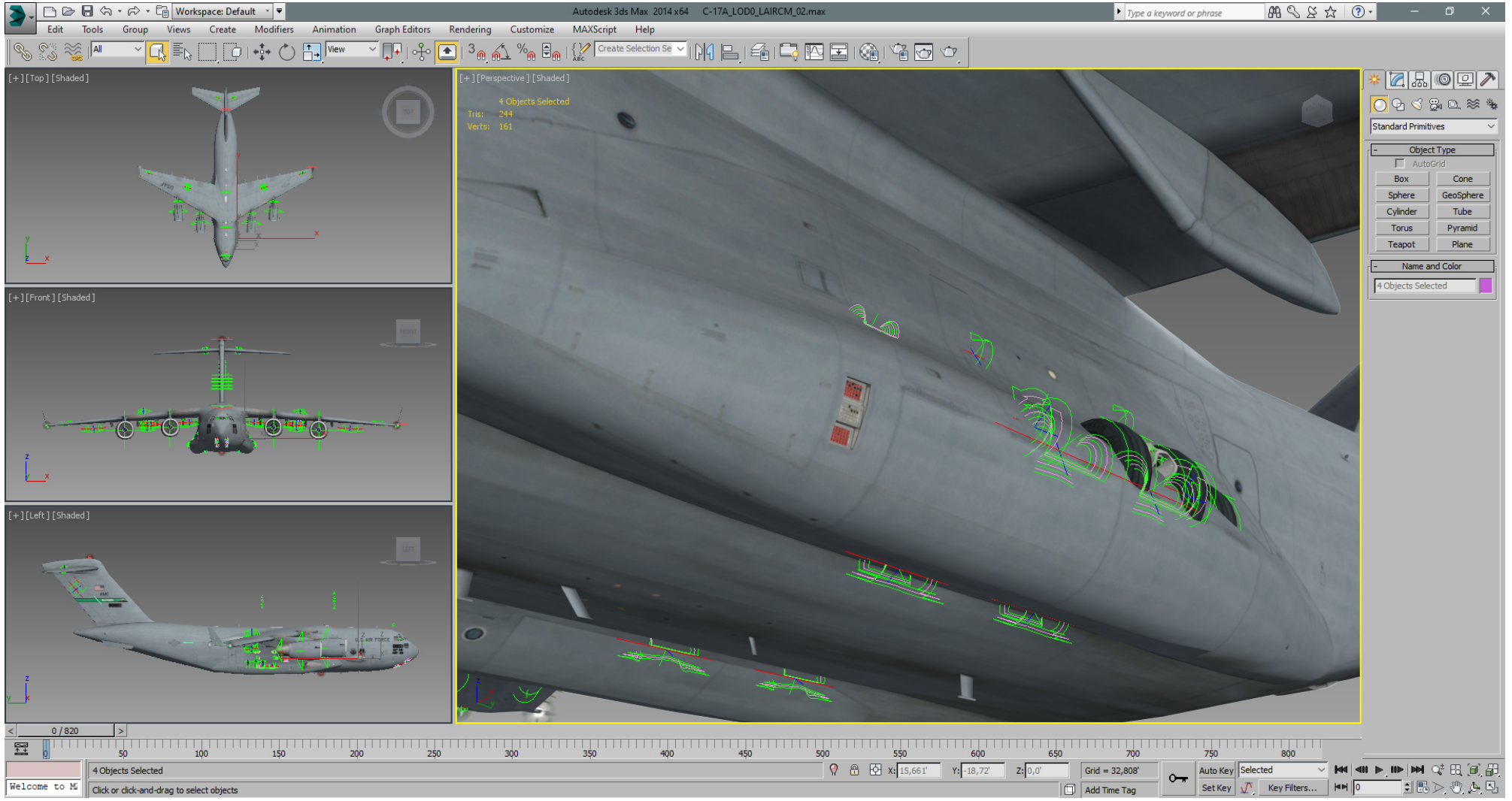
We have added 47 triangles of geometry for the AAR lit geometry, but they are linked to the existing AAR Switch, so they shouldn't hurt the performance at all.



Result:

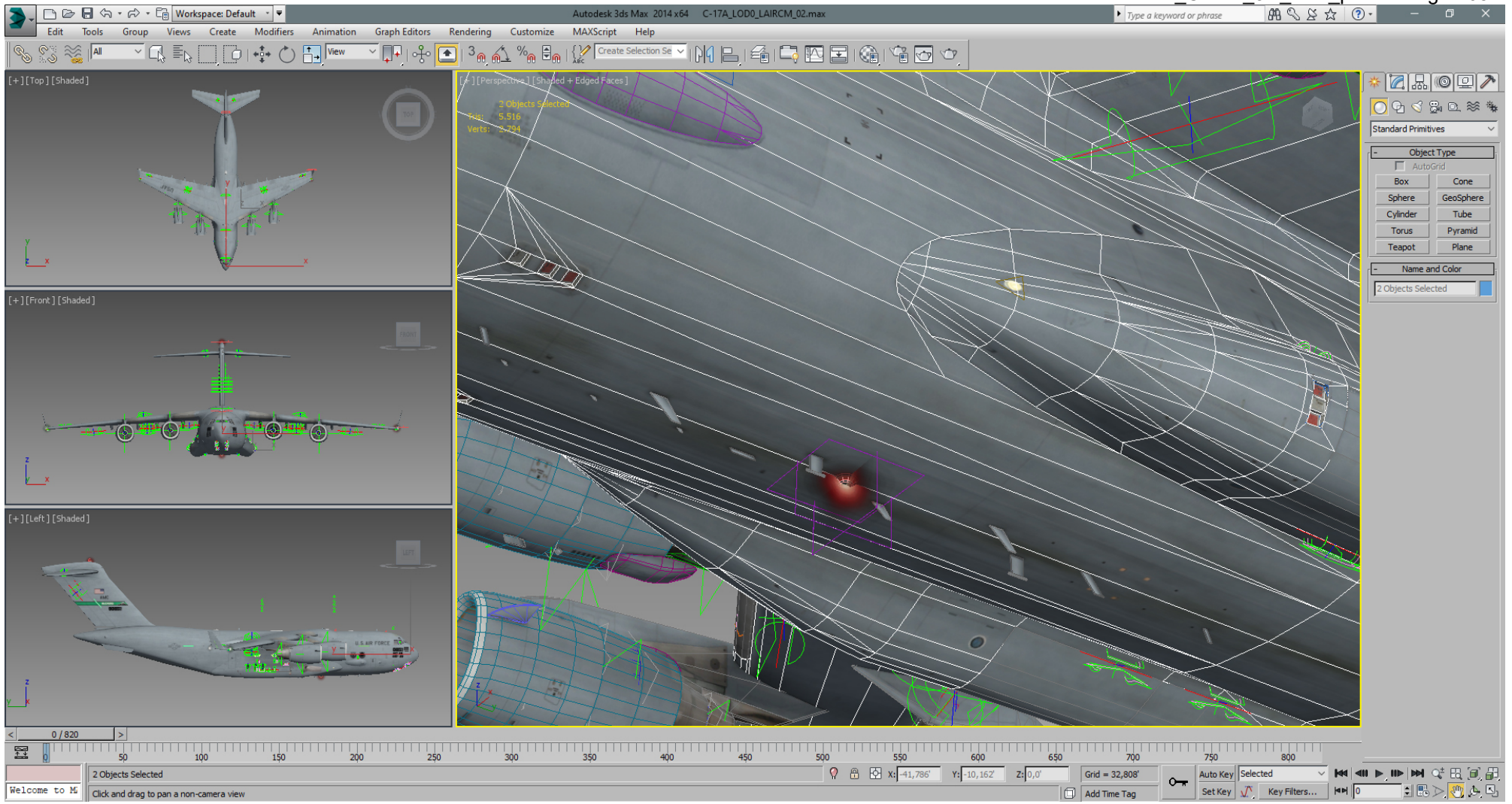
As yet, we have modeled the older Block of the C-17A, but we want the LAICRM version.
Let's see how much triangles the "war- variant" would cost for LOD 0.

The side dispensers have been cutted into the left and right sponsons.



And the bottom dispensers have been cutted into the bottom fuselage.

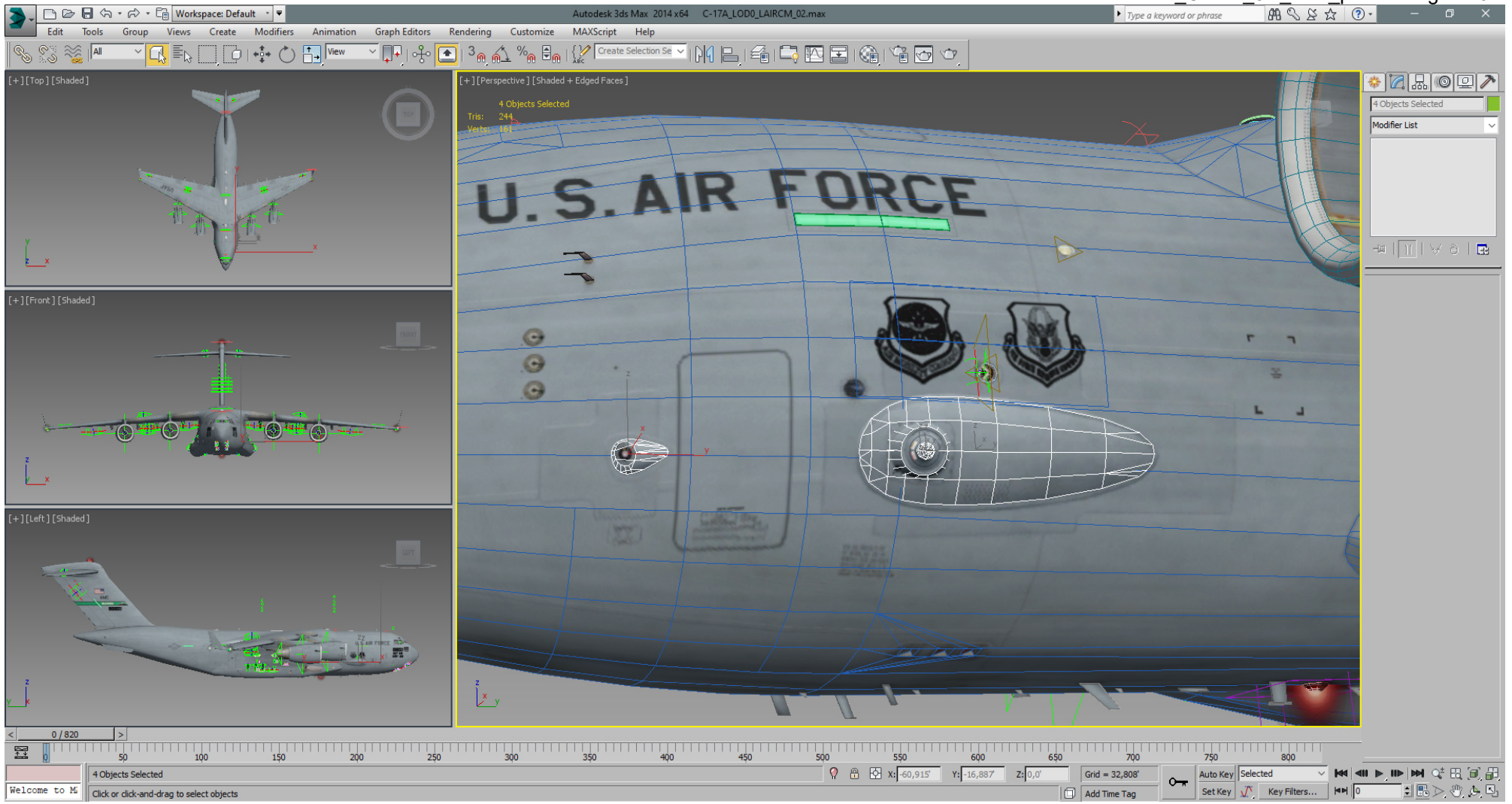
The dispensers overall cost are additionally 136 tris.


Workspace: Default
Autodesk 3ds Max 2014 x64 C-17A_LOD0_LAIRCM_02.max
Edit Tools Group Views Create Modifiers Animation Graph Editors Rendering Customize MAXScript Help
[+][Top][Shaded]
[+][Front][Shaded]
[+][Left][Shaded]
[+][Perspective][Shaded + Edged Faces]
2 Objects Selected
Standard Primitives
Object Type
AutoGrid
Box Cone
Sphere GeoSphere
Cylinder Tube
Torus Pyramid
Teapot Plane
Name and Color
2 Objects Selected
0 / 820
2 Objects Selected
Click and drag to pan a non-camera view
Add Time Tag
Auto Key
Set Key
Key Filters...

The front sides got some geometry for the additionally sensor in front of the door, for the bulge, and the LAIRCM.

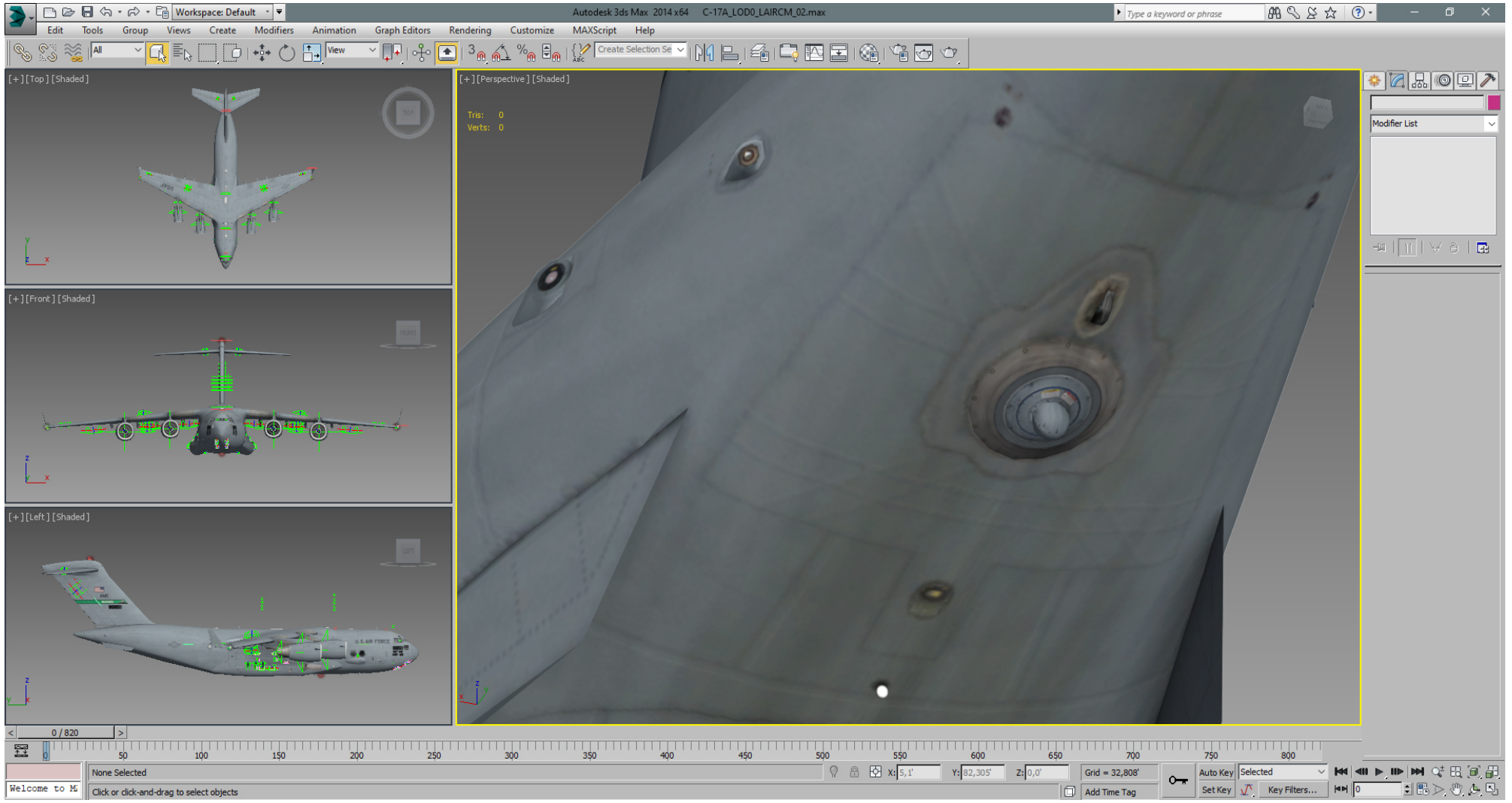
Here it was also necessary to move some stuff on the texture, the command license plates geometry,
plus the nose landing lights geometry, and adjust related light values in the C-17.dat.

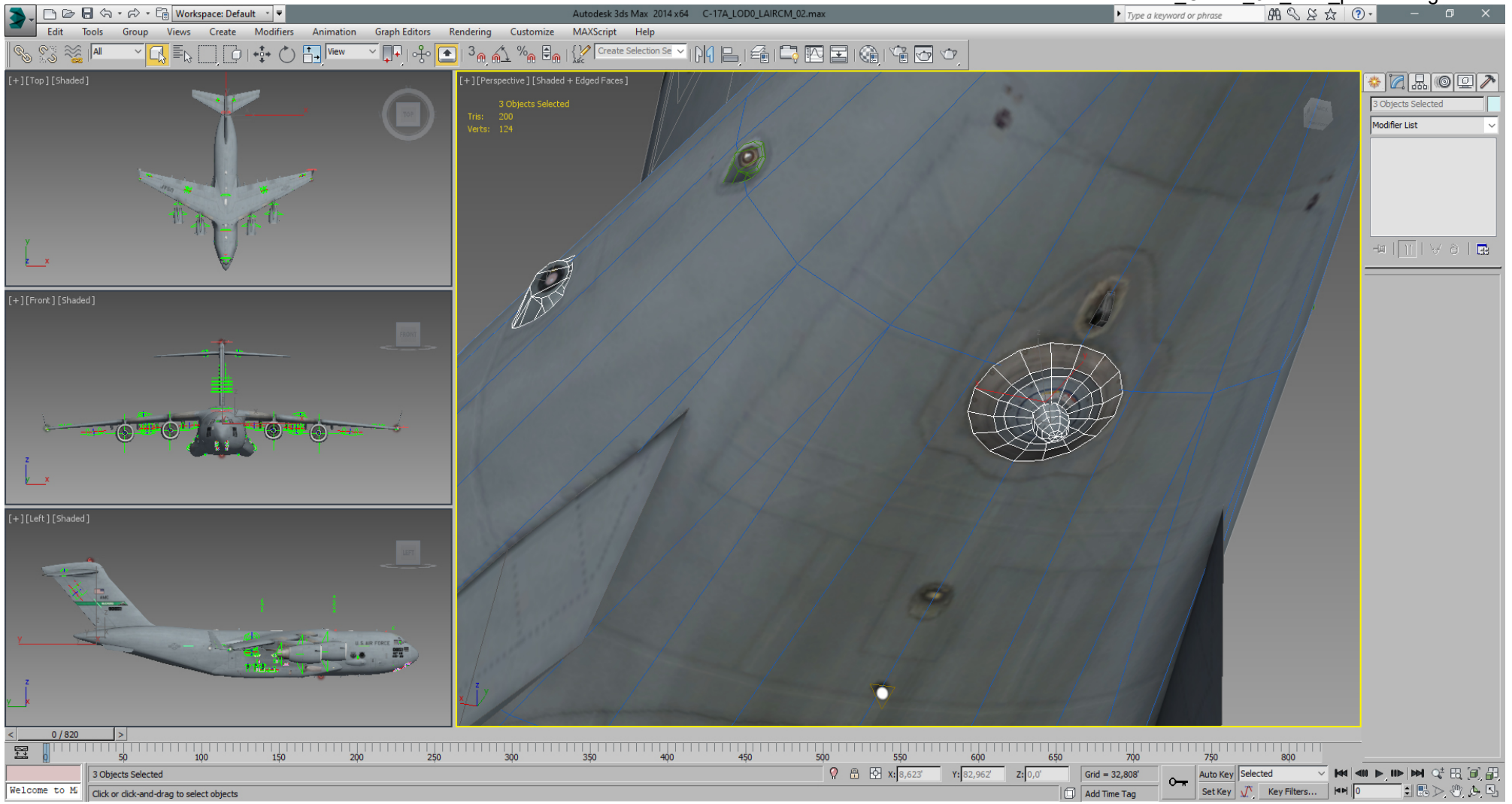
The sensor, bulge and LAIRCM cost 244 tris per side, so 488 tris both sides.


Workspace: Default
Autodesk 3ds Max 2014 x64 C-17A_LOD0_LAIRCM_02.max
Edit Tools Group Views Create Modifiers Animation Graph Editors Rendering Customize MAXScript Help
[+][Top][Shaded]
[+][Front][Shaded]
[+][Left][Shaded]
[+][Perspective][Shaded + Edged Faces]
4 Objects Selected
Tris: 244
U.S. AIR FORCE
Modifier List
0 / 820
4 Objects Selected
Click or click-and-drag to select objects
Add Time Tag
Auto Key
Set Key
Key Filters...

On the back end, we got some geometry for another sensor on the side again (the bigger one), and some geometry for the bottom LAIRCM.

Sensors left and right, plus the LAIRCM cost us here 248 tris.

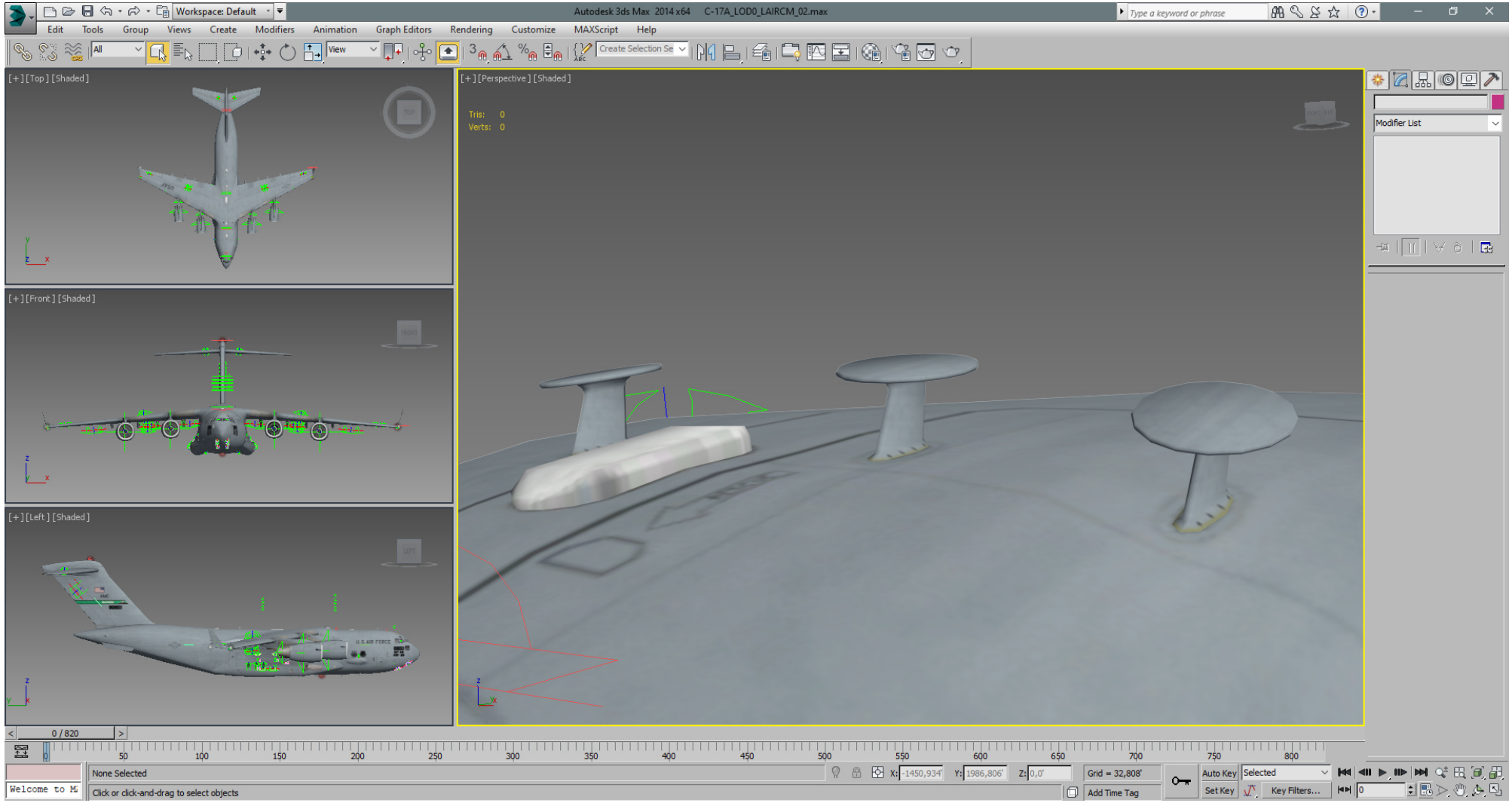



Workspace: Default
Autodesk 3ds Max 2014 x64 C-17A_LOD0_LAIRCM_02.max
Edit Tools Group Views Create Modifiers Animation Graph Editors Rendering Customize MAXScript Help
[+][Top][Shaded]
[+][Front][Shaded]
[+][Left][Shaded]
[+][Perspective][Shaded + Edged Faces]
3 Objects Selected
Tris: 200
Verts: 124
Modifier List
0 / 820
3 Objects Selected
Click or click-and-drag to select objects
Add Time Tag
Auto Key
Set Key
Key Filters...

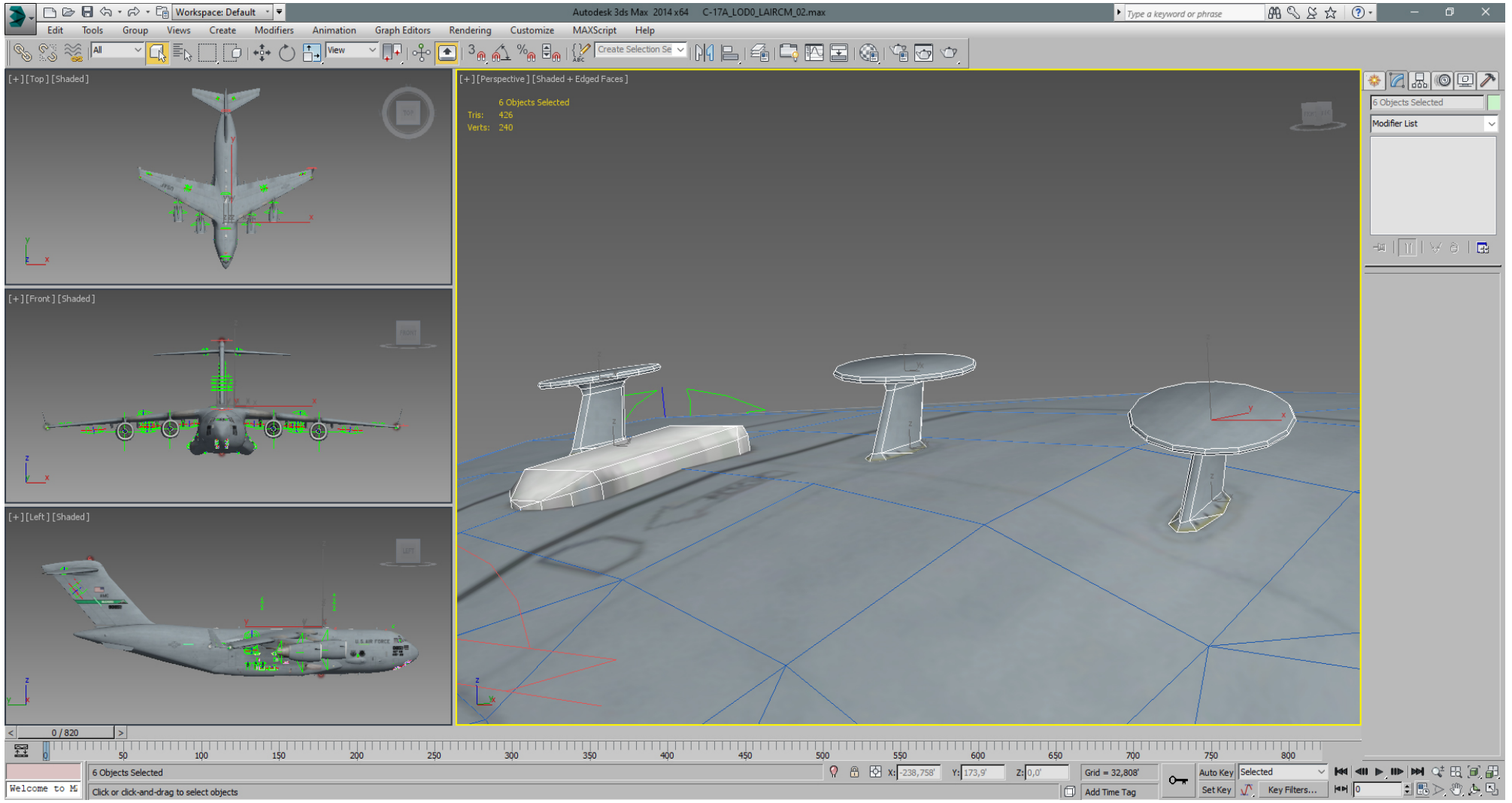
OK, dispensers and LAIRCM are done.

Let's have a look at those UFO antennas on top of the wing.

They should be round and smooth which is costly.



All 3 together cost 426 tris, whereat one socket is 50 tris, and one disk is 92 tris.

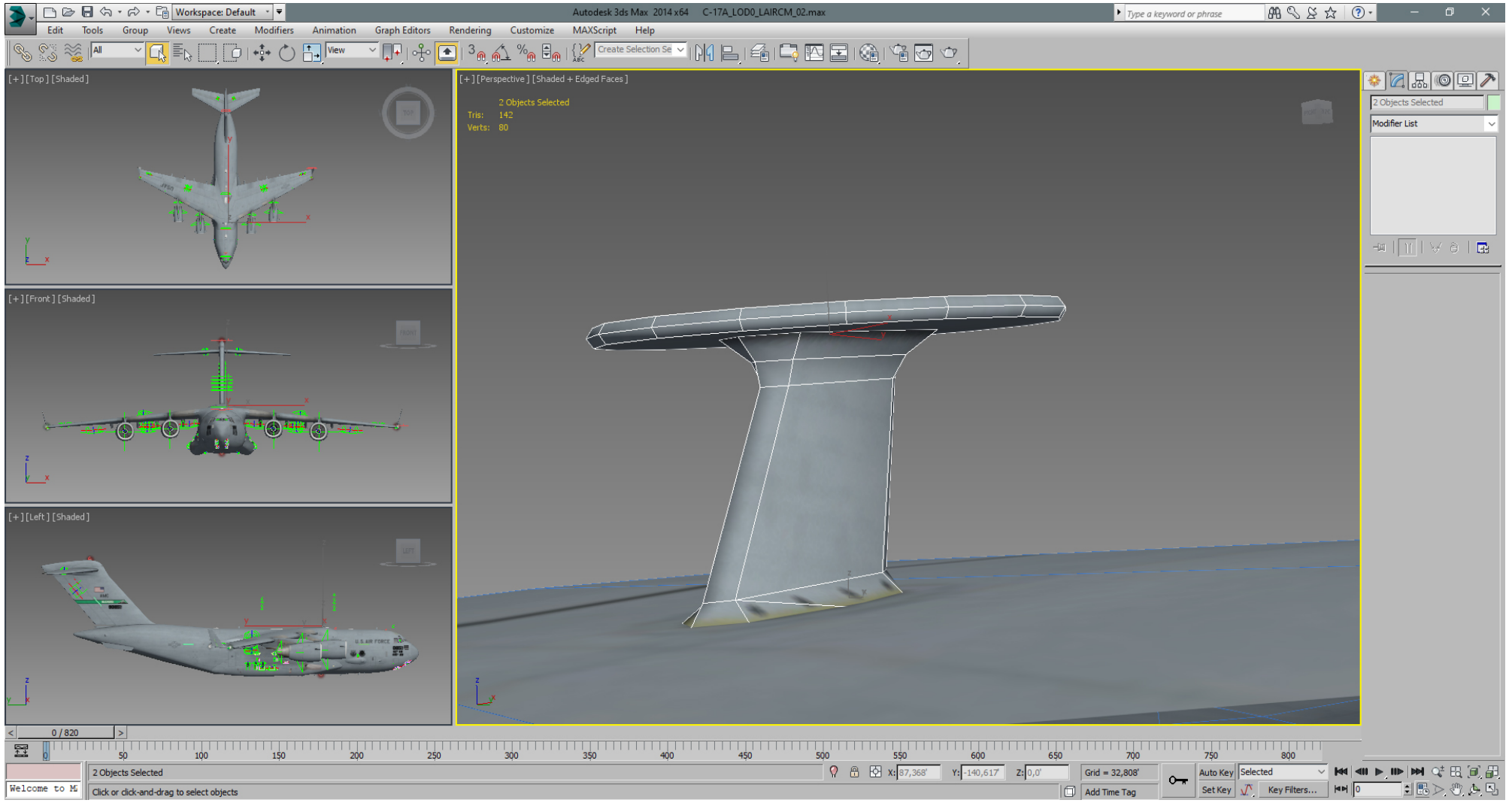


Why is the tris count of the disk that high?

Well, we wanted them round and smooth as possible, because they are good visible at close distance.

Back in the day we did such disks with a simple top/bottom geometry, even 2-sided to save tris, but that was more 2D than 3D.

Those disks here are higher in tri count, but use just one smoothing group (SG1) and pType 9 so I guess they are draw calls friendly.

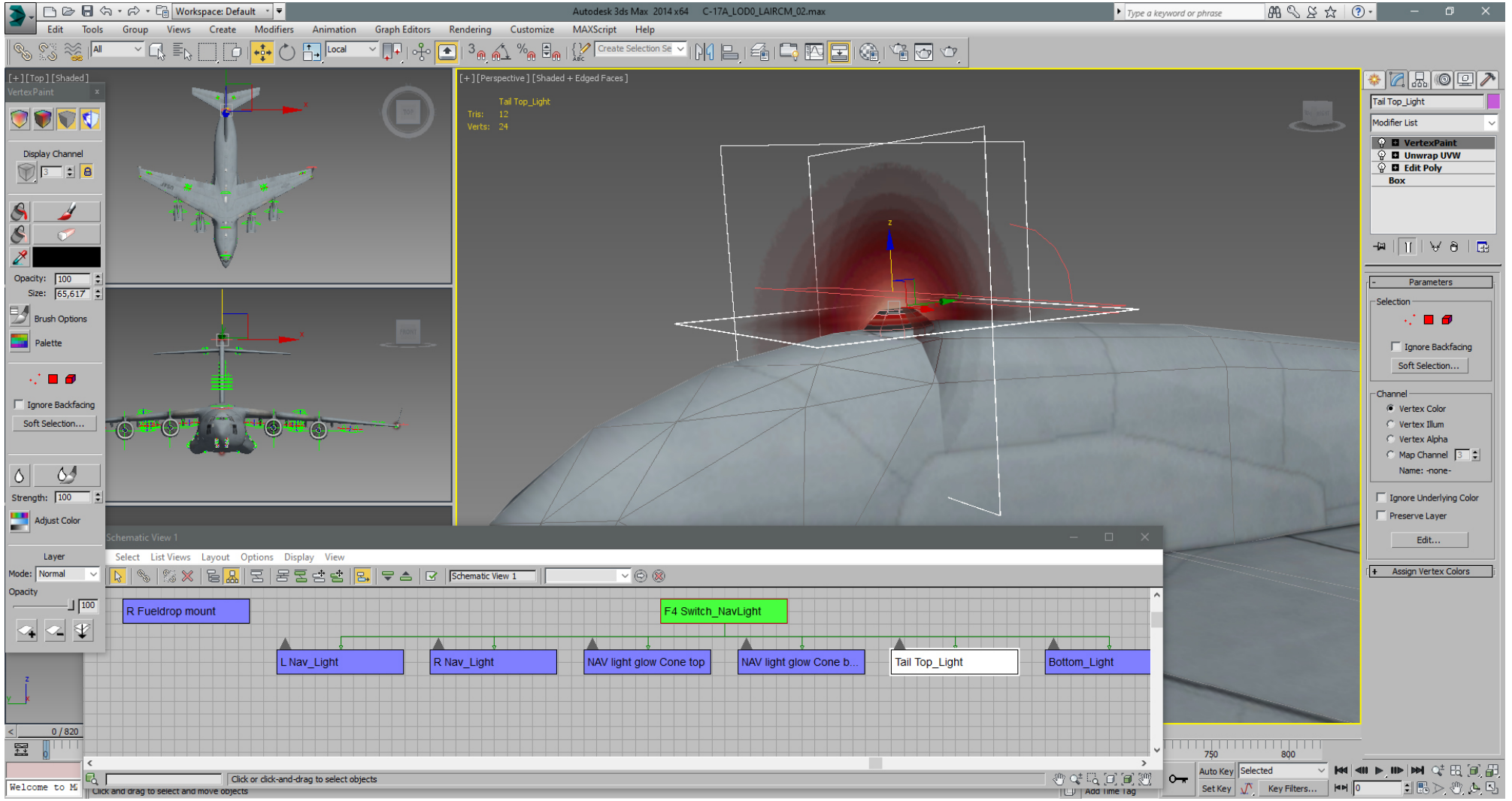


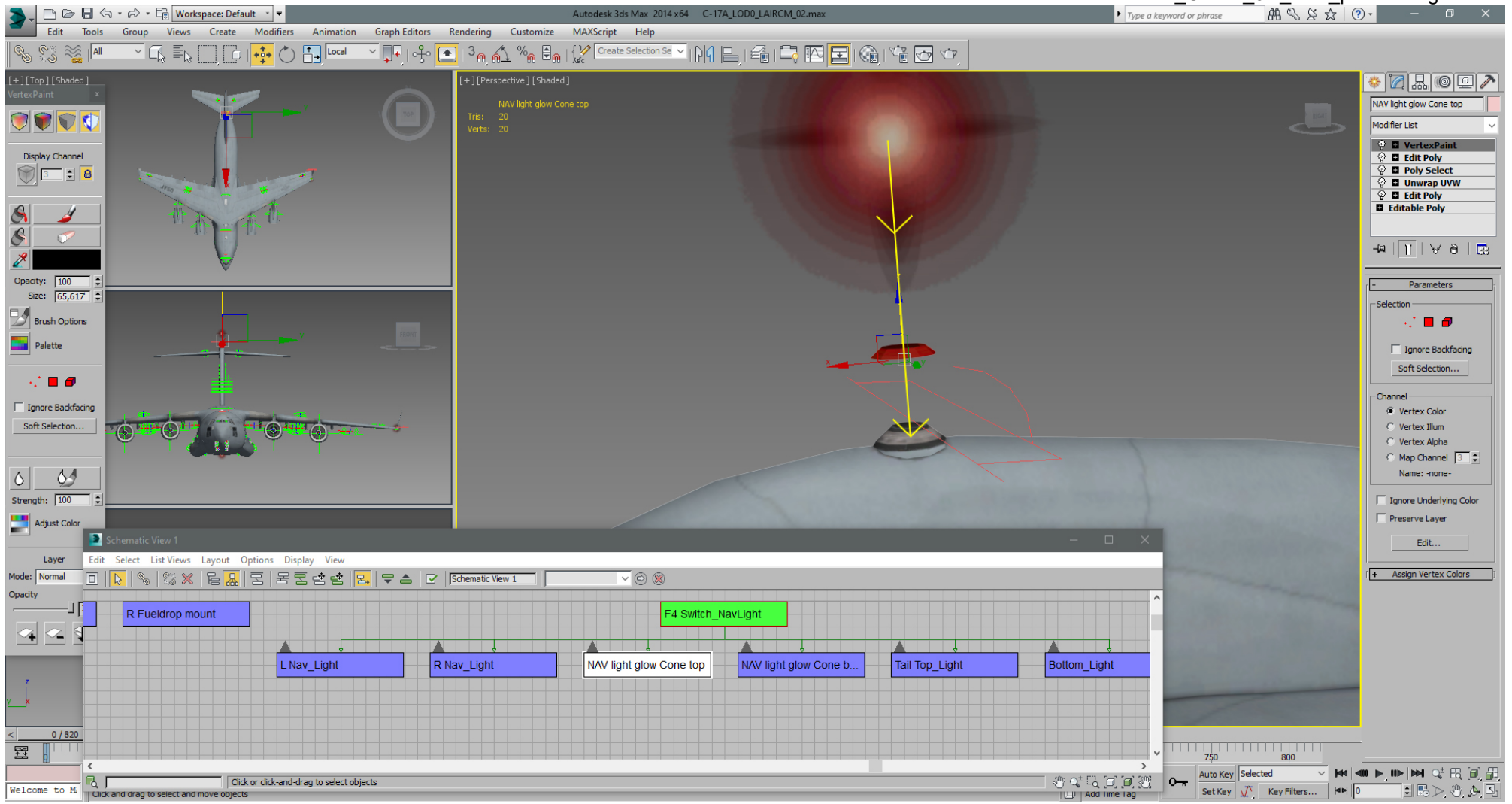
The red anti-collision lights fuselage bottom and top of vertically stabilizer got an update as well.
The old ones were bulge shaped and the updated ones are cone shaped.
Whereat it looks like the new cone shaped are some kind of modern LED technology and spread their light primary radially.

I've tried to simulate the radially effect by using additionally pType 20 lit geometry on top of the pType 9 cone shaped anti-collision lights geometry.

Those additionally pType 20 lit geometry (20 tris per light) should come for free, because they are linked to the existing Switch #8 - Nav Lights.

The old red glow effect geometry (165.dds) counteract the wanted radial lit effect, but those lights are way to dim insim at a distance anyway so I decided to keep them as they are.





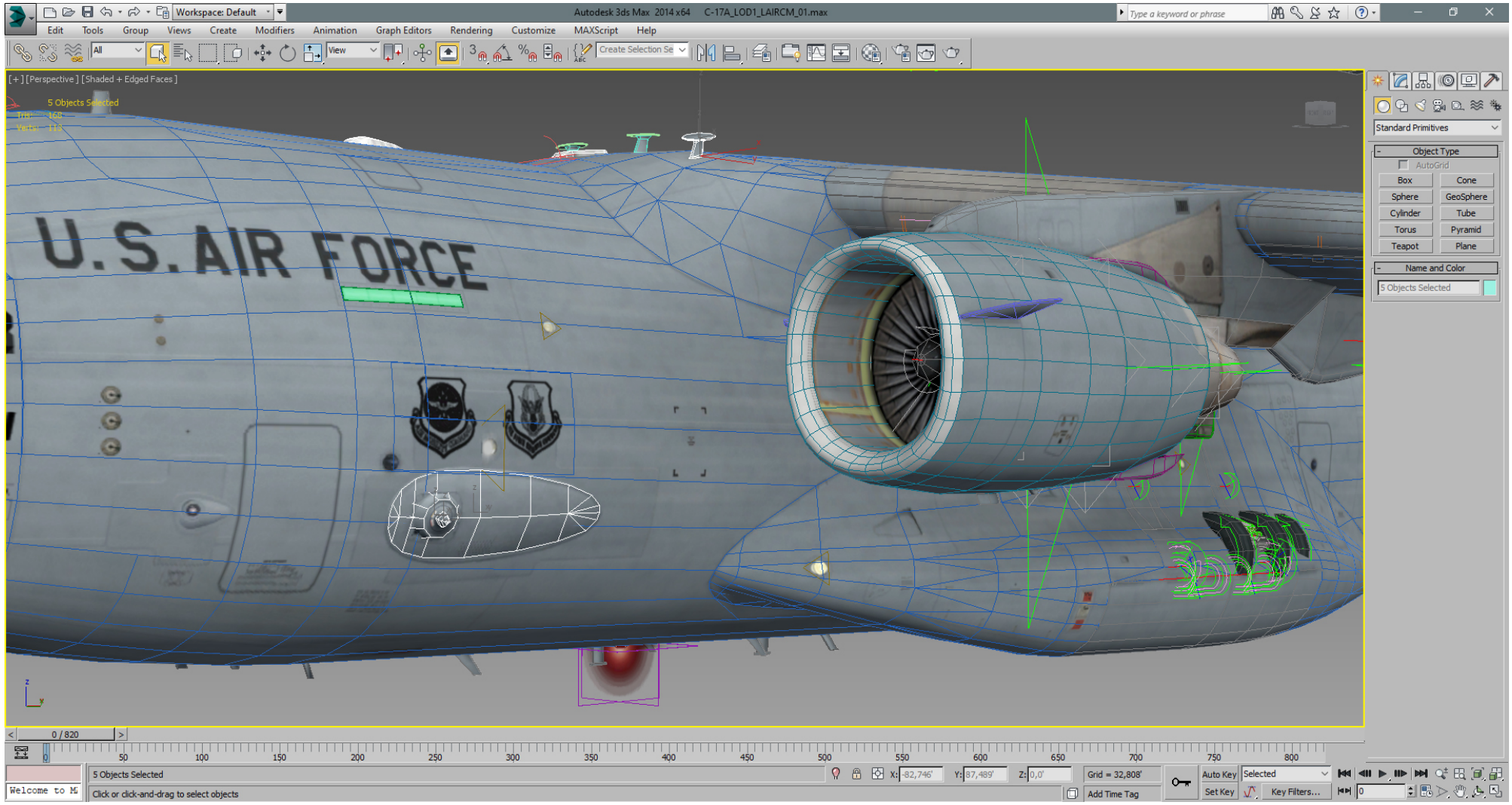
The difference between the actually 3D model in 4.36.0.11 DB and the lately LAIRCM modified one is 1272 tris.

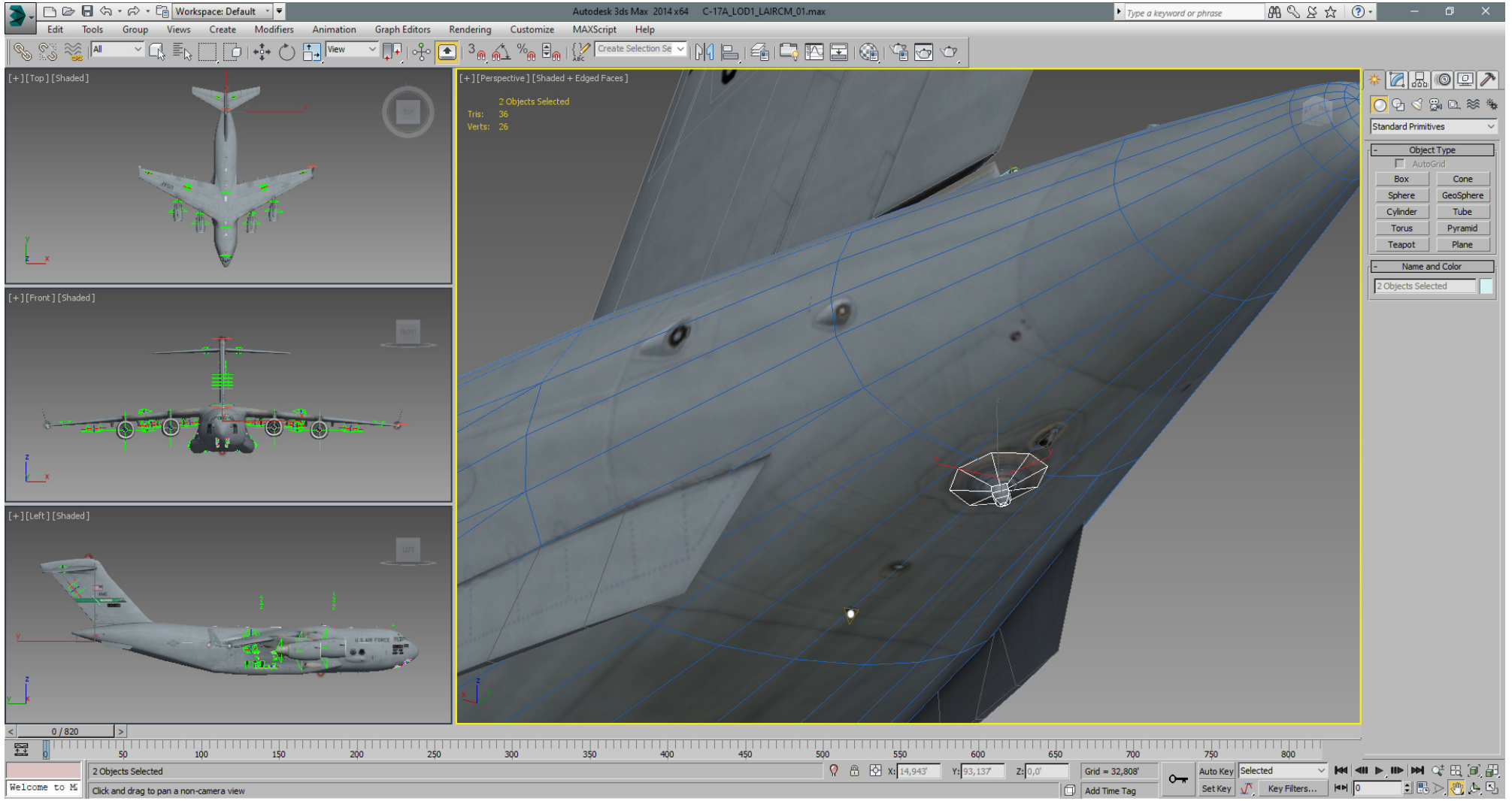
LOD 0 old: 42128 tris
LOD 0 LAIRCM: 43400 tris

For LOD 1 I thought I can skip the LAIRCM 3D stuff and just paint it on the fuselage texture,
but couldn't get away with it, because it's to noticeable insim.

So LOD 1 got all additionally 3D parts we did for LOD 0, except the 4 sensors,
(front of doors and backend left and right) and the dispensers, which are painted on the fuselage only.

The added 3D objects have been further optimized to reduce their tri- count approximately by half.



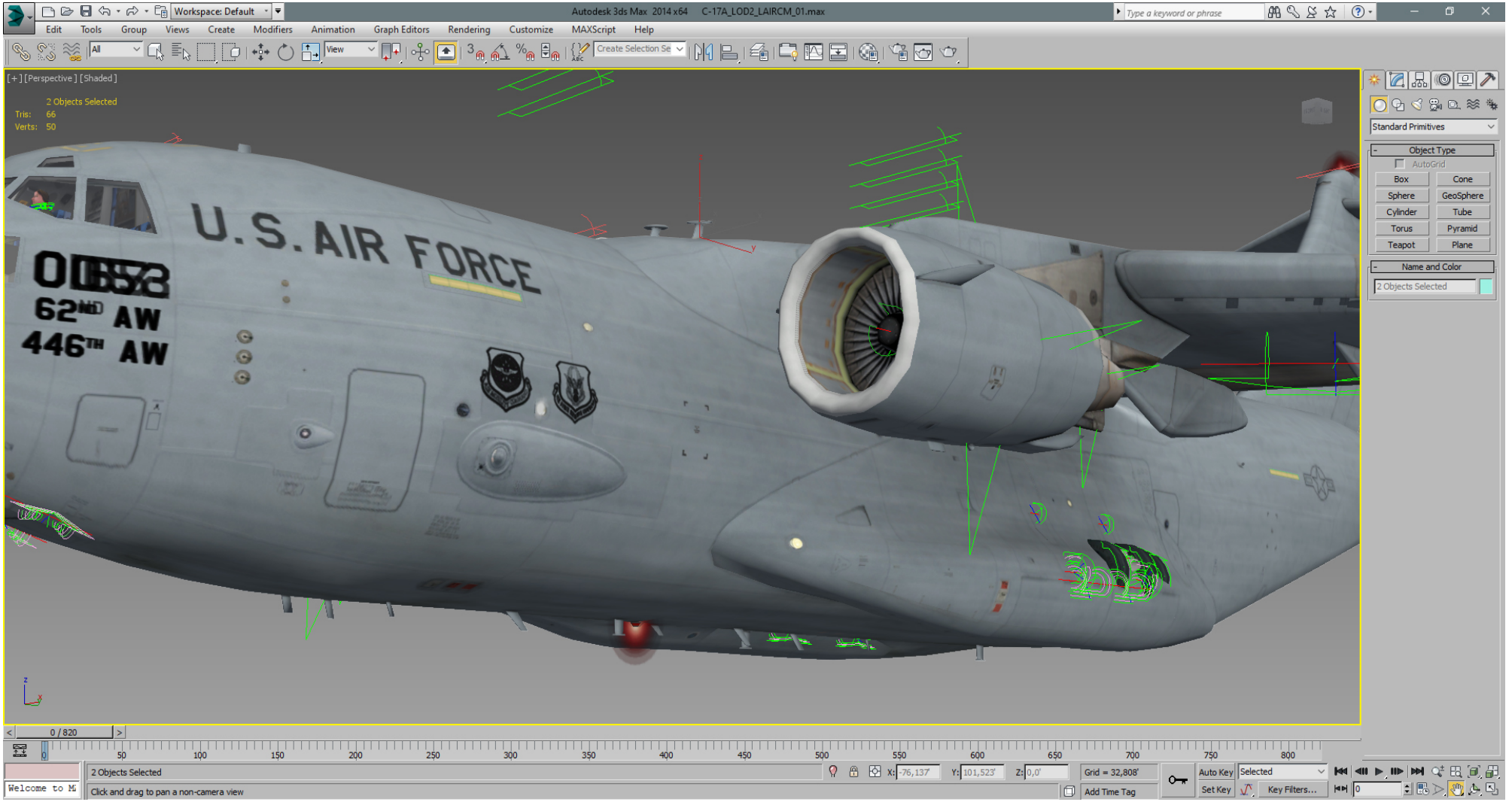


Long story short, we have added 442 tris here.

LOD 1 old: 30164 tris
LOD 1 LAIRCM: 30606 tris

For LOD 2 we just kept the new cone shaped anti- collision lights, including the pType 20 lit effect ring and the 3 UFO shaped antennas on top of the wing.

LAIRCM, sensors and dispensers are painted on the fuselage only.



The difference is 196 tris.

LOD 2 old: 15292 tris
LOD 2 LAIRCM: 15488 tris
For the other lower LODs there are no changes in tri- count, but command license plates and landing lights pType 20 lit stuff has been moved to match the LAIRCM mod.

Finally we prepare a release package with a folder structure where our beloved BMS DB guys are used to.

We'll use a main folder "\C-17A" created anywhere on our system.

So we copy our 4 HiRes .dds textures to \C-17A\Textures_HiRes\
And we copy our 4 LowRes .dds textures to \C-17A\Textures\

We copy our C-17.dat to \C-17A\Data\Sim\Acdata\
A copy of our \Parents\1461 folder goes to \C-17A\Parents\1461\

A copy of all the .max source files for our final LODs goes to \C-17A\Source\3dsMax_2014\
And a copy of all our .psd texture source files goes to \C-17A\Source\Photoshop_CS5
Photoshop and 3dsMax source files are necessary for possible further modifications.

In our case we have used the "AmarilloUSAF" font in our textures, so it would be a good idea to place a copy of AMUSAF.TTF also in \C-17A\Source\Photoshop_CS5

If you use another painting software than Photoshop, then make sure your source textures are saved in a lossless file format which can be read with Photoshop. (.png or .tga or .tif for example)

It would be also nice to keep important layers separated editable.
- rivets and panel lines
- Ambient Occlusion (and lighting map if exist)
- Dirt

Maybe save them even as separated files with a transparent background color.

If we send such a package to BMS as a compressed archive, then there is a good chance to get it included into a future BMS release!

Well gents, I think the new C-17A is done for now.
Textures will get fine tune and more work with upcoming BML v2 and PBR.

To me, the C-17A was an experiment and a challenge where we, at least me personally
have learned a lot and I'm happy to got it all written in this document.

A huge Thank's to everyone for all the help, the support, code work, motivating posts, info AND your patience!

Without all your help, the result wouldn't have been the same. Thank you !!!

Additional:

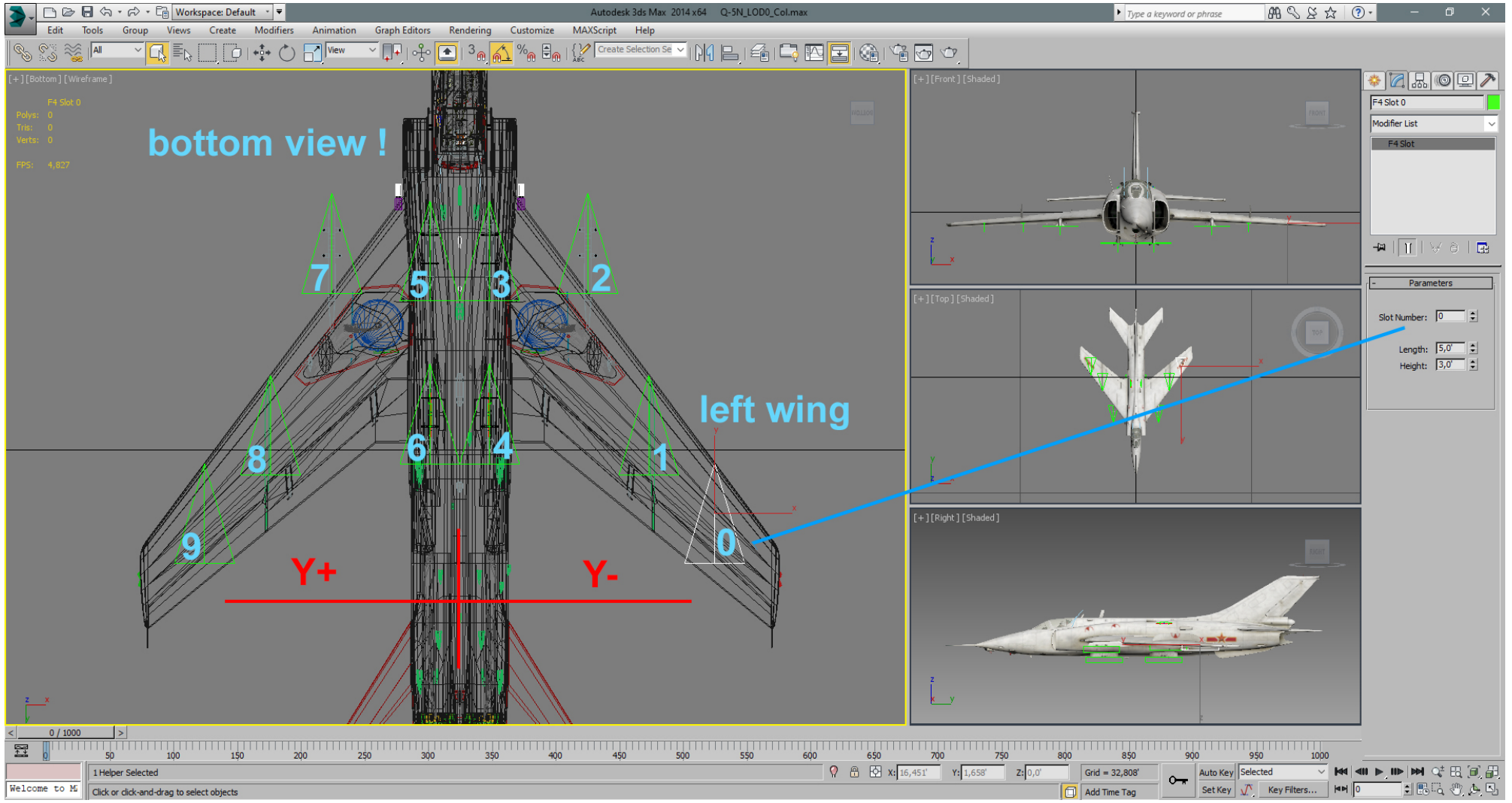
While we have no payload on the C-17, we might want to add pylons/racks to carry weapons and fuel tanks etc. to other aircrafts.
So there is another BMS Exporter helper (beside DOF- and Switch helper) which is called "Slot" helper.

A "Slot" helper can be placed similar to DOF- and Switch helpers, but should be placed in "correct" order,
which is in increasing Y- distance. That means that we always start on the most left Slot helper as Slot 0.

Once Slot helpers are placed, we'll get their xyz distances by using the script (with BoundingBox and Radius).
And then we can add the Slot distances to our Parent.dat, also in increasing Y- distance.

Reminder: Never mirror a Slot helper, … never!

See here an example of the Q-5N and the "paper plane" shaped Slot helpers placed.



The Parent.dat for the Q-5N with Slot values added looks like this:
We start with the most left Y- distance at -12.76, then -9.46 and so on …

Dimensions = 37.000000 -16.450001 27.549999 -3.250000 3.250000 -3.500000 3.500000
TextureSets = 1
Switches   = 62
Dofs   = 91
AddSlot = -3.160000 -12.760000 0.950000
AddSlot = 1.240000 -9.460000 0.950000
AddSlot = 10.350000 -6.400000 1.190000
AddSlot = 9.970000 -1.500000 2.680000
AddSlot = 1.820000 -1.500000 2.610000
AddSlot = 1.820000 1.500000 2.610000
AddSlot = 9.970000 1.500000 2.680000
AddSlot = 10.350000 6.400000 1.190000
AddSlot = 1.240000 9.460000 0.950000
AddSlot = -3.160000 12.760000 0.950000
AddLOD = Model_0.LOD 100.000000
AddLOD = Model_1.LOD 200.000000
AddLOD = Model_2.LOD 500.000000
AddLOD = Model_3.LOD 3000.000000

Beside some aircraft, external pylon/ rack 3D models need a Slot helper if they are to carry something.
The Slot is where the object (tank, munition, etc...) attaches to the pylon.

In future:

With upcoming BML v2 and PBR the 3D modeling doesn't change much. Sure you'll get a new BMS Exporter for 3dsMax with similar functions.
But with the new .BML format I wouldn't use "bill boarding" anymore to avoid "Alpha sorting" issues.
(like we did for slats hydraulic cylinders etc. for tri saving reasons)

Those Alpha sorting issues might happen when 2 objects (or more) are involved which use both a transparency texture with an alpha channel.
Better model those things as "solid" geometry, without using texture(s) with alpha channel.

Also it's not necessary to build the last LOD as not textured. We're looking at draw calls in first place.
So if the lowest LOD takes just 1 draw call, there is not much more to optimize, except the object is still high in tri- count.

And it will be not necessary to care about "pTypes" anymore.
Just name materials in 3dsmax and assign it to the geometry. (C-17A, Glass, Glow, Decals … for example)

Now, I'm really not sure if all the pictures and the bla bla I wrote makes sense to you,
but I hope it's helpful for one or another 3D modeler at least partially.

I wish you a happy 3D modeling, take care and have a Falcon day!