Using MDD with displacement in Lightwave

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How to use mdd and displacement at the same time on the same model in Lightwave 9.0+. This is not possible by default even though it is a very useful feature for animation production.
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Ver 1.1, January 12th 2010 (more info about displacement export and use, re-organised tutorial)
by Niko Mäkelä, http://fi.linkedin.com/in/nikomakela

in short

Using two displacements on one model, one for animation(mdd) and other for detail, is possible with DP Kit-plugin, using bumb-displacement and by tweaking subdivision and displacement order - choosing when each kicks in. This is one way to do this in Lightwave 9.0+ but most likely not the only one.

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about

In spring 2009 I did a personal animated short where I animated in Messiah and rendered in Lightwave.

I chose to use MDDs, that is animation applied as displacement, for it is an universal way to transfer mesh animation data between software. That means morphs and all – no bones are transferred to final rendering software. Problem was I also wanted high level of detail in my characters via displacement. To run two types of displacement on one object at the same time in Lighwave took some research and testing.

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1. Get plugin

Get DP Kit plugin for Lightwave 9.0+
You can find it here: http://pagesperso-orange.fr/dpont/plugins/nodes/Additionnal_Nodes_2.html
While there you might want to grab the separate MDD Pointer-plugin to use with objects that have no other displacements than mdd (like characters eyes if as separate objects).

2. Exporting displacement map

You need 16-bit displacement map derived from your detailed mesh. I originally adviced 32bit but that's just overkill and most software use 16bit. You can sculpt detail in sculpting software and export.   See below one example of Zbrush exporting.

So you've sculpted all the detail you want in Zbrush. In **Texture-panel** make sure your model has **UV enabled**. For animation production I would recommend **AUVTiles** or similar mapping method. Now go to the **lowest subdivision level in Geometry-panel.**

Create your displacement map in **Displacement-panel**. Adaptive and SmoothUV-settings seem to deliver good results. You might want to play with the intensity if the values in the generated map are too tame. You can edit the map later in Photoshop, too.

The map is generated as an Alpha-map. Go to **Alpha panel**, select the map and click **DE Options**.

In **Displacement Exporter** the default settings should be good, but if not see what I used below.

Exporting generates a TIFF where color channels hold the displacement info(neutral, positive and negative). You can convert this TIFF to PNG in Photoshop and so reduce filesize by half. PNG seemed to work just fine for displacement in Lightwave.

3. Basic setup and displacement map

Export animation as MDD from you animation software. Is usually done by selecting the mesh and finding Export Morph Sequence or Export MDD in some menu. See your software manual for details.

In Lightwave install DP Kit plugin, load object in Lightwave and apply your textures in Node Editor including the displacement-map. Your displacement map should be 16bit and have both positive and negative displacement in it.

First node is your displacement map(2D Textures>Image) and next 2 are Math Nodes that 'activate' the dispacements in your map (negative+positive). Add Node>Math>Vector>Subtract and Add Node>Math>Scalar>Multiply. The final node is your surface, target is of course the displacement value. 4 Nodes is all. Below shows my full setup for an animation character. See the values I've entered in the Math Nodes.
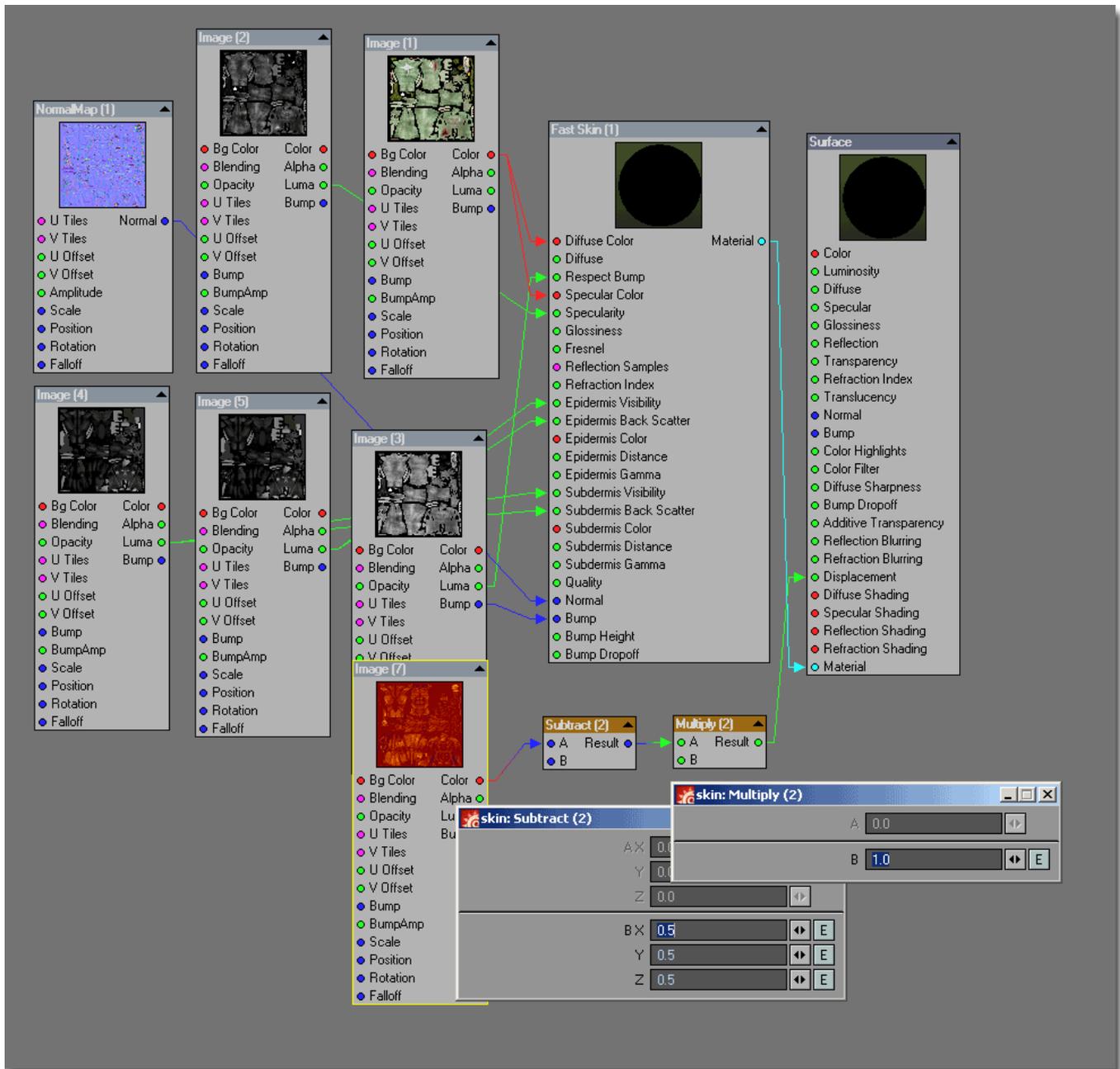
4. Controlling displacement

In Object Properties(geometry tab) set Render SubPatch to Per Polygon Level. This sets polygon detail to generate at rendertime only where visible. You need to control this with textures, so hit the T-button.

Set up two layers with your displacement map as lower and a gradient as upper.

Make the gradient with 3 parts: displacement at maximum, displacement at minimum and displacement at maximum. Set values for each. In my project Maximum 10 was more than enough for close-ups and if I had fast movement or object far away, I could go as low as 4 or 3 (saving in rendertime).
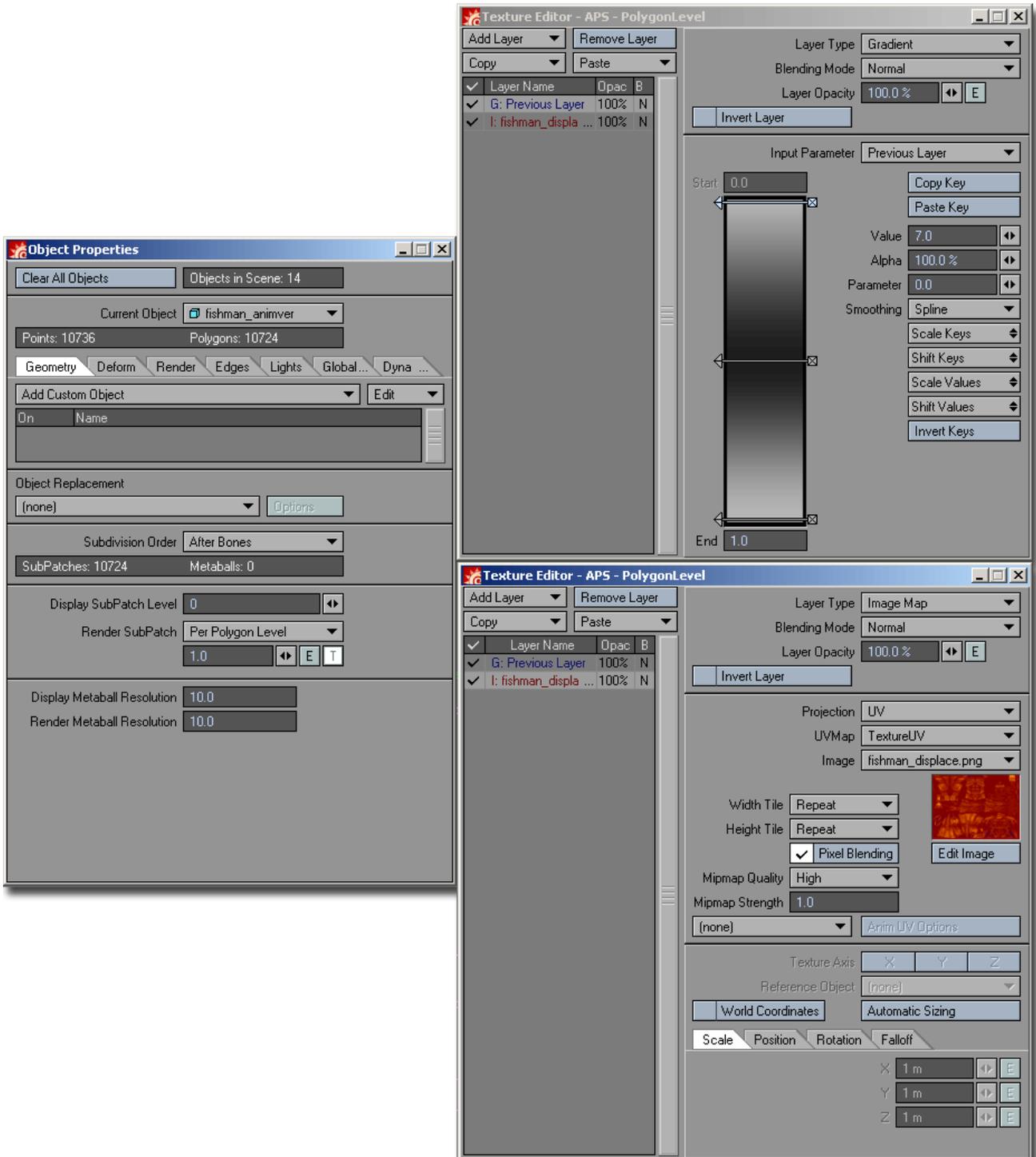
5. Displacement order

In Object Properties
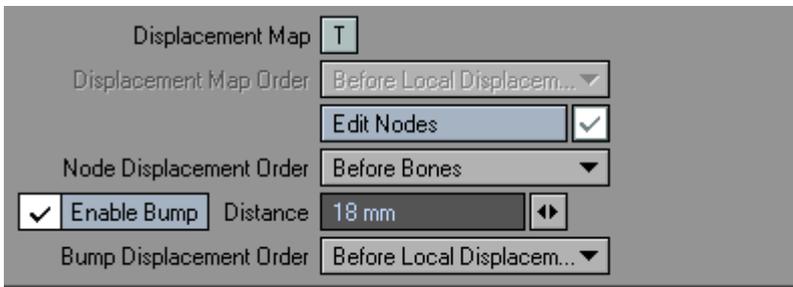
Geometry-tab
Subdivision Order: After Bones

Deform-tab
Node Displacement Order: Before Bones

Bumb Displacement Order: Before Local Displacement

and enable Bumb Displacement. Set distance to reasonable amount.
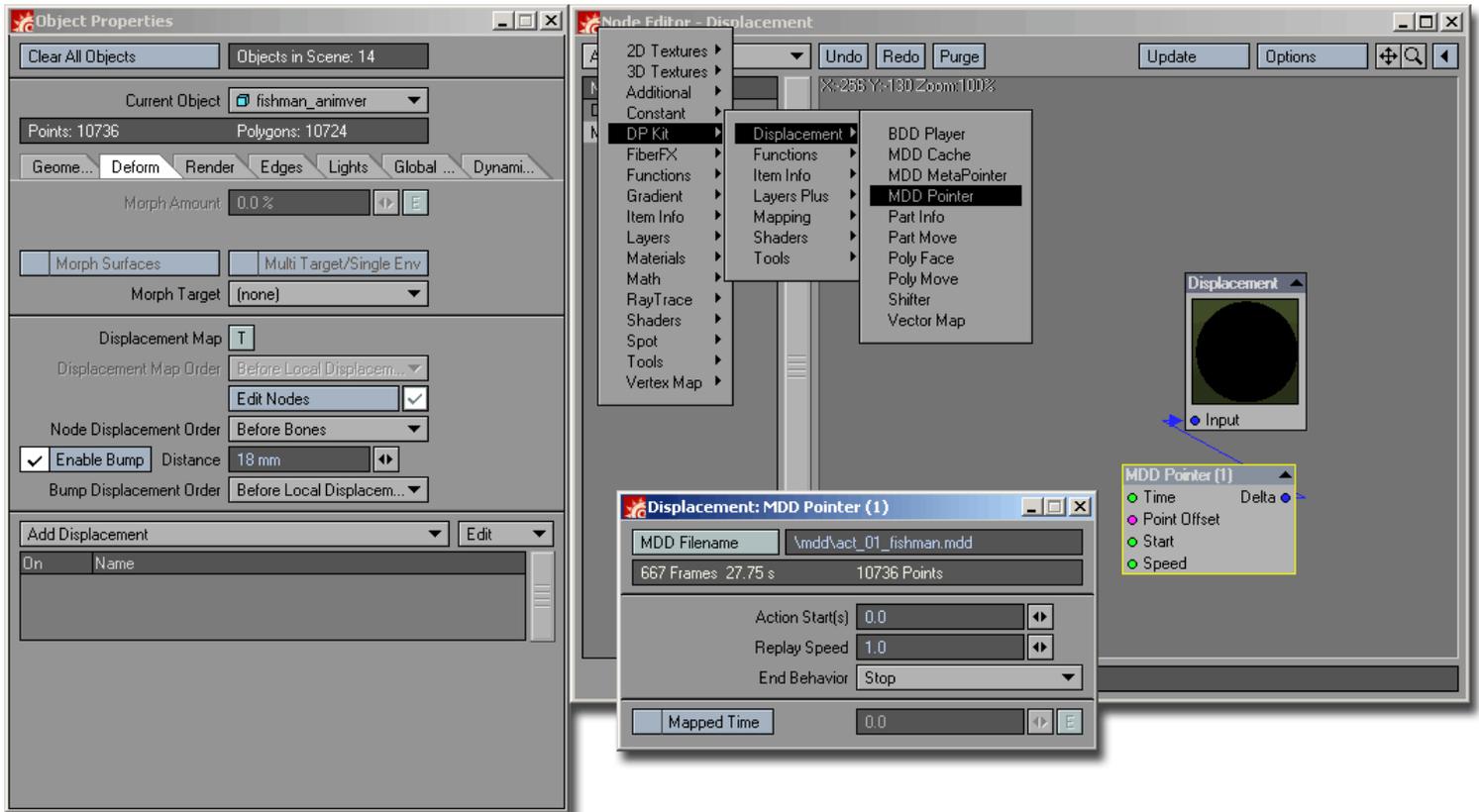
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6. MDD activate

Insert your animation displacement(mdd) via Displacement Node Editor(Object Properties, Deform Tab).

Open Node Editor and add it with Add Node>DP Kit>Displacement>MDD Pointer.

That's it!

6. Resources

Discussion about Zbrush-Messiah-Lightwave-pipeline:
http://forums.cgsociety.org/showthread.php?f=92&t=632527&highlight=mdd