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Creating a Kalevala Inspired Dark Fantasy Knight

Business Administration

Game development

Spring 2019



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Abstract

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Title of publication: Creating a Kalevala Inspired Dark Fantasy Knight

Degree title: Bachelor of Business Administration, Video game development

Keywords: 2D Concepting, 3D modelling, digital sculpting, re-topologizing, texturing, videogame character

The main objective of this bachelor's thesis was to develop a presentable character model. The secondary objective was the successful documentation of said development.

The format for this thesis was the following: First and foremost, it documented the author's progress with a single 3D character. The actual written content was largely formatted into weekly reports, punctuated by short explanations of each work phase along with sources for said techniques. If a technique was self-taught/developed, there is simply an explanation of the process (however this would be a rare case). At the start of each day, the day's tasks/goals were explained, after which the actual work was started. If the task was expansive and could not be completed in one day, it was continued on the next day. At the end of each day, a report was given about the day's tasks in full. If a task was incomplete, very expansive or the day was uneventful, daily reports were combined into one easily readable summation of events. The goal of this was to provide the text with more informational value, instead of a text for the sake of reporting.

Concepting refers to the process of exploring various visual design elements and finding something that meets the goals of the project. It can involve but is not limited to: digital paintings, thumbnail sketches, sculpts and reference images/moodboards.

3D modelling within the boundaries of this project involves modelling, re-topologizing and unwrapping. 3D sculpting is also a form of 3D modelling but is generally referred to with a separate term for readability. The difference between the two is in general, how one can create one's work. In 3D modelling, one generally works with vertices, edgeloops and has very fine control over the specifics of mesh topology, however lacking the ability to make rapid sweeping changes and the inability to easily work with very high-fidelity models. Sculpting, on the other hand, mostly deals with very high polycount models and one has significantly less fine control over edgeloops and topology overall, but one can work with much higher polycounts and edit the mesh with dramatically more detail. Generally, one

would use traditional 3D modelling to achieve one's in-game mesh, while 3D sculpting would produce the high detail mesh.

Texturing is the process of painting textures for the mesh. Textures may contain many image files to form the final result, or just one image file dependent on the desired end result. Texturing is what will eventually create the final components for the visual look of the mesh and the bitmaps required to create materials, to achieve the final visual result.

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Terminology

Ambient Occlusion (or Cavity) Map – Simulates soft occlusion shadows in for example recessed areas.

Diffuse/albedo – The main color map, defines how light diffuses on the surface. Within the PBR method of roughness-metallic also contains specular colors.

Emissive Map – Determines what parts of the material emit light and can also determine what color it is depending on how the material is setup.

GoZ – A plugin for ZBrush that allows seamless asset transition between ZBrush and select third party software, for example 3ds Max and Maya.

Hard Surface - A term used for models that are not soft bodied or organic. Mechanical shapes and stone etc.

Metallic Map – Is used to determine if a surface is metallic or not. In most cases the values of the map are either very light or very dark, as there are generally not many cases where materials appear 50% metallic.

Normal Map – An RGB map that saves directional detail information from a high-quality mesh, which then interacts with light to simulate 3D details.

PBR – Physicality Based Rendering, is a method of rendering materials that tries to simulate how light behaves in real life.

RGB - Red Green Blue, referring to the color channels on a 2D image

Retopologizing, Retop – The process of re-topologizing a high-quality mesh and thus creating the low detail in-game model.

Roughness Map – Is used to create microdetails in a surface, which mostly affect how smooth the surface appears.

Specular Map – An RGB map that is used to simulate how much light is reflected onto the surface from the environment, after which it will again reflect off. Generally, its values are high for metallic and low for non-metallic materials.

Sub-tool – A term used in ZBrush for sub-meshes, components of one mesh that are not attached and can be manipulated without affecting other parts of the larger whole.

Supporting Topology – Extra edge loops added near angular areas and areas that require sharp definition, causes smoothing to happen on a much smaller area and thus allows for more accurate normal maps.

Topology – In 3D topology refers to the latticework of vertices and edges that form the model.

UV map – Is essentially the “skin” of a 3D mesh, flattened out into a 2D plane so as to facilitate texturing.

Vertex Normal – The “facing” of a vertex. The normalized angles of the surrounding faces will determine the direction of the vertex normal.

1 Introduction

This work was started as an attempt to merge a thesis work with the creation of additional portfolio materials. This will take the form of a brief summary of theory related to the subjects covered in the project. This is followed by daily reports on the actual project and its progress. The main goal of this thesis work is to further familiarize the author with modern software related to 3D projects. The project will encompass 2D concepting, sculpting, retop/low poly modelling (Retop is a common shorthand for retopologization), unwrapping and texturing.

A general overview of the character itself follows: The character is a guardian of sorts, picked from some of the most promising individuals in their order, they are both ceremonial and martial in aspect. They carry little gear with them as they are an elite defensive force of a handful warriors. A general idea of what the character is and what they should be doing are as follows:

Their armor consists of light/medium plate and cloth elements. The area is rather cold thus they need some layers of clothing in addition to armor. As they are expert fighters, heavy plate would slow them down while also making standing vigil for longer periods of time a very real pain and fatiguing by itself. The armor has protective runes and ornamentation etched into it, one of the most prominent elements is the "Steel raptor" a stylized bird figure. The warrior's dominant side has slightly less armor, as their fighting style revolves around rapid sword work. While a shield is involved their combat-style de-emphasizes defense.

The clothing is thick fabric and leather, which incorporates similar decorative elements as the armor, albeit these are embroidered. They carry some gear with them, ranging from various herbal remedies to possible personal items or food and drink. The helm will be a fully enclosed one and should have an aggressive/menacing design. The helm also has several inset gems to ward off otherworldly forces and corruption. The character itself will be a male of average size, with an athletic build

I am not planning on modelling the weapons as part of this project but may do them afterwards or during weekends if I feel so compelled.

2 Work phases

This segment contains a list of work phases and theory related to this project. It will more specifically go over the general topics and techniques, while also providing some simplified technical knowledge.

2.1 Concepting & detailed designs

This phase includes gathering reference material and creating thumbnails/concept sketches. The concepting phase will result in completed 2D schematics of the character. The software used will be Adobe Photoshop.

This phase utilizes basic concepts of sketching, regardless of technique, the goal is the same. That goal being to flesh out the character. [11]

The starting point for this character project was an elite warrior gatekeeper, so he needs to look intimidating. This could manifest with the armor having jagged features and/or having a rather dark or strong color scheme. The reference material collected for the project included traditional Finnish clothing, platemail, examples of runes and their meanings, as well as some research into the Kalevala mythos.

I created the basic design rules as seen in the introduction, which would act as my guidelines when creating thumbnails. The rules themselves were derived from some fantasy lore I had created earlier, excerpts of which will follow.

“The order is a mysterious group of guardians who protect the gates of Loviatar from all intruders, to keep what is imprisoned within and intruders out. The order’s fortress is located at the mountain range called the crown of Ukko. Deep within the mountains resides the dread gate itself, guarded by the most skilled and immovable warriors. From time to time the order descends from the mountains to gather promising individuals who are gifted in varying degrees in the matters of either the body, mind or spirit.”

Next, the backstory for the character I modelled the armor for. “The guardian himself has become legend, his old name lost to the winds of time, his old deeds and life has slowly turned into myth and reverently hushed whispers among the younger aspirants. For the

guardian left behind his name and past life when he took up the plate of his office, the runes and symbols inset with bone keeping him alive far beyond his time. His identity slowly becoming that of the order, his well of memories so deep it is difficult to recollect his distant past. He stands alone, the final line of defense at the core of a mountain, yet more immovable than the surrounding bedrock itself.”

In other words, the character is his armor, which serves as his badge of office. He would be a symbol of duty to his peers, thus why his armor is both ornate and grim. To further drive home the fact that duty is grim, but within the completion of it lies honor.

After setting the rules for my design I proceeded with fast thumbnails. Due to time constraints and having a strong idea of what visual elements I might generally aim for beforehand, I settled on the broad style quite fast. After the main silhouette was settled I did variants, after which I decided a certain look to go for. After that I created more detailed renderings of the character to help with modelling. When designing the character, I endeavored to create an interesting silhouette, before filling in the details.

The final design involved the use of old Scandinavian and Finnish symbols, ranging from runes to more elaborate shapes and symbols. The embroidering on the clothes is quite geometric in nature as seen in traditional Finnish clothing. The bigger symbols present are the Hannunvaakuna, which is a symbol of good luck, Ukonvasara and Kokko the steel eagle. There are other more minor elements like waves depicting the surface of a lake (lakes hold a special place in Finnish culture). Then there are runes of the giant on the shoulders and the forehead, depicting the strength of will of the bearer. The arms and legs along with the abdomen are kept relatively simple to keep the design from looking too busy, as well as an attempt to focus the viewer’s gaze in the chest and head areas.

From behind, the cloak is the dominant element, and thus has a very elaborate design. The Hannunvaakuna along with Ukonvasara form the grip and cross guard of a stylized blade with wavy tendrils forming its blade. Both afore mentioned symbols are depicted in figure 1 below. The blade part was an attempt at evoking a magic effect on 2D, as the blade is ensorcelled.



Figure 1 - A rough stencil I made of the Hannunvaakuna, note the blurriness of the stencil is to facilitate smoother stamping in ZBrush. This was then retouched once stamped onto the sculpt. Ukonvasara or alternatively Ukonkirves, is depicted on the right. The ornamentation on the hammer symbol is not essential and was added for purely aesthetic purposes, as this sketch was used for the design of the cloak.

In the following, I shall detail the impact of climate on the costume design. The clothes underneath the armor consist of thick but soft leather trousers, a wool greatcoat underneath which the character would have some warm undergarments. His gauntlets are leather as well, with riveted plates on the back of the hand and fingers, as chainmail gloves would simple be too cold. Underneath the helmet, the character wears a thin close-fitting cloth hood similar to a balaclava, but with the face fully exposed. Finally, the character has a thick cloak which would keep him warm during long periods of standing vigil. The right spaulder is small to facilitate slipping off the cloak when needed.

My process often starts with small sketches of silhouettes, called thumbnails. After this, I create more detailed grayscale paintings and variants. Often after some amount of iterations, the finalized design will emerge.

This might be technically the simplest phase, being a series of grayscale 2D renderings. However, it is still one of the most important aspects, as a creative 3D model starts on the 2D plane most often. Some things that can make a design more interesting include using some asymmetric features, utilizing negative spaces and clear segmentation/layering of the design.

Finally, as I had a schedule to keep I had to limit the length of the design phase, and while the concept might have benefitted from more polishing, the project had to move forwards. So, I went with a “good enough” design. It is up to the creator or client to decide if the design is of sufficient quality, as these things are often subjective. It is, however, important to move on, as it is easy to get bogged down in the minutiae of design, which may well end up stalling a project.

Final design

The character ended up utilizing strong yet relatively worn colors, to give some feeling of age to the war gear. I decided to go with creating a knight with Scandinavian-Finnish iconography, instead of the other way around, due to personal preferences. I used a sort of blued steel look for the hard armor, as I wanted it to have a darker theme overall. As mentioned earlier I did not go forwards with designs involving more plated armor and decided that the sides would be left only covered by his wooly tunic, to facilitate agility and comfort. I also left out any fur elements, as they just didn't satisfy my tastes.

The rivets on the other hand are normal hammered steel, and so they provide a point of contrast with the darker armor, making them “pop” some more. I used a sort of ivory inspired milky white/light brown texture with cracks, to further liven up the overall dark armor, as the idea was not to make him look evil. The patterns on the armor feature Nordic symbols, including the upwards pointing ukonvasara, which represents the tree of life, after which I added symbols depicting the sun and moon. The ideas or themes I attempted to go for were to emphasize contrast with light and dark values, the struggle between natural forces and people. Thus, the sun and moon imagery, further hammered home with them being either gold (sun) or steel (moon). And finally, the martial and spiritual power that keeps this fantasy world balanced, represented by the Kokko imagery in the chest plate. Also, the rune of the giant is used throughout the design, to signify that only special individuals may wear the armor of the order, and further still to be able to hold the gates of Loviatar shut.

After a significant number of attempts, I decided to color the clothing black, but to avoid everything just fading into itself I added ornamentation into the clothes in the form of embroidery, as well as contrasting stitching at the seams, embroidery also assists in

breaking up the model into distinct segments. To emphasize his importance and power, I made his cloak red, with gold embroidering. Both of which convey strength and importance. I also made the ornamental clasps holding the cloak onto him quite elaborate, to even further emphasize the idea.

2.2 Sculpted mesh

The sculpting phase includes sculpting the high-quality mesh and planning on how in the final product I want edge flow to be like. This phase will utilize zBrush, with 3Ds Max used for most polymodelling through an import/export utility called GoZ. [4]

The basics of sculpting revolve around incremental addition of details, along with incremental subdivisions. In digital sculpting work begins with a low poly model which one would sculpt into a rough basis for the final mesh, or a low poly model that needs details is taken into the sculpting software to be worked over.

Once further details cannot be added due to the sparseness of the topology of the mesh, it must be subdivided. With more polygons, the mesh supports further detailing. Following an iterative process helps with achieving the required levels of detail with a degree of efficiency not easily found in meshes that are quite dense from the start.

The sculpting process often begins with concept images and a primitive, which can be any quad based low polygon mesh that meets the requirements of the sculpting program. This mesh can either be an external 3D model waiting to be detailed or one created within the sculpting software either through poly tools or primitives.

zBrush contains many tools and brushes, far too many to list here. However, I will mention a few of the ones that I used extensively. Standard brushes like the “Standard Brush” or smooth will not be elaborated on, their purpose being immediately clear.

The clay brush allows one to sculpt flat surfaces and to fill in ravines in the mesh, it can be used effectively in conjunction with the dam brush to create sharp edges for panels or other angular objects. The dam brush creates sharp valleys or peaks and thus is well suited to work with the clay brushes, as the clay brushes can be used to fill in the valleys to either side of the dam brush, thus as an example one could create angled plates.

There are also cutting tools like slice and trim, which allow for sweeping changes in the mesh topology. Slice allows one to use curves to segment a mesh but will not actually cut the mesh into two pieces. If needed to, the segments can then be separated into their own sub-tools. Trim will flatten the mesh along a curve, allowing for the smoothing of a large area. If taken too far, it will flatten a large area into a 2D plane, which can be detrimental to one's work. It is thus best used in slight increments, with the use of standard brushes and smoothing brushes assisting in keeping the results clean.

zBrush offers various non-traditional sculpting tools, such as Dynamesh, which allows one to reprocess the visible mesh components while working on them. This is useful in the creation of the base shapes of one's model. As it remakes the mesh with each change done to it so that it retains its shape but has even topology. This is not recommended to be used on more complicated meshes as it simplifies topology in favor of even and clean topology. As a result of this, Dynamesh should mostly be used when creating base shapes for one's sculpting project.

zRemesher is a tool that allows one to reprocess the mesh topology, either in segments or the entire mesh. It can be used to reduce topology as well as cleaning up mesh topology after using the slice tool. It can in some capacity be used to increase the polycount of a mesh if one does not wish to subdivide and thus quadruple their polycount, it is however suboptimal as this method will remove any previous levels of subdivisions and will likely result in topology that prevents the rebuilding of higher subdivision levels.

Soft body or organic shapes are efficient to do with sculpting tools from start to finish. However complex mechanical shapes such as joints, layered paneling and very precise shapes are often best done with polygon tools to save time. For this zBrush in particular offers multiple options, whether to use the internal vertex modelling tools or use GoZ, a plugin that facilitates rapid transmission of the workspace assets between software packages. In the case of this project I opted to use GoZ to transfer assets to 3Ds max as my experience with that software exceeds other similar products. When creating these hard surface primitives for 3D sculpting one must chamfer or otherwise add supporting topology to areas where the primitive should retain its hard edges and/or precise proportions.

Depending on the size of the project and workstation technical specifications the sculpt may require some optimization. On this project I will use zRemesher for a large part of it, as it would allow the reduction of very specific areas while leaving the detailed areas with higher density topology. The specific method of selective topology reduction in this case shall involve hiding areas that should retain detail and then using zRemesher on the parts that need to be reduced.

2.3 Re-topologized mesh

The retop phase includes the creation of a low detail version of the high quality (HQ) mesh on top of the actual HQ mesh, also includes topology loops and optimization. Due to monetary constraints no specialized retopology tools will be used for this project, instead 3Ds Max will be used for these purposes. A significant amount of polymodelling and extra work is involved with this workflow. [14]

The method that is used for this work involves “drawing” topology on top of the HQ mesh. Thus, re-creating the shapes and proportions of the previously sculpted mesh, with significantly less polygons [10]. This new low-quality mesh will then be finalized and prepared for further work. Creating the main poly loops manually can assist greatly in assuring that the model has the proper topology that facilitates proper deformation when animating.

Deforming meshes require special attention with the creation of topology. The mesh must preserve its volume as it deforms, this requires the user to create polygon loops specific to this purpose. Limbs should in most cases have at least two edgeloops on either side of a joint, that complete a circuit around the limb. More loops can be added to attain higher levels of detail with the mesh, but two is the absolute minimum for the limb to not collapse while deforming. [12]

When creating topology for a joint like a knee for example, there should often be a vertex to the side of the joint to allow for proper rotation of the topology. The position of the vertices is determined by the primary rotation direction of the joint. For example, on the knee there would be vertices on both sides of the joint, to allow both sides of the knee to deform and rotate properly with the animation. This way if one would draw a line through

the joint it would first pass through a vertex then the actual joint and then again through a vertex.

During retop the user must also ensure that the vertex normals are usable for texture map baking, this means that 90-degree folds between polygon faces and extreme concave or compound shapes should be used sparingly [7]. Also, steep angles should be supported with additional poly loops to mitigate distortion and to avoid a wave pattern (on curved surfaces) when there are normal map details running along the direction of the edge. Figures 2 and 3 show the effects of insufficient supporting topology. The reason for these artifacts is that the vertex normals used for normal map rendering are at a shallow angle, thus skewing the end results of the normal map rendering. Figure 4 displays cleaner results due to supporting topology as well as the 90-degree angles being reduced to a shallower angle [8]. Supporting topology will also help minimize the file size of normal maps, as there will be fewer and smaller gradients, allowing for better file compression.

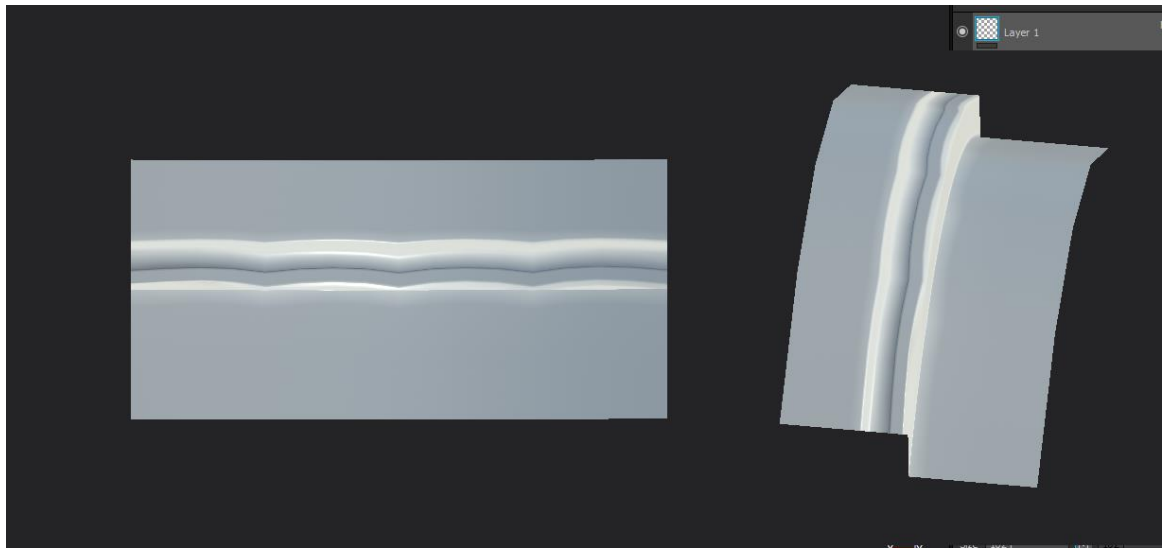


Figure 2 - Insufficient supporting topology as well as a 90-degree angle within close proximity to details result in a shallow angle in the mesh normals.

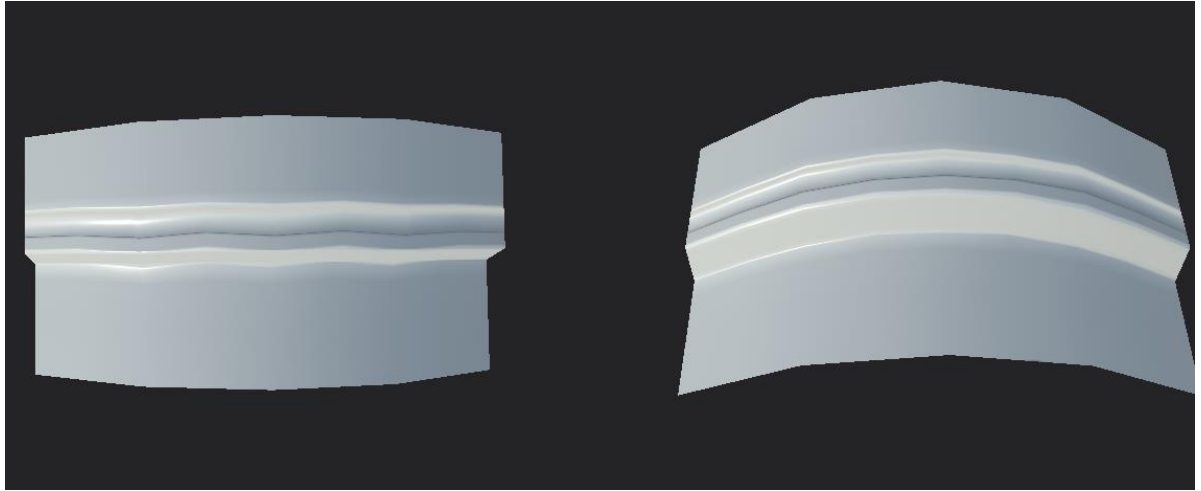


Figure 3 - Demonstration of a flawed normal map rendering due to insufficient supporting topology. The details were rendered along the vertex normals which were too shallow thus distorting them.

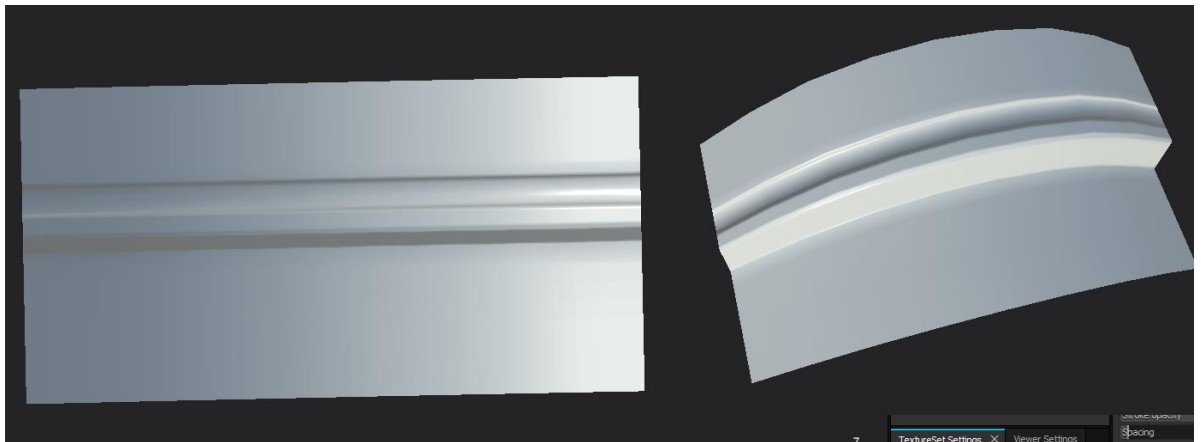


Figure 4 - The shallow angle along with supporting topology results in a correct render direction and thus clean results.

Retop in 3Ds Max is handled through manually placing vertices onto the HQ mesh, while not as good or flexible as real retop software it is what is available. The increased workload will result in more mistakes and a longer retop phase, as all topology will need to be hand placed due to 3Ds Max not possessing the capabilities to directly emulate the functions of software like Topogun. Keeping in mind the topology guidelines the process is relatively straightforward.

2.4 Unwrapping

The unwrapping phase consists of UV unwrapping the 3D model to enable texturing. Generally, one would unwrap their model using a 3D modeling software, like 3ds Max or Blender. UVs allow for a 3D object to be textured. Each polygon has a corresponding shape in the UV map. These polygons are the visual representation of the UV coordinates, which facilitate displaying 2D textures on 3D surfaces. [6]

Unwrapping a mesh requires the placing of UV seams in one's 3D software of choice, after which the segmented mesh needs to be unraveled and flattened out, much like skinning an animal. Each different segment is called a UV island, and will be used to apply the 2D texture to the corresponding area on the mesh. It is important to maximize usage of space when UV mapping, to assure as high a texture fidelity as possible. As textures are pixel based, the orientation of UV islands and the majority of the polygons should follow a 90-degree rule when applicable. This will allow for maximum quality as pixels along edges won't be cut off and it will reduce required anti-aliasing, simplifying image compression. Distortion on the textures should be minimized but often cannot be completely removed, a small amount of distortion is acceptable.

UV islands should be scaled in a 1:1 ratio between each other. For example: A very small segment should still be very small in comparison to other parts when unwrapped into a UV map. This will help hide seams while also allowing for easier texturing when using physicality-based rendering (PBR). UV gutters are an important secondary requirement, as these minimize MIP map color bleed resulting from the downscaling of the textures. These are especially important with normal maps as insufficient spaces between islands can result in normal artifacts.

With regards to optimizations UV seams effectively duplicate the vertex count where the split happens. If the mesh has smoothing groups, the vertex count will again be duplicated over edges that are unsmoothed. However, a UV seam running along an unsmoothed edge will not quadruple the vertex count. This can be utilized when deciding where to place one's UV seams, mostly to save on the project's polybudget.

2.5 Texturing

Texturing the model will be done in Substance Painter with texture baking taking place in xNormal. While Substance Painter allows for texture baking xNormal works better with the limited hardware resources available.

This phase requires the creation of various texture maps and masks, to create the finalized visual look. The desired end product will largely determine what exact methodology is used to create the textures used for the materials on the model. This project will utilize PBR, specifically the Metallic-Roughness workflow, as this process leads to more optimized materials, with only one RGB texture needed. However, this method will create white artifacts along areas that have highly contrasting levels of roughness and conductivity (commonly known as metallicness). The other main method Specular-Roughness on the other hand uses two RGB textures, and thus cannot be compressed quite as much as the aforementioned type. As a somewhat advantageous feature, this method causes black artifacts in high contrast areas instead of white, which are in general less visible. The sources of theory for this part are consolidated into a single place at allegorithmic.com. [5]

Texture baking is the process of saving directional and lighting information onto a 2D texture primarily for the purposes of transferring HQ mesh details onto a low poly mesh. Texture baking is primarily required for ambient occlusion (or cavity maps) and normal maps.

PBR is based on the realistic simulation of light once it interacts with a surface, which can either be the absorption or scattering of the light rays. On the technical side it is a complicated subject and well beyond the scope of this work. The following will be a general summation of the theory behind the subject as well as some practical topics relevant to artists working in PBR.

Absorbed light decreases in intensity and thus the reflection of such rays is less significant, this is based on the real phenomenon of light changing into another form of energy. A matt surface will absorb more rays of light than a shiny surface, which reflects light and thus creates visual reflections.

Scattered light is projected into random directions, without decreasing the ray intensity. This can be visible in semi opaque thin surfaces, like plastic sheets or skin. In these instances where light can pass through, but the rays are scattered, the resulting light will appear softer and blurry on the other side.

Another example that is given in the PBR documentation is glass, which has both a low absorption and scatter value, allowing for the rays of light to pass through mostly unchanged. Resulting in a level of translucency.

Surfaces can have many properties, and this work is of insufficient scope to cover all of them. The properties that are most common follow, in no particular order. Specularity is primarily used to determine if a material is metal or not, it also allows the setting of colored reflectance values. Diffuse on the other hand represents in RGB, light entering an object and reflecting within it, until it either exits or is absorbed within the surface. Roughness represents in grayscale microdetails in the surface, resulting in a light absorbing/scattering effect when the roughness value is high. And finally, metallic which represents in grayscale the metallic properties that the surface either has or does not have, to different degrees.

PBR materials also support other traditional texture maps, such as: Normal, Subsurface, Emissive and Ambient occlusion maps. These work as normal with PBR.

In Substance Painter one can use existing materials or create their own, all with preset PBR values and then paint it onto a 3D mesh. The painting can be done either manually or by using masks. These materials have PBR values that will then be automatically applied to each of the texture maps, this allows for real-time viewing of the PBR materials while texturing.

Work in Substance Painter is largely layer based, much like some dedicated 2D image editing software packages. This facilitates non-destructive workflows, by allowing any changes to take place on a different layer. These layers can then be individually edited or have masks and effects applied to them. Substance Painter allows the use of smart masks, which take into account the shape of the mesh and utilize baked textures to apply masking into certain types of shapes on the mesh, for example concave shapes. The application of the masking effect can be manually adjusted to take into account various

variables, like curvature, cavities or normal details. These smart masks can be used to quickly add wear or grime, however often the results will need some manual touchups. Substance Painter also provides smart materials, which work in a similar way to smart masks, but also provide premade materials on top of the masking feature. These are useful as a base for the materials in one's project.

It is important to realize that each layer adds another full-size texture into Substance Painter project, which means that the file size can rapidly balloon into multiple gigabytes, while also slowing down the workstation significantly. This can be mitigated with layer instances, which take one layer or layer group from another material ("texture group" in Substance) and adds a non-editable instance into another material. This comes with the advantage of saving on file size as well as performance and may decrease workloads somewhat. Any smart masks will automatically react to the model as normal, even on instanced layers. [13]

3 Reports

3.1 Week 1

I worked on the plans, further defining each step I was going to take in the project. After which I worked on adding sources into the plan, also started consolidating sources into an archive where I can more easily pick them out as needed.

I resumed thumbnailing, further exploring different design styles. Realizing that I had stuck with a very narrow avenue of shapes/designs I attempt to find new, more exciting ideas. Work is done in grayscale with rough sketches of some of the more promising designs. I try to vary things up on occasion by improvising something in between pursuing some of the more promising designs.

Work continues on thumbnails, 2D is not my strong suite and thus it is slightly more of a struggle to turn out actually good material.

3.2 Week 2

This week I am planning on getting close to finishing the concepting phase and begin work on the actual character drawings. The drawings will be made from the following angles: front, side and back.

Day 1 (4.4) - First day of the week was spent working whatever material I already had into the thesis template. Nothing much to report on the subject, I will implement further changes when needed.

Day 2 (5.4) –Today I want to resume working on the concepts as they are still relatively rough. I will try to nail down the look of the character’s platemail elements, the helm will be finalized along with the platemail as they are a set.

Report: I have achieved a relatively good look for the platemail elements, there were some specific pieces of inspiration I wanted to incorporate into the design.

Day 3 (6.4) – Today I will aim to finalize the boots and tabard elements, I am looking to finish rough concepting and move onto drawing out the detailed designs. I will look into actual medieval boot designs to help me make them more believable, as I am unhappy with how the character’s boots look somewhat like modern military boots. I will further study the decorative designs on the character to make them feel more authentic and see if I can improve on them. I may, if I have enough time, work on the initial schematic drawings as well.

Report: I did not get as much work done as I’d want, technically I achieved what I was looking for, but I am not happy that today’s achievements are limited to “good enough”. I did not manage to start the schematic drawings, these will be worked on during my next work session. The final variant sheet is displayed below as figure 5.

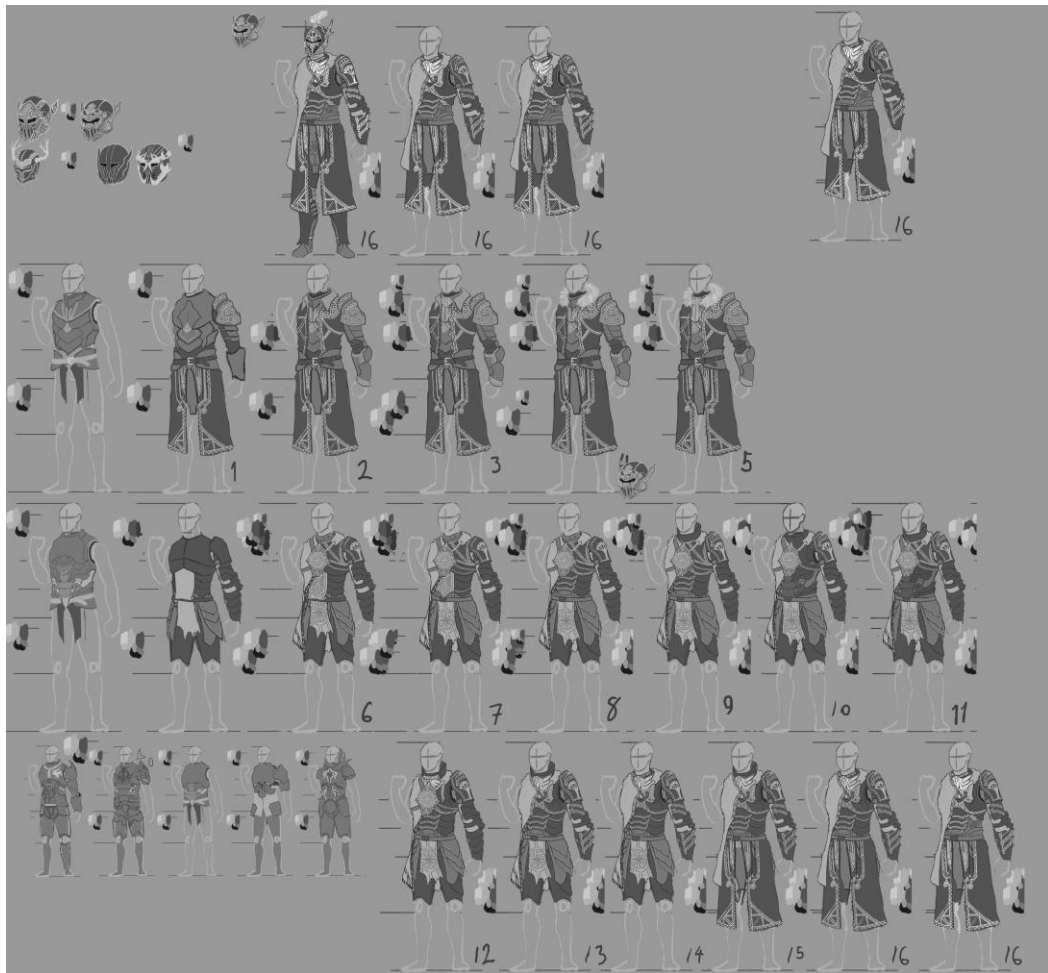


Figure 5-Armor variants

3.3 Week 3

This week will see me finishing the rough concepts and starting work on the character schematics themselves. It is likely that this phase will take most of the week as 2D is not my specialty, so I am not planning on anything else being done. The character designs will first be painted grayscale, after which I will paint some basic colors onto it.

Day 1 (9.4) – I will finish the thumbnailing process. Begin the ground work for the final character designs. I will create the character design in layers, with the base layer containing platemail, cloth and leather elements that are more in line with clothing etc. and then there will be a layer with equipment and finally the layer with the tabard, long coat and cloak.

Report: I have finished the initial thumbnailing process and ended up with a rough design that I like. I then proceeded to refine it and fit it to an anatomically accurate character physique. I spent a fair amount of time making sure that the proportions were good with the figure, as this is the very base level of groundwork for the actual 3D model, so time spent here will save time later. I began painting over some rough platemail and clothing onto the silhouette, almost finished the first rough iteration of the bottom layer.

Day 2 (10.4) – I will continue with the base layer of the character, refining the larger color masses and building more on the base layer. Among all the other work building on yesterday's work, I will block out the helm of the character. I may, depending on how well work progresses, start work on the engravings for the armor. There are no new techniques involved here, still working in grayscale and simple 2D painting.

Report: The helm is largely finished. Engravings are well underway, I refined some lines in the chest plate and the plates on the abdomen area. The pants and all the main bottom layer pieces are done, simply detailing and polish remains. Work is slow, but hopefully it will pay off later. Because of said slowness there is little to report on.

Day 3 (11.4) – I will aim to finish the engravings and move onto finishing off the rest of the main layer's detailing. I will aim to begin some basic work on the side profile picture

Report: I revamped a part of the breastplate, the designs attempted were styled closer to traditional Finnish engravings/patterns. The side profile was started as well. I "copy-

pasted” the frontal image and cut off parts to create a simple starting point for the side profile.

3.4 Week 4

This week will focus on finishing 2D concepting/design phases and to finally move to 3D and the main body of work for the project.

Day 1 (16.4) – Today I will work on the 2D designs still, I will most likely leave the side and back perspective images less accurate than the frontal perspective image to save time. I will also hopefully be able to start on the second layer for the character designs.

Report: Work on the second layer was begun, had some difficulties with coming up with a pattern. In the end I came up with a relatively nice trim pattern for the long coat elements, the half-cloak is blocked out, but I really could not figure out the trims

Day 2 (17.4) – The backside of the character’s second layer is going to be started today. Hopefully progress is swift, as I do not want to prolong this further.

Report: Progress is slow at the moment. Usable ideas have been scarce, so I resort to just testing out different patterns for the back of the character. In the end I do come up with something that I like. I researched some ancient Finnish/Scandinavian symbols and decided to combine “Ukonvasara” and “Hannunvaakuna” which represent the hammer of Ukko the overlord of gods and a symbol of good luck respectively. I accidentally arranged the symbols so that they slightly evoke a stylized sword of all things, quite the happy accident.

Day 3 (18.4) – Today I will attempt to reach a good enough level of clarity, regarding the character design. With luck, I can begin basic 3D modelling for this tomorrow.

Day 4 & 5 (19.4 - 20.4) – I will begin the sculpting process and start shaping the basis of the character.

Report: I brought the character drawings into zBrush, through the “Draw” feature set. I prefer this method over the others, as it anchors the reference images into the floor grid [1]. Draw simply displays a 2D image in the workspace.

After that was done I picked the demo soldier mesh and removed most sub-tools (Sub-tools are essentially just separate sub-meshes) from it. The starting soldier had an overbuilt physique, so I used inverse inflate, standard brush and clay to remove excess bulk from the base mesh. with copious use of smoothing brushes to achieve a smooth base for the rest of my work. [2]

After I altered the base meshes’ anatomy I started on creating all my sub-tools out of the base mesh. I did this by duplicating the body mesh and then using slice and trim brushes to cut out shapes corresponding with the armor plating [3]. The helmet itself will prove most challenging to sculpt, so I worked on the base shape for it, and started to cut out shapes that I need to define it with.

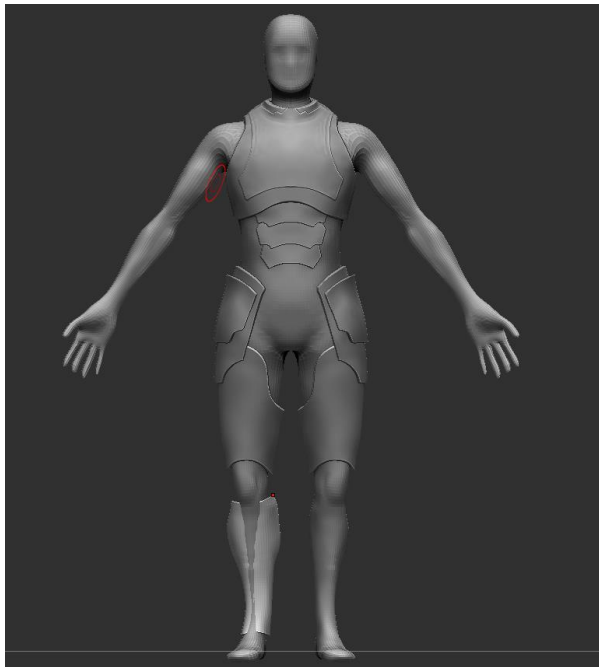


Figure 6 - Base shapes, note the overtly slim body, as I needed to get rid of intersecting topology

3.5 Week 5

Day 1 (23.4) – I will continue working on the base sculpt of the mesh. I will work on the helm and arms today.

Report: A relatively mundane day, I managed to get all the very basic elements into the helm, again with the use of slice and trim. It took longer than anticipated due to some issues with overlapping meshes, and how long it took for me to notice said meshes. I may resume work in the evening if I have the spare energy to do so.

Update, I did the basic shapes of the arm armor, tomorrow I will likely cut out what will form the individual plates. I did some tests for engravings on the armor, after a few tries I decided that I want the outlines of the engravings carved inwards, and later on will see about the specifics of polishing the details. Overall it came out good enough, I shall utilize said method for now.

Day 2 (24.4) – I will continue with the model, I will move on to the creation of the basic elements for the character.

Report: Today I tweaked the helm somewhat and optimized certain areas of the mesh. I also modelled the basic shape of the long coat and belt. I added jewels to complement the engravings.



Figure 7 - Helm engravings overall view

Day 3 (27.4) – I will aim to get closer to finishing the initial sculpt of the character, I will do this by finishing up the basic shapes and getting the masses right for the various parts of the mesh. This is done so that I can safely add details to a mesh with the absolute minimum amount of issues, as fixing said issues may warrant removing already created detail work.

Report: I bulked up parts of the mesh, so the armor & clothing looks like it has actual thickness, I reshaped the hands and started some initial detailing there, by sculpting some small wrinkles and seams for the gloves. I used the GoZ (Go Zbrush) plugin to bring parts of the sculpt into 3ds max, so I could more easily create a basic shape to sculpt from. The process was simple, I selected a subtool after which I simply pressed the GoZ button, after which the model appeared into 3dsMax. From there I created a basic shape using traditional polygon modelling techniques and then used the GoZ plugin for max to re-import the mesh back into ZBrush, after which I appended it into the main model. [4]

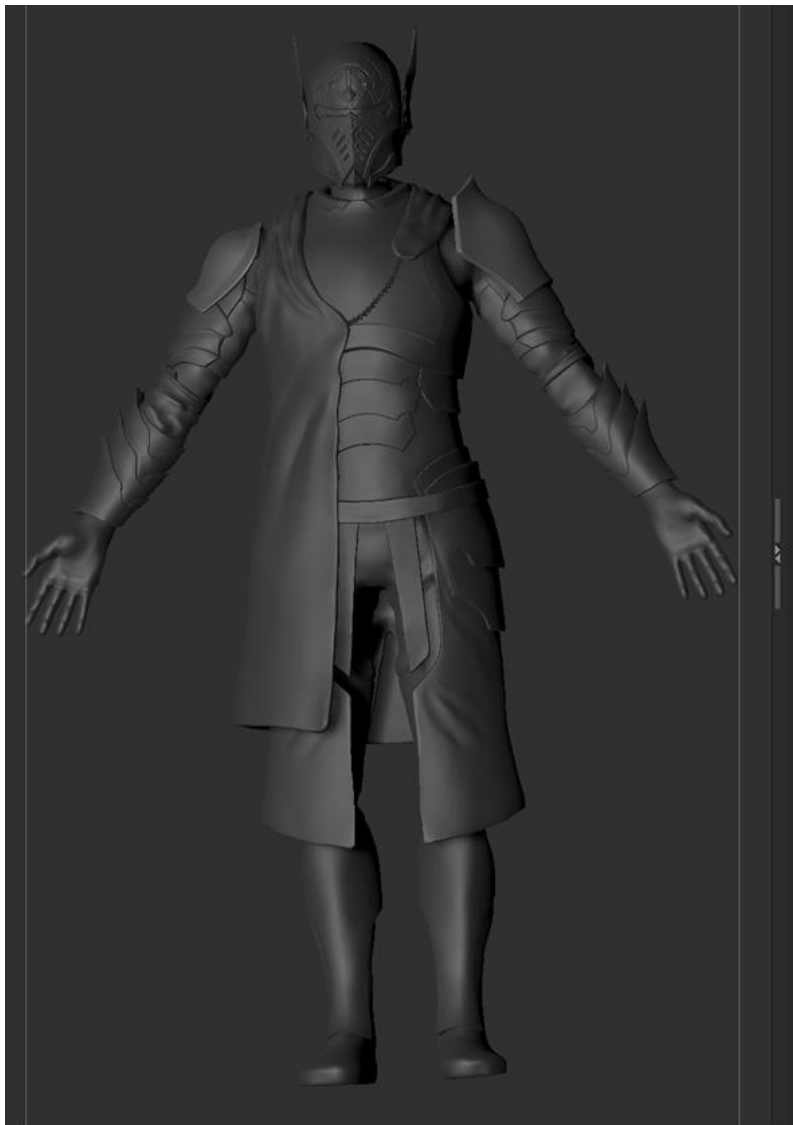


Figure 8 - Character overview. There is going to be zero chainmail on him. All areas not made of rigid plate are either cloth or leather, this is to keep the outfit warm.

3.6 Week 6

I will work more on finalizing the base shapes, so I can start doing the detailing and get closer to the completion of this phase.

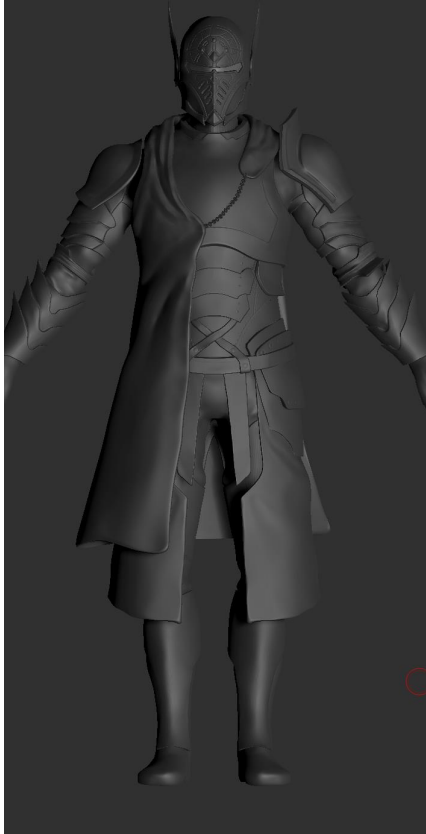


Figure 9 – Bulking up the shoulders, arms and armor plates yielded good results

Day 1 (31.4): Today I will work more on basic shapes of the mesh, I'd like to get closer to finishing this stage of the project.

Report Today work has progressed at a great speed, I worked on most parts of the model. Mostly work was put into refining shapes and creating the last components for the mesh. I realized at some point that the silhouette of the body was way less menacing than the helm and proceeded to remedy that. After some thought I decided to bulk up the shoulders and arms, while also enhancing the collar area by bringing it higher while broadening the chest. I also made the cloak more voluminous, with the goal of providing more mass to the body. I refined the sculpt of the details on the helm as well, finding a generally good look for them. As a result, I now have a process for the rest of the engravings related details on the model.

I quickly created some extra accessories for the character with GoZ, and completely redesigned the spaulders of the character. I went into an excellent flow state today and ended up working over 12 hours, I am happy with my progress today.

Day 2 (2.5) Today I will work on the chest plate and polishing up the armor so that it is ready for the detail pass.

Report: I worked mostly on the breastplate. I added the steel raptor design onto the chest. Afterwards I added a wave pattern underneath the bird motif. I tried to design the wave pattern in a somewhat similar style to some Kalevala illustrations. I will have to do a lot of polish work on the breast plate itself. I am trying to keep the depth of the details similar, but it is difficult when I must rework some areas.

Day 3 (3.5) Today will be spent cleaning up the chest plate

Report I spent the day polishing the lines, I also decided to polish the shoulder pad a bit. Really just quite an uneventful day. I'll take a break from the bird motif and return to it later with a fresh view on things.

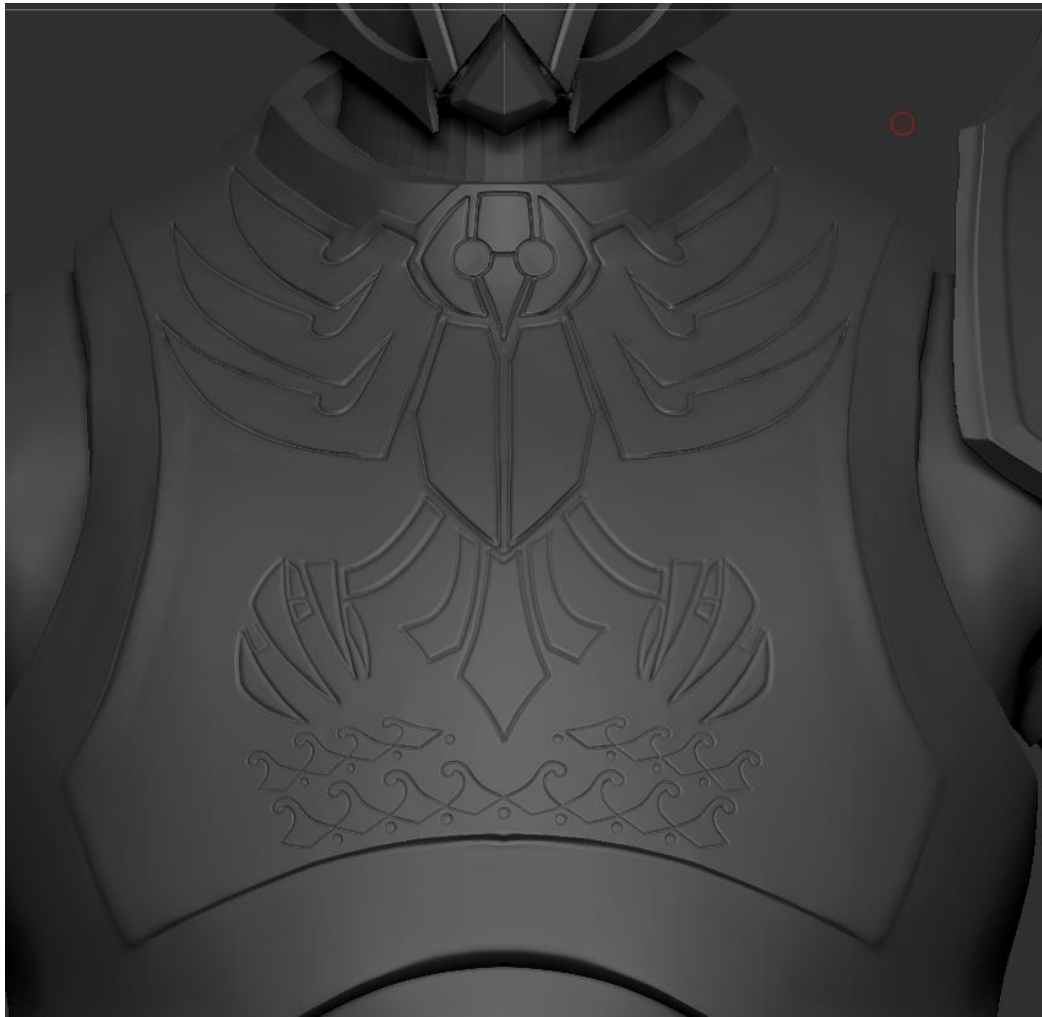


Figure 10 – Kokko the steel raptor depicted flying over the surface of a lake. In Kalevala Kokko caught the “Suomuhauki” from a lake, which is where I got the inspiration for this design.

3.7 Week 7

I will work on polishing the shapes I currently have so I can do the rest of the engravings, then I will do as many other detailing pieces as possible.

Day 1 (7.5) Most of my work day went by doing some errands and other tasks, so once I got to work on the model I decided to mainly do optimizations and smaller polish tasks. The reason why I want to do optimizations right now is that later, when I'm going to finish things up I will need to subdivide certain parts of the mesh. And since the project is currently at 17.726 million polygons, it would end up with easily over 100 million polygons after a few subdivisions.

Report Optimizations were made with the goal of reducing polycounts drastically. I would mask off parts that required a lot of polys, and then I'd reduce the unmasked parts. I did this by hiding the parts that should retain detail and then I used ZRemesher with the setting set to half and adaptive set to a very low value. Mostly I reduced large flat surfaces that do not need details or are hidden from view. I also did some reference material collecting for cloaks, so that when I decide to finalize the cloak I will already have some starting references in place.

I ended up doing easily over 6 hours today, so I at least exceeded the minimum I've set for myself. As a result, it was a slightly more productive day than I thought it would be.

The image below shows how I reduced topology for areas that are mainly hidden from view, I may go even further with the reductions. The transitions between optimized and non-optimized areas, I try to keep in the simpler or flatter areas of the mesh. This will mitigate or hide the loss of fidelity, as the areas don't have actual sculpted detailing.

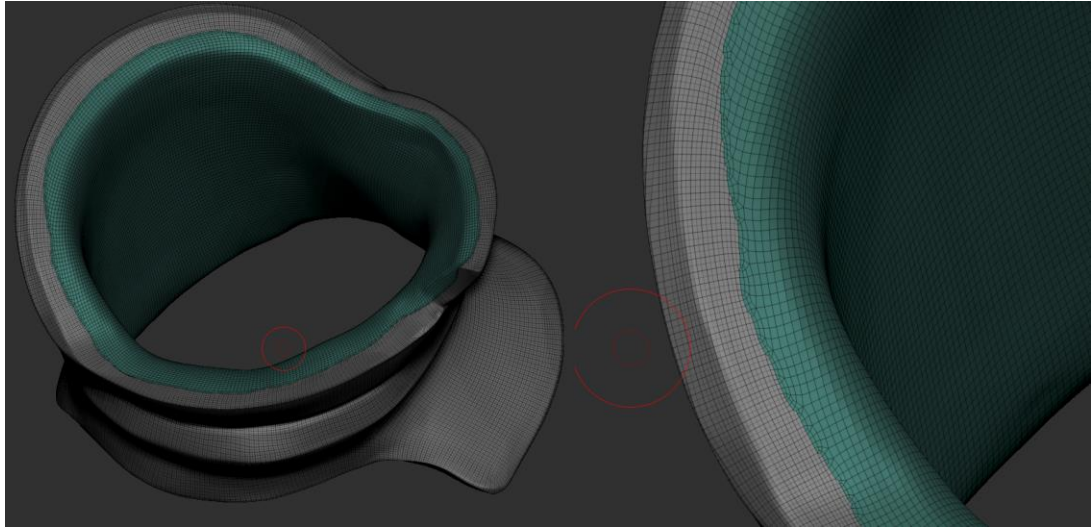


Figure 11 - Topology reduction, note the topology that turns in on itself, reducing the following topology

Day 2 (8.5) Today I will continue optimizing and polishing, likely with an emphasis on polishing tasks.

Report I polished up the gauntlets, there will be some images below of the results. I then optimized the cloak and did some polish on that. I also created clasps and a chain to hold the cape in place, these I did once more with the help of GoZ and 3ds max.

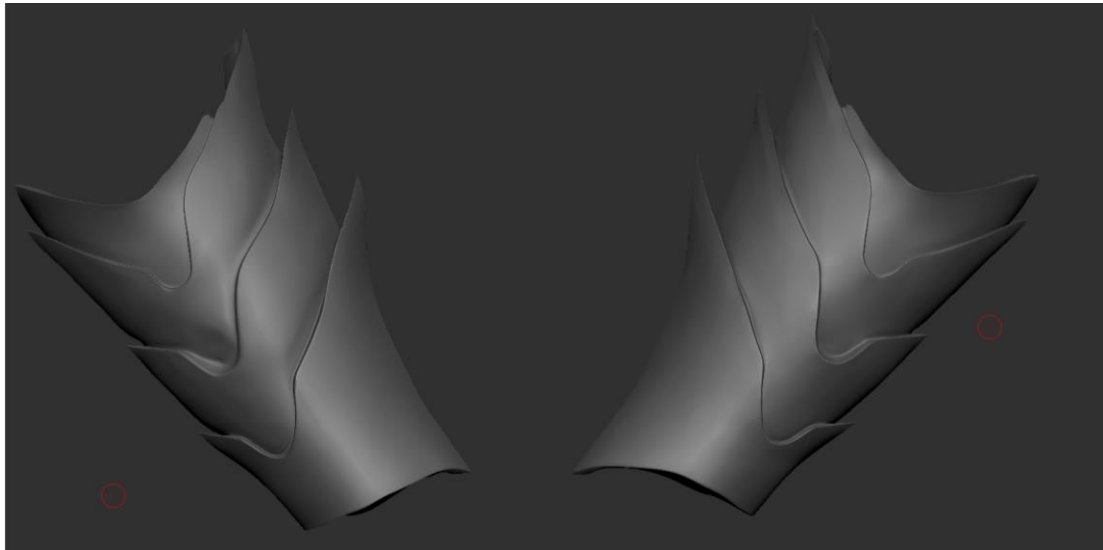


Figure 12 Gauntlets – Old one on the left, revamped version on the right

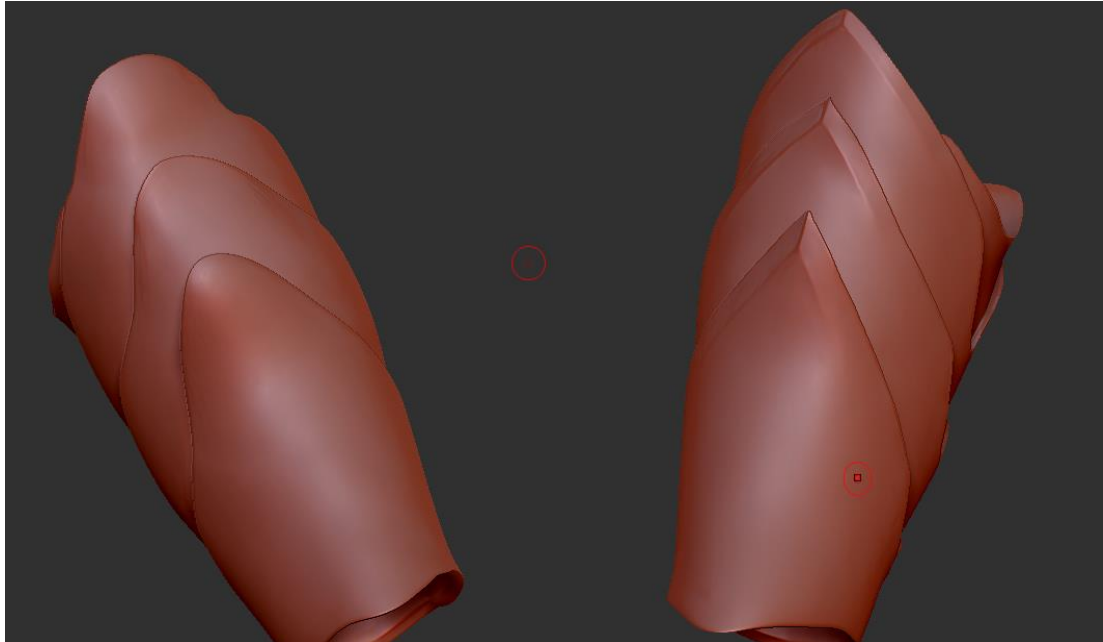


Figure 13 – Old one on the left, revamped on the right. I switch materials on occasion to help identify faults better

Day 3 (9.5) Today I will work on the helm’s ornamental horns/wings. I will also do some other minor tasks, again related to optimizations.

Report I worked on the ornamental pieces of the helm, thinning them out and refining the shapes. I looked at the character’s silhouette from the side and discovered that the horn ornaments barely clear the top of the helm, thus leaving quite a minimal impression at a glance. I decided to elongate the horns to alleviate this issue. I added some engravings onto the horns and made their structure more even in terms of thickness.

I then proceeded to work on the cloak again, the frontal silhouette of the cloak is very plain, and it obscures the character’s own silhouette. I proceeded to experiment a little bit with adding belts or extra clasps to keep the cloak’s silhouette interesting.

Day 4 (10.5) Today I will work on the belt/cloak, I’ll see if I can add some tools and pouches in ways that look good.

Report I did a lot of work with the cape and the new belt piece for the cape. I added a small pouch with rough stitching on the seams of it, to make it feel a bit more in the style of old. I decided that I wanted to add some ornamentation to the bag, so I decided to put on a “Hannunvaakuna” on it. I first used the alpha to “stamp” on the shape using a

standard brush, after which I used a stitch alpha with the standard brush to paint over the recesses, giving it the look of being stitched on to the bag. I then proceeded to add some leather tabs on the lid of the pouch to give some realism, after which I decided to add some buttons on the tabs as well. The buttons I made quickly in 3DS Max and used GoZ to bring them into ZBrush.



Figure 14 – Frontal view, updated cape

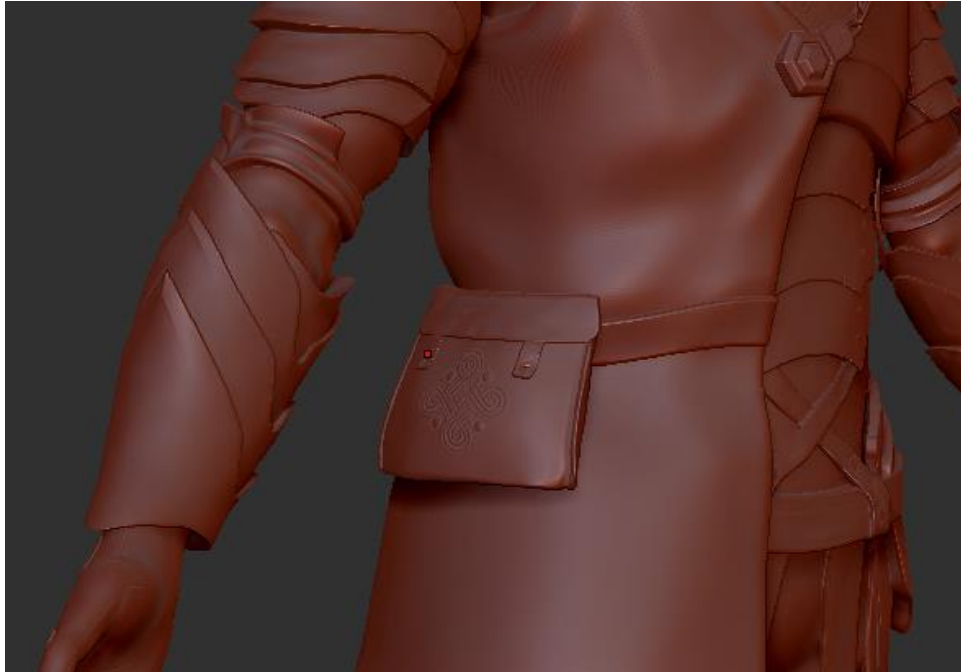


Figure 15 - The pouch incorporates the Hannunvaakuna, a symbol for good luck

Day 5 (11.5) Today I will focus on adding beltloops clasps and other small pieces to the model, I will also work on the cloak a little bit more, if time permits.

Report Today was derailed completely, instead of the small details overall, I worked on the boots and leg armor, as they just suddenly stuck out as woefully undercooked. I refined the armor of the lower legs and gave the boots some creases and softer shapes.

3.8 Week 8

I will endeavor to reach the point where I can start adding microdetails into the mesh, which means that this week I will focus on making sure ALL the basic shapes are of sufficient quality and that there are NO unfinished segments left.

Day 1 (21.5) Today I will finish the gauntlets, the point is to make them look relatively weaponized, to work as last ditch or opportunistic methods of attack, on top of being protective gear.

Report Added segmented finger armor, modelled in 3ds Max. Happily it looks good, requiring little to no reworking.

Day 2 (22.5) I will review the model for unfinished areas, what immediately comes to mind are the boots.

Report I have worked on the armored boots and created kneepads for the character.

Day 3 (23.5) Today I will review the mesh and make some initial plans on how to add some immersive details.

Report I added small potions to the character's belt, this was a very short work day.

3.9 Week 9

I will try to finish the sculpt this week, this will include adding functional parts to the armor, as well as adding seams and straps to relevant locations.

Day 1 (28.5) I added some seams to the armor, so that it looks like it could be removed. A very short day again due to urgent matters.

Day2 (29.5) Today I will try to focus yet again on the seams and buckles required for usability. I will add some straps and other details as well if time permits.

Report Today I worked a great deal on making functional straps and seams, with some extra polish added here and there. I used a great deal of polymodelling in 3ds max to create the basic shapes for many of the components created today. Figures 12 and 13 illustrate the changes clearly. I spent some time designing functional buckles to hold the armor together, along with finally creating the belt buckle itself. It was quite enjoyable to design the mechanism to prevent the buckles from potentially slipping/loosening. Hopefully I can return to a more regular schedule from here on out, as the recent week has had a great deal of other important yet distracting tasks.



Figure 16. There are now new seams and bootstrap details added to the boots



Figure 17 - Buckle and straps, note the peg preventing the belt from slipping/loosening

Day 3 (30.5) Today I will continue with the functional details

Report Refined some of the armor plate edges, I spotted some uneven areas on the helm and proceeded to fix them.

Day 4 (31.5) Today will be spent doing various polish jobs on the armor, no solid plans, just touching up areas that need work.

Report More unforeseen errands I had to run, tomorrow I will see if I can clear out the rest of these distractions. I am not exactly with all these errands I must run, but they just have to be done.

3.10 Week 10

This week I will try to pick up the pace, last week I managed to clear the last of my miscellaneous courses and moving related tasks, so I will now be able to focus on this fully. This week will be the last week I work on the sculpt, it has gone along long enough and its nearing a point that's "good enough".

Day 1 (4.6) Today I will attempt to polish the model and try to work towards the finished sculpt.

Report I polished the right shoulder pad, I also created seams for the bottom layer of clothing. I added small details in the form of rivets, to the fingers of the gauntlets. I also added some rivets to the chest plate. In addition, I added wrinkling to the cloak while also pushing the soft leather pouch closer to the surface of the cloak. I then worked over the chest plate detailing, refining the lines of the bird motif as well as adding more details. I then added some engravings to the bottom edge of the chest plate. Other tiny & miscellaneous changes have also taken place all over.

Day 2 (5.6) Today I will continue in much the same manner as yesterday, looking for areas that need details or polish.

Report I worked extensively on the helm and managed to almost completely finish work on it. I added a large amount of engravings and detailing, while also doing slight adjustments to the silhouette of the helm. Tomorrow I will take one last look at it and try to finalize it completely.

I do still have a single large issue with the helm, which is the area between the jaw plate and the face of the helm. The area was originally designed to be canvas, to facilitate easy breathing and also que the viewer of the possibility that the helm has a canvas lining, or that the character wears a scarf and cap underneath for warmth. However, I am not sure if I like having two giant unnecessary weak spots, vulnerable to thrusting attacks on a plate helm. So, I will likely experiment with either a steel mesh, or perhaps more likely, a layered steel plate array in a gill-like pattern in the end (which would deflect any attacks off to the side, while providing some extra ventilation).

Day 3 (6.6) Today I will continue with polish.

Report I added extra protection to the wrists, in the form of extra leather bracers that connect to the plating on the gauntlets. I also added the final piece to the belt, while also refining the left spaulder and adding in some ornamentation. Today was less productive than yesterday.

Day 4 (7.6) Polishing will continue, hopefully I can reach a good enough level of finish today. My current problem revolves around deciding what details to do purely in the texturing phase and what to do right now.

Report The helm is as ready as I am going to make it, other parts received some smoothing and polish as well. And finally, ZBrush crashed which made me lose some fair bit of progress, so this day was “ok” at best.

Day 5 (8.6) This day will be more polish

Report I did some stitching to the leather and cloth components, mostly belts. I have a feeling it'll take more time to get this done. I spent some time just going over the model, I'm nearing the point where it is not easy to just improve something at a glance.

3.11 Week 11

I couldn't finish the sculpt as fast as I wanted. This is the final week I will allow work on the sculpt as the project needs to move forwards.

Day 1 (12.6) Today I will look for areas that need polish.

Report I ended up doing a whole lot of work on the spaulders as well as engraving some runes to the helm.

Day 2 (13.6) Today I will work on finishing up the sculpt, and hopefully start planning mesh segmentations for retop.

Report I worked a with the cloth elements as well as doing small touchups to the greaves and helmet. The character is starting to look finished, or at least good. I had plans on creating more small accessories for the character, but I really do want to move on with this project. I feel like I've spent too long in the sculpting phase. Although to my credit I must admit that a lot of time has been spent learning ZBrush, as this is my first complete character sculpt with the afore mentioned software. And of course, learning ZBrush was one of my main personal goals with this thesis.

Day 3 (14.6) Today I will begin the re-topologizing process. This involves taking parts of the HQ mesh into an application that can re-topologize, and then mostly hand drawing polyloops. There are automated systems for that, but they do not allow for quite as much control over topology density and edge flow.

Report I split the HQ mesh into separate layers/groups corresponding roughly to how I plan on rendering the normal maps for the low poly mesh (abbreviated to LQ mesh). I then spent the majority of the day creating the LQ mesh based on the main body of the character. The LQ mesh will not have any of the layered elements of the model, just the base objects. The layers will be built separate to facilitate easier texture baking.

Day 4 (15.6) Today I will continue working towards retopologizing the whole mesh.

Report I had to remove all the retop I had done at about halfway through the day, due to the mesh getting corrupted. As far as I know it was a script that malfunctioned and thus created impossible edgeloops everywhere, which in turn crashed 3Ds Max every time I tried to edit the mesh. I then proceeded to work on the torso again, the breastplate was finished today as well as the legs.

3.12 Week 12

This week will be spent on retop. I will hopefully get it done in just one week.

Day 1 (18.6) I will continue retop, I will work on the leather plates on the hips and work on the arms.

Report I did the armor over the hips as well as started work on the arms.

Day 2 (19.6) I will finish some of the arm plating today

Report I worked on the arm plating, the work was slow due to me being unsure if certain concave shapes would cause issues further down the line.

The following is a summation of work done over a month of on and off work, due to a heatwave preventing active work.

Report on retop: The process went relatively smoothly after the most difficult and layered areas were done, I did a fair bit of back and forth with polycounts as I tried to hit a sweet spot between fidelity and reasonable polycounts. As this work was done a little bit at a time in sporadic bursts, there is not much to report on. In the end I decided to merge several components to try and keep things neat, as there were a great number of separate submeshes to deal with. This process was done to alleviate issues with the UV maps.

Report on UVs: I managed to get a laptop into a workspace with air conditioning by this point, and thus made great progress on UV mapping. In a matter of two days I managed to UV map the entire mesh. This was an attempt to make up for time lost during the heatwave. UV maps are a very familiar subject for me, having dealt with them for over a decade. With the general goal of maximizing UV island size while ensuring that there are still gutters between them, whilst minimizing any texture skewing/warping. However modern PBR materials do add some additional requirements, and that is for the islands to be of similar scale relative to each other's surface area. This will mitigate materials displaying visible blurry seams along the UV borders. This will also help with the use of procedural materials, as one would not have to separately scale, mask and layer a pattern for different scales of UV island.

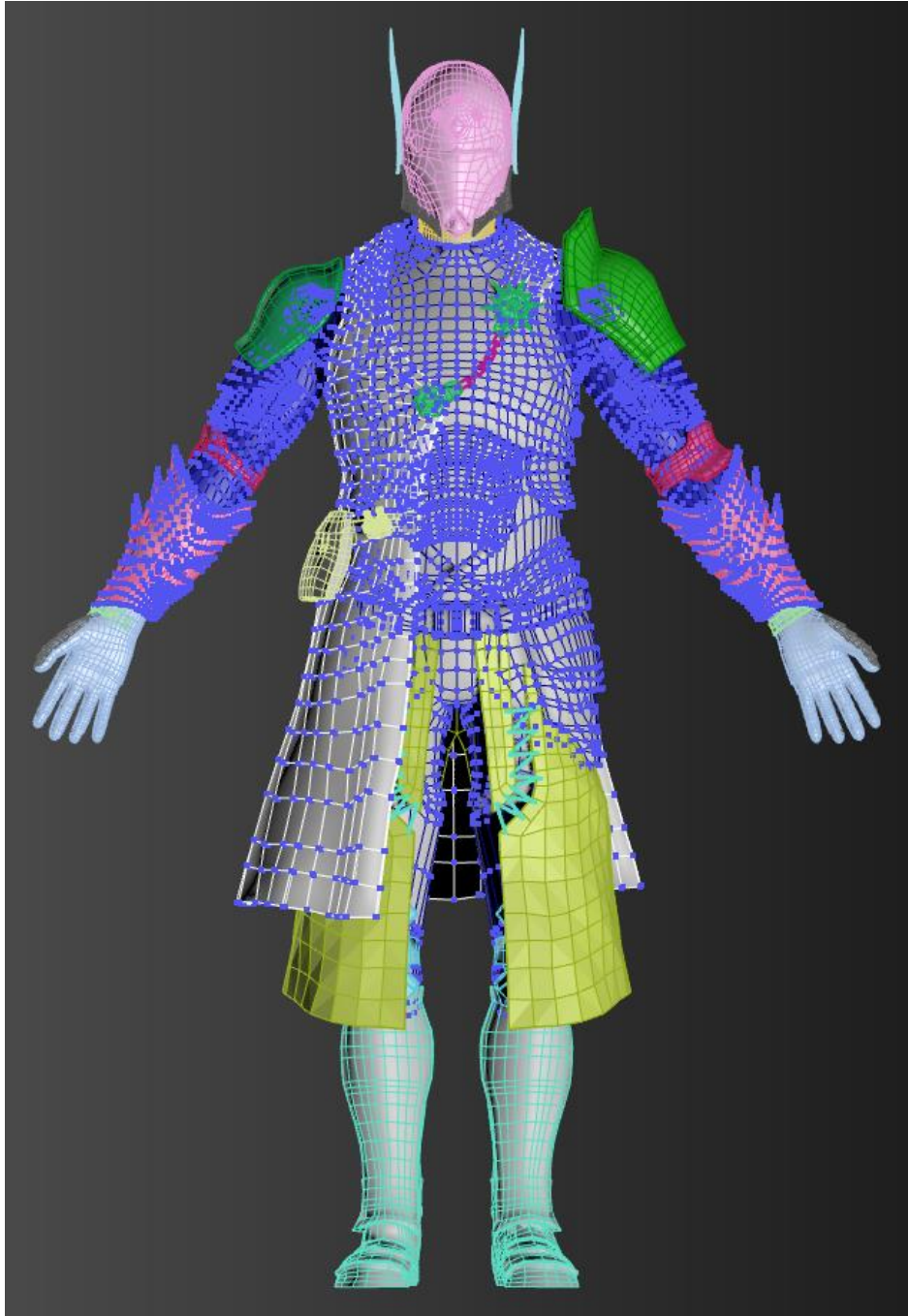


Figure 18 – Most submeshes are visible here in different colors. I use color coding to plan out what submeshes should share a material and what should not. Note that this was not the final iteration of the “material splits”.

3.13 Week 13

This week will be spent on baking normal maps and ambient occlusion maps. This will be an iterative process as I slowly tune the projection parameters for ideal results.

Day 1 (30.7) Today I will create the initial cage files and do some test bakes, hopefully some bakes will work right out the gate, however I do think that I will need to “explode” parts of the mesh to be able to get quality projections of them.

Report I did manage to generate initial textures for the various pieces of the mesh, there were quite a lot of areas that needed closer attention. The obvious priority area being the hems of the cloak.



Figure 19 – The model with testbake normal and AO maps, there are some glaring projection errors visible

Days 2-5 (31.7-3.8) I will spend the rest of the week doing texture bakes in xNormal and trying to get rid of most of the projection errors. I will be working on a single task for the entire week, and it is relatively simple, but time consuming, so I will roll all the remaining workdays into one.

Report I spent the week eliminating most of the projection errors, adjusting cage sizes and modifying base meshes to better fit with problematic areas. The reason I rolled the rest of the week into one, was due to the somewhat monotone nature of the task. As I simply looked for errors and then adjusted the problem areas, until the projections were clean. I avoided hand editing normal maps, and instead created duplicates of the most problematic areas and cut them apart, adding them to containers called "(PartName)RenderSplits" with names corresponding to the exact component in question. Then I rendered them one piece at a time, after which I merged the maps into one.

Here is where I had to adjust a few UV maps, as the edge padding encroached on some of the UV islands. This was due to rendering the pieces in separate batches, as xNormal would not normally generate edge padding on top of UV islands. This time however it did, as parts of the mesh were missing, and as such the padding was extended over a few of the closer islands.

Day 6 (4.8) I worked an extra day to catch up on lost time.

Report I managed to get most of the texture projections to look right, or at the very least acceptable. Next week I can start texturing, which will be the final phase within the scope of this project.

3.14 Week 14

Day 1 (6.8) I will start texturing today, I will create some initial materials and see if I can work up a color combination that pleases me.

Report I did manage to find a color scheme that I like, however it is a relatively common and often seen color combination. That being black, red and gold. I will see if I can "mix it up". Part of the theme is dark fantasy though, so there are not that many areas I can go for that would still be within the theme.

Day 2 (7.8) Today I will work on the leather surfaces and further creation of first pass materials

Report I worked on the leather parts as planned and attempted to create some further detailing using smart masks, none of my experiments really worked and so I decided to work more on just laying out first pass materials.

Day 3 (8.8) Today I will work more on the torso, as I want to find a nice material for the breast plate inlays. I have ivory as an initial idea but may have to go for gold or silver if it doesn't work.

Report I spent almost the whole day working on the ivory material, whether it actually looks like ivory doesn't matter in the end, as I like the result regardless. I worked for 9 hours, so more than the usual.

Day 4 (9.8) I will work further on the basic colors of the mesh.

Report I worked extensively with material instancing to lower the resource load of the project. I then worked on adding initial wear and tear to the torso. I decided that I will use the "ivory" elements as accents throughout the model, as a unique design element. I worked for 10 and a half hours.

Day 5 (10.8) Today I will add basic textures to the rest of the model.

Report Uneventful day, I added basic colors to the rest of the mesh while refining the wear of the helm and torso. I am nearing an acceptable style for the metal.

Days 6 & 7 (11.8-12.8) Extra days, attempting to catch up with what remains of my schedule.

Report I worked on minor fixes and ended up refining some UV maps, which required me to re-bake some normal & occlusion maps. I was able to mitigate an ugly seam and some extreme texture stretching in the web of the thumb, which had gone unnoticed before. I did however do some texturing as well, working on the boots and bootstraps.

3.15 Week 15

This week will see me taking the textures out of the first pass texturing phase and will see me create some initial second pass detail work.

Day 1 (13.8) – Today I will work on the arms, to bring them up to par with the rest of the mesh. I will also see if I can figure out how to begin creating the elaborate design work for the cape.

Report I managed a good start for the arms, achieving a decent result rather quickly. as for the cape, I decided to try and attempt to transfer the design from the concept .psd files directly. So, I created a new brush using the entire design of the cape as the basis. After some attempts I did manage to “stamp” the cape with the design and with some adjusting was pleased with the results.

Day 2 (15.8) – I will refine the cape, and work on the coat more.

Report I added some extra details for the cape in the form of embroidered dots. I also did initial embroidering for the coat. While doing it, I realized that the character’s coat is cloth from the waist down, while the rest was leather. I rectified this oversight rather quickly.

Day 3 (16.8) - I asked some of my contacts for feedback on the previous evening, after which I created a list of the suggestions and ideas. Today I will attempt to integrate the suggestions I received.

Report I have now managed to come up with the final color palette for the character and will most likely not change it from here on out. I am rather pleased with the results so far. However, I did have doubts as to whether the color scheme was bad or not. I tried a dark blue, but it ended up clashing with the warmer tones and with the platemail itself, it being a very dark shade of blue. (See figure 16 below)

I ended up trying multiple variants, ending up with a dark gray lower layer, with a slightly warm tint. The rest of the mesh retained the existing color palette. (See figure 17)



Figure 20 – On the left one can see one of the older color variants, the blue does not fit with the rest of the mesh. On the right can be seen a variant that uses a dark gray, which fits in much better.

Day 4 (17.8) Today I will focus on fixing the actual errors pointed out to me by the people giving feedback.

Report I ended up reworking the arm armor's base mesh, as it caused some unrealistic shading. After a while I returned to adding small details and cleaning up past errors on the textures.

3.16 Week 16

I've decided that this week will be the second to last week of this project, I have had too many setbacks regarding my schedule. This project is nearing completion and I will increase the pace to get it finished.

Day 1 (20.8) – Today I will work on the legs of the mesh, I will make sure that they look uniform with the rest of the model.

Report I ended up working on the character's kneepads for most of the day. After taking a further look at them I decided that they needed adjusting on the mesh level, as well as texturing. I edited the sculpt after which I quickly adjusted the LQ mesh to match the HQ. I then proceeded to render new maps for the boots and the results were much better than before. I added some supporting topology around the roughest of angles to smooth out the shading. The rest of the legs will have to wait for tomorrow.

Day 2 (21.8) – I will finish the rest of the legs today.

Report I tweaked the mesh for the boots themselves, to mitigate skewing near the tops of the greaves. I then proceeded to refine the trims for the boots. After this, I added some wear and tear to the lower parts of the boots as well as adding some more mud to the areas closest to the ground. I did the stitching for the boot seams as well as adjusted the height of some elements.

Day 3-5 (22.8-24.8) – I will roll up all these days into one as there is just a large amount of small details left to iterate on.

Report I ended up finalizing more textures as well as adding more trimmings and adjusting the cloth textures. I added extra trims around the cloak as well as the coat. I added a reinforcing strip for the coat straps, so that it didn't look like it'd instantly tear loose. I added some battle damage to the platemail as well as more scratches and some rust and stains. Near the end I realized that the cape's topology was way too flat, but that'll have to wait until next week.

3.17 Week 17

Day1 (27.8) – Today I will ready the fixes for the cape.

Report I quickly adjusted the sculpt once more, after which I did some retop and adjustments for the LQ of the cape. I ended having to redo the UV's as the changes to the basemesh were quite sweeping. This in turn lead to issues in Substance Painter as the elaborate patterns did not transfer over almost at all. I spent an hour or two trying to

rectify the issue, but in the end decided to redo the detailing on the back. Almost the entire day was spent on this, and I ended up working for 11 hours.

Day 2 (28.8) – Today I will add some small fixes here and there and try to enhance and polish various details. I will also take some high-res renders of the model for to be able to view the final results.

Report I took the renders and sent them onwards for feedback. I also worked on the gloves and cape for a little while. I also did some work on the left spaulder.

Day 3 (29.8) The final day for this project. I will make what little fixes there are left and create the final renders.

Report I added some extra wear to the cape and coat, as well as adding rivets to the back of the helm. I also cleaned up the neck quite a bit. Most of the day will be spent rendering the final renders, but these are already outside the scope of this work.

4 Conclusion

The character in its current state looks acceptable, I did not use the fluffy fur coat elements I initially thought of, as they would have added too much room for mistakes. The omission likely being a good thing, having eliminated some potential delays. The overall mesh topology is not as good as I'd want it to be, it is a little rushed and in dire need of optimizations. The previous fact leads me to the conclusion that the optimization phase and indeed the entire retop process needs to be extended in the future. The texture work is better than the topology with regards to quality, but the metal surface is not quite as readable as it should be and would need a second pass at some later point. The reason being that the surface damage is not as visible as it needs to be, nor does it necessarily have enough detail at the edges and large flat areas. Moreover, some of the locations of damaged metal do not make sense.

I did learn a lot during this process even though the project was tougher than anticipated. zBrush on the other hand, I learned quite well and am currently capable of working with several modern modelling pipelines as a result. I improved my texturing, as well as texture baking abilities.

I consider the primary goals set for this project complete, having created a presentable 3D model, as well as documenting the work process. More personal tertiary goals, such as learning zBrush and refining my skillset are also a success.

All in all, while the project has stretched for far too long I would count it as a success, as this project has shown me areas in my craft where I should improve to be more competitive in the job market. While the entire process has also provided me with a better more rounded skillset to build upon.

If I were to recreate this character, I would most likely utilize GoZ more as well as pay more attention to the retopology phase, which I rushed through. I would also adjust the mesh of the character somewhat, making sure that the breastplate would have a realistic level of thickness. Currently the breastplate begins immediately at the torso, it was never intended to be this thick and is more of a technical issue with how I built the breastplate model. The current implementation does not allow for as much deformation as a breastplate which was separate from the upper abdomen area, as a separated piece would allow for the abdomen to move more independently.

Future steps for this character involve: polish, rigging and the creation of weapons. The afore mentioned polishing involves cleaning up the textures and rethinking how the damage details are spread around the model. It also includes cleaning up the mesh topology. Rigging involves creating a skeleton for the character to facilitate animations and posing. The specific weapons I decided, are going to be a longsword and a magical kannel. Once I consider the reworking process complete, I will create a small diorama for the model and create an action pose for it. This is all done to further my portfolio and to make the model more presentable.

High resolution images of the textured model follow.



Figure 21 – Bust



Figure 22 – The hems of the great cloak feature geometric embroidering it was inspired by old style Finnish embroidering/decorations



Figure 23 – The cloak incorporates the Ukonvasara and Hannunvaakuna

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