Game Project Overview

« The first king » will be a open source single player 3D FPS game. The game will be story driven. The basic idea for the game is this « A rogue archelogist is searching for a lost knowledge ». Based on the « Hero Journey » or monomyth type story.

The hero character (player) is a rogue archelogist that had a vision of a lost artefact that contain the knowledge of the ancients gods in an previous expedition. He will try to get it in Egypt, by using a robot to dig a tunnel under the pyramids and resist to the egyptian troops that are guarding the site.

He will have to find it's way in a maze of underground tunnels and find and underground temple. Activate a portal that will make him travel to another planet. Once on that planet will have to confront guardian warriors, navigate thru a Sumerian type city and retrieve 6 keys to open the last door that are guarding the artefact.

This project is not meant to be as good as a commercial game, but make a nice open sourced FPS. This game audience would be surely directed for teens and/or a mature audience.

The main developpement effort will be on the Windows XP/Vista version. Ports are planned to the Macintosh and Linux depending on the size of the team.

Future of the game

Since the game will be open source, nice addons could be created:

> Multiplayer with network engine, physic engine integration, more level, etc. If the beta phase is a success, the game could be used to promote and demo the IRRlicht engine to the public.

Features:

- Unique story with blend of reality, myth and legends.
- Open source game that can be expanded at will.
- Included level editor (FK editor) also can be expanded at will since it will be also open source.
- Support for old hardware and newer hardware, some settings to define your hardware
- Support for normal/specular mapping to have realistic characters and environnements
- Use of shaders for special fx like motion blur
- Particles for explosions and smoke FX
- Complete camera system to have a realistic immersion in the game.

GAMEPLAY :

THE CAMERA SYSTEM

The first king will use a *standard IRRlicht camera*, operated by some custom **camera rigs**. This system, will have the flexibility, convenience and ease to create cinematic views. This will permit multiple features to allow the player easy and realistic navigation into the levels.

CHARACTER GAMEPLAY:

Game functionnalities:
The user will be able to pause the game using the ESC key or a specific key on the joypad (Xbox 360). There will be a menu to setup the game, save and retrieve a game and quit the game. Cutscenes can be interrupted at any time by pressing the ESC key. The game is saved automaticaly at each level step.

Player movement features:
The player will be able to walk, run, dive, swim, crouch, crawl, jump in the environnement.

Player abilities:
The player will also be able to activate some mecanisms, take some objects, use theses objects, fire and reload weapons.

Player health:
If the player is hit and is wounded, health will recover automatically gradually with time. There could be some objects that would help the player recover faster. Could be interesting to have some scripted animations to show the damage and recovery of the player.

Player death:
If the player is killed, then the player will respawn to the last saved position.

Ennemies abilities:
The ennemies will be able to walk, run, and jump. Also the AI should work that they will be able to hear noise from the player, and see the player move. Attacks could be made a single NPC or/and squad based (if other NPC are in the same area as the NPC that attack). If AI is advanced enough, the NPC could see the other NPC health status and protect the other NPC instead of attacking the player.

Ennemies keys:
Some of the ennemies will have keys or artefacts that need to be used to complete a level. In that game, an officier will have the access key programming control for the robot and on Nibiru; there will be 6 Anubis warrior-priests with artefact needed to open the gate to the chamber of knowledge.

Ennemies health:
The same principle of the player will apply to the ennemy NPC. If the NPC is wounded and can recover from it's wound, it will be in patrol mode again and if the NPC encounter the player will attack again.

Ennemy death: For each level player, the system will keep the position and angle of the death NPC. Save games will also account for the current level. The game will not save the deaths for every level but only the current played level.

Environnement gameplay:

Digger robots:
A key will be needed to activate and program the robot to dig where the player will have to follow the tunnel. The player will have to install a mine and explode the opening of the tunnel to not be followed by the soldiers. The actions done by the robot will be scripted.

Tunnels:
The player will have to navigate thru a maze of underground tunnels to found the underground temple.

Water bassin: There will be a water basin leaving to the underground tunnel where the player will emerge. The player will have a limited time to get out of the water to not drown.

Portal: There will be a portal and the player must activate it using an artefact found in the underground tunnel maze. The portal will activate and will open a door to another world. (Planet Nibiru)

Sumerian Pyramid: The player will have to open a door using the same artefact, encouter and fight the Anubis guardian warrior protecting the temple.

Sumerian temple (inside a Sumerian city): There a 6 Anubis warrior priest that have an artefact. The player must find theses 6 artefact to open the gate to reach the knowledge artefact.

The knowledge artefact: The player will have to take it and wear it to complete the game.

Interfaces:

The main interface will be available using the **ESC** key.
The game will go then in *menu mode*.
The main elements of the menu are: **New game**, **Load game**, **Save Game**, **Configuration**, **Quit game**
The Configuration menu will have submenus: as **Display**, **Sound & Music**, **Controls**,

Game Controls

The Camera-Rig Concept

For having camera movements mimic the most realistic way possible. There would be need for such a thing.

The camera will be fitted with a manipulator that will allow it to do certain movements using constraint like in real life. It will be based on current camera support (ex: tripods, monopods, camera-crane, etc.)

Camera rig example: tripod with crane rig

With that kind of support multiple camera rig can be constructed using nodes as joints to allow for flexibility in the task at hand. This design will allow for some interesting cinematic movements.

(The gamera-rig concept continued...)

Each rig can be constructed from different functions. Theses function will be in classes and specific ones for creating pre-defined rigs.

Theses rigs will be controlled by the mouse and the keyboard. Also planned is to add Xbox360 controller support later.

PLAYER BASED RIG (FPS TYPE):

features:

- Will have a state for each occuring action

- Camera node is parented to the *foot node*

- Movement made on a *foot node* and controlled by the keyboard. Will use WSAD type movement controls for the keyboard. Can be changed to the locale settings for the user keyboard (*DVORAK*, *AZERTY*, *QUERTY*) in the control submenu.
- Camera rotation (target) done with the mouse movements
- *Foot node* will allow for:
  - sprint
  - jump
  - run
  - walk
- *Camera node* will allow for:
  - crawl
  - crouch
  - head tilt (Upvector manipulations)
  - walk simulation (based on sin/cos wave)
  - zoom (local Z) (will move the camera to create the zoom effect)
  - look around (with the mouse movement)

Collisions setup:

Will need 2 collision response animators:

- One for the *foot node* (player size). This will allow the player movement to be blocked by the environnement.

- One for the *camera node* (head size). This will allow the camera movement to be blocked by the environnent. Also will not allow the zoom to look bewond a wall

LADDER BASED RIG:

features:
- Will have a state for each occuring action

- Camera node is parented to the *foot node*

- Movement made on a *foot node* and controlled by the keyboard. A bounding box will define the entry/exit for switching from the player based rig to the ladder rig with the help of a keyboard action.

- Movement will be UP/DOWN only

- Player can jump off the ladder with the action key or when reaching the destination (bounding box)

- *Foot node* will allow for:
  - move up/down
  - jump

- *Camera node* will allow for:
  - look around

ROPE BASED RIG:

features:
- Will have a state for each occuring action

- Camera node is parented to the *foot node*

- Movement made on a foot node and controlled by the keyboard. A bounding box will define the entry/exit for switching from the player based rig to the rope rig with the help of a keyboard action.

- Movement will be UP/DOWN and rotate on movement.
- Player can jump off the rope with the action key or when reaching the ground (bounding box)
- *Foot node* will allow for:
  - move up/down
  - rotate horizontally on the rope with the keyboard strafe movement.
  - jump
- *Camera node* will allow for:
  - look around

CAMERA RIG FUNCTIONS

Here are the main function that the camera rig will have access:
- Strafe move
- Moving forward & backward.

- Speed change move, applicable differently on each movement.
- Camera rotate target rotation
- Camera view rotation (mosly for tilt actions, or simulating earthquake)
- Camera view move (zoom, simulation of walk, crouch, etc.)
- walk simulation affector (based on cos/sin wave)
- camera orientation affector (rotate the Upvector to a specified angle)
  This could permit walking on walls and ceiling as in the game **PREY™**

Constraints:
- Rotations will have to be calculated in quarternion to prevent gimbal lock
- Tilt rotation will have to rotate the Upvector and use a local system
- Each move will be activated by inputs (mouse, keyboard / Xbox360 controller)
- Rigs could be created using the specified functions and adding new ones

Other Game Mechanics:

Shaders and Lighting

The game will require the use of shaders, because the model will use Normal/Specular/Color maps. Also the inside level design will require Lightmaps for global illumination (pre-calculated), exterior scenes will mostly use dynamic lighting for the sun with soft/stencil shadows using shaders.

IRRcg from Nadro, will be surely used to implement the shaders inside the engine. If the time will permit, I would also use shaders for some post-processing effect like, DOF(Depth of field), Motion Blur, bloom and glow effects. All of those setting will be selectable from the ingame menus.

Another process that could be interesting to add is mask with blending with layers from a surface type. This could allow defining trails or road on surface without using lots of video memory.

Optimizing Culling

The current IRRlicht rendering engine does not feature occlusion culling but view frustum culling. The idea is to optimize the level design/programming to use simple algorythms to optimize the view distance from the frustum culling.

A solution that I am thinking of is using ray/intersection tests with the environnement from the camera view to determine what is the farthest object in the display to render. Once the distance is found, do a change on the frustum culling FAR distance value. There could be problem with transparent surfaces like windows (not seeing beyond the windows). If the implementation of a good solution work, then the level could allow for more polygons and better frame rates.

AI engine : IRRAI

Chris Mash (JP) is working to implement AI to the game. We decided that it would be a separate project. IRRai will have function to have path finding and state definition so the characters then be able to patrol area and have different states like attack, flee. IRRai would also do the state changes on

entities (characters, objects, etc) so it will be able to have lifts, activating doors, have characters get damaged with weapon impact etc.

Settings:
Graphics overview

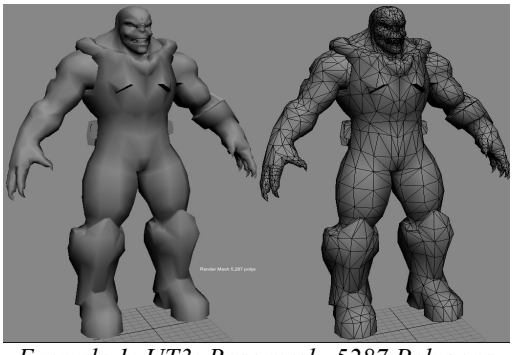
Mapping and hardware:
The game will be designed using normal maps/specular maps for characters and level details. Modeling will have to take this into account. For hardware not able to use pixel shader 2.0+ the system will use only diffuse maps. For systems able to use shaders, the system will provide for normal maps/specular maps and post effects (motion blur, other fX)

Particles: Particles will be used with billboards graphics to represent sparkles, explosions, bullets, smoke, sand, water sparkling.

Models:
All ingame models for a character should be around 2K-4K poly, and standard level would be around 50K-75K poly.

Models would have to be created in 2 versions. A low level version and high level version. The low level version will be used for the ingame model, and the high level version would be used for the creation of the details surfaces of the model. A high level model could account for more than 1000K polygons.

Character modeling:
Characters would have to be modeled in low detail first, then enhanced in full detail to produce the final detailed mesh. Then this mesh will be baked into normal/specular maps to be imported in the engine.



Exemple 1: UT3: Base mesh. 5287 Polygons

Exemple 2: UT3: Detailed mesh 2 millions polygons

UT3: Final model rendered with normal/specular maps. 5287 Polygons. Example taken from Unreal tournament

Character Animation:

- The characters will need to be animated for differents actions (walk, run, swim, crawn, crouch, etc.)
- if possible have expression in their face when doing their moves.
- The character will require a bone hierarchy (rigged)
- Guns, spear and swords will need to be attached to the character.
- The jackal headed warrior is very tall (8-10 feet tall), to it's attack target should be low.
- Animated model will be needed in .X format, and static (environnement model) .X, or .B3D.

The environnements

There will be 2 main environnements, probably subdivided into sub-levels:

- ***Cairo pyramids and tunnels under them***. This level will have the 3 main pyramis and the Sphynx. There will be tunnels under the pyramids, some of them will be buried (player will need a digger robot) and some of them will be underwater. There will be ladders and ropes all over the level. All the element will have to look like real ruins. If AI engine is present, entrances will be guarded by egyptian soldiers.

Reference for Pyramids and Sphinx ruins

- ***The traveller (Kensu) – Planetary portal.*** The Kensu portal will be located inside a round hidden chamber (camber of the Osiris tomb).This will be way to connect the 2 levels (storywise). Once the player has entered the portal, there will be an animation of stars with particles and some « flash » from the start and at the end of the travel.

Reference look for the Kensu portal.

The Kensu portal will look less metalic

- ***Nibiru: Babylonian city with a Ziggurat and temple***.
  The artefact will be hidden there in the chamber of knowledge inside the temple.

  The buildings there will be old but not ruins. There will be probably a bassin there with water.

  The city is surrounded with a big wall.

Level Design

First world: Gizea, Egypt – The piramids

This level, will need to have lots of detail (also why is normal maps are needed). There will be pyramid (inside/outside), sphinx, tunnels, some land design, rocks to be build and the objective is that they look ravaged by time.

Pyramid detail reference

Meshes:

- Meshes will be build in a low detailed version, imported into the engine, then a version will be enhanced further to put all the details and bake the normal/specular maps of the damage.
- Model will be needed in IRRmesh, .X, or B3D format.

Particles:

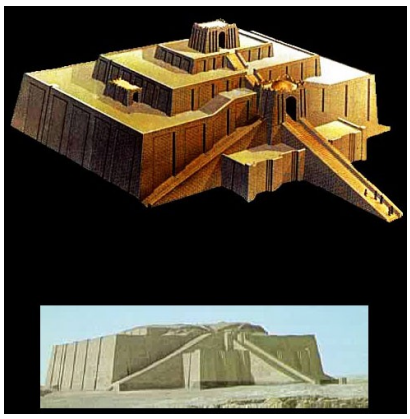
- Will be used to simulate sand in the wind outside and dust coming from the ceiling inside the tunnel when the player is walking.
- Used when the robot will start digging to open the tunnel for exploration.
- Used to simulate a bullet impact on objects (determined from the collision)

Lighting:

- Outside of the pyramids, dynamic light will be used with shadows
- Inside of the pyramids, rendered lightmaps will be used
- the player will arrive in the early morning at the site, so the lighting must be appropriate for that look.

Second world: Planet Nibiru

- This level will need to have some details. There will be a Ziggurat (Sumerian pyramid), a temple, some buildings, and a great wall all over the city.
-
    - There should be a river, with some water and a few trees.
    - the water type that could be used could be the realistic water node by Elvman. I would have to put some water in the temple. I'll need to see if it impact greatly of the frame rate.
    - The Lighting will be darker, since Nibiru is another planet. Could be a light gold tint in the light rays from the exteriors. (The planet higher atmosphere is saturated with nanobots made from gold particles redirecting light.)



Ziggurat detail reference

THE CHARACTERS DESIGN

- ***The main character:***
  no name yet. The character is like a rogue explorer. This will be the player. May be armed at game start with a pistol and bare hands. The character will be able to fight but with only with weapons and hands, his feets will only be used for jumping.
  The player will be able to walk, run, climb, etc. The player will be wearing a camera on his head on the right side, the camera will be part of a special type of helmet. The player will also have a backpack (also a protected recorder for the camera is placed there) that will handle the ammo for the guns, the artefacts, etc. When playing, we'll see only his hands, and perhaps some body parts when he's hurt (battle damage)

Reference look for the player

- ***The Egyptian Soldiers:***
  These soldiers are guarding the pyramids. They are be armed with pistols and guns. They would patrol area near the entrance of the pyramids and attack the player if spotted or heard.

  If AI is strong enough, squad tactics would be great. There is a officer on the site that has the key to unlock and program the digger robot. The player will have to get it to use the robot. The player will have to get his weapons from them and get as much ammo as he can.

Refence Image for the soldiers

- ***Anubis Jackal headed warriors.***
  Theses warrior were created by Anubis and patrol the Babylonian city located on planet Nibiru. The heigh of theses warriors are around 8 feet to 10 feet tall. They are fast, but armed only with spears and swords. Some of them protect themselves with buckles.

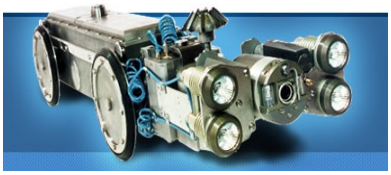
  If the AI engine will permit, use spartan squad tactics when confronting the player. They would also patrol areas and attack the player if spotted. Theses warriors would patrol different areas in the city and temple. They are warrior minded, value honor above anything else exept their creators.

  There are some variant in these characters:
  - Anubis base warrior: Spear and buckle, slow but fierce and robust. Mostly in squad using spartan type tactics.
  - Anubis ace warrior: Very fast, using ninja type moves and wearing a sword. They attack alone and try to surprise the player. (Could be in the ceiling falling down on the player)
  - Anubis priest warriors: Have an body armor and sword. They wear an artefact that the player must get to open the chamber of knowledge.

Reference look for the jackal warriors

- ***Digger robot.***
  This unit will dig tunnels to help the player find the entrance of the Osiris tomb. The robot will be using scripted event to start digging.

  Will have to incorporate some kind of info so that the player can activate them. It will only activate from using the key of weared by a commanding officier (Egyptian troop protecting the site)



Digger reference image.

THE GAME MUSIC:

The game music will be using the gameplay. When the player is exploring and that there is no menace, the music will be of orchestral type. When the player is spotted the music will change to a techno music type with a good rythm.

THE GAME SOUND FX:

The sound FX in the game should reflect the audio interaction with the defined environnements and actions. There will also be spoken dialogue thru the game to instruct the player what are his mission objectives. (Main Character that talk and find relevant informations). Could take example on the game « Duke Nukem 3D » for the way the audio dialogue worked.

THE GAME STORY:

BACKSTORY (prelude of the game)
(Introduction Cutscene)

We are in year 2011-2012. Our main character (and the player) is a man, mix between Indiana Jones and Lara Croft. The character is educated and is facisnated about ancient civilisations and legends. He became famous and rich doing explorations and video documentaries.

Doing research for some time in different parts of the world. He always wear a camera, because he resell the images after as a documentary video to make money. He often, do not conform to rules when doing exploration.

Discovered about the legend of the knowledge of the ancients artefact, by having a vision when the character found a Mayan Crystal Skull in a previous exploration.

In his vision, he saw a sumerian legend of the Annunakis that came to earth and created the humans. Beings that were master of DNA manipulation and had great knowledge.

They used humans to serve them and help them retrieve gold, a previous mineral that was required on their planet NIBIRU. This planet is going in a excentrical elliptic orbit and go into our solar system each 10,000 years. They've left and let us their last knowledge in the *ancient knowledge library* artefact.

The researcher found a trace of an artifact that could be hidden in the Cairo Pyramids of Egypt. That artefact have been hidden by the last Annunaki descendant and was a one of the god of Egypt. His name was Osiris, he had the knowledge on how to build the great pyramid and had a way to contact the gods with his traveller « Kensu ».

A partner in Egypt told him the governement closed all Gizea Plateau site because they found something. They put the army to protect the site and don't tell anyone what is happening.
The partner investigated and seem's that they found some secret underground tunnels under the pyramids using some sound probes.

The player decide to equip himself and go there. He learn that there are arrival of specific type of digger robots and learned how to reprogram them. His plan is to be the first to find the chambers and film it to prove to the world that it's exist. He thinks that the knowledge of the ancients is hidden there.

STORY AND QUESTS (warning: Contain spoilers for the game story)

(Level 1- Gizea Plateau)
Try to inflitrate the site, gain access to the digger robots, reprogram them and lauch them. The player will not have any weapons. He will have to find some weapons from the soldiers there. The player must find a way to get the key to activate the robot from the officier that is on the armament depot without alerting the troop that are guarding the area.

(Level 2- The Dig)

Robots start digging. Protect them while the soldiers are alerted by the noise. Enter the tunnel and explode the entry. Will have to follow the robot while it dig. The bomb can be obtained in the first area in the armament depot.

(Level 3 - Entrance to the secret tunnels)

Robot digger dig into a water basin, the tunnel is getting filled with water fast, the player have to go thru the end of the tunnel and swim up the the basin.
There will be the entrance to the underground tunnels under the pyramids.

(Level 4 - Finding the temple)

The tunnels are a maze and connect to the pyramids but most of them are destroyed. The player must find a way to the underground temple were is located the PORTAL. There is a chamber in the maze that contain the artefact to activate the Kensu portal.

(Level 5 - The portal)

The player found the temple. He realize the artefact that he have will do something to the portal. Once the portal is activated it will go into a cutscene. Once he put the artefact in place the Kensu portal activate and the character is surprised. He's determined to get the knowledge artefact and decide to enter the portal. The portal will transport the player to the Nibiru Planet.

(Level 6 - Planet Nibiru)

The player arrive at the other side of the portal. He arrive in a sumerian pyramid (Ziggurat). From there he navigate, hope to find the knowledge of the ancients, but must face some Jackal headed guardians.

(Level 7 - The Sumerian city)

The player must fight his way thru the sumerian pyramid and go in the sumerian city. The guardian are alerted and know that an intruder came from the portal. They will try to stop him from getting the knowledge of the ancient. Could put a very small cutscene to show that the guardians are alerted when the player is exiting the sumerian pyramid.

(Level 8 - The sumerian temple)

The player will have to defeat the guardians and find his way into the sumerian temple. He fell that he his near the place where is kept the secret.

(Level 9 - The secret of the ancients)

The player finally found the place where the secret is hidden, it's a egyptian crown as he saw in his vision, he have to wear it to have the knowledge. The player will have to get 6 artefact from the Anubis warrior-priests to get access to the chamber of knowledge. Once the artefact are in place the player will have access to the temple of knowledge and will wear the egyptian crown.

Conclusion Cutscene: The player will then talk in a strange language and the guardians will understand, see the crown, stop attacking and become their new friends. The game will end when the player will enter once again in the Kensu portal. (Could do a sequel, as the player is not returning on earth but on another planet)

Current Team Members

Here are the current team members:

Lead & game designer: Christian Clavet
AI programmer: Chris Mash (JP)
Character Modeler: David Torres Rodríguez

Recruiting

The project will need some additional help in:

- Programming (enhancing the game engine, integration with third party components/engines)

- Arts (Concept arts, Modeling, texturing, animation)

- Audio (Music and Sound FX creation, voice talents for dialogues)

- Tools (Programming, art, and translation needed for the Level editor tool and other possible tools needed for this project)

- Translation to other languages (English, French, spanish, etc.), voice acting for other languages

- Porting to other platforms (Windows XP, Windows Vista, Linux, Macintosh)

Anyone interested joining the team:
send a mail to: christian@clavet.org
With « FIRST KING PROJECT » in the subject field.

Please, specify:
In what part you'd like to contribute,
Your sourceforge username (sourceforge accounts are free)
Your preferred contact.

If there more than one person for a worked feature of the game, we'll try to make sub-level teams for each worked feature. If other user would like to create « add-ons » for this game, they're also welcome. Their add-ons could become other projects (like IRRai).

Licence:

The current licence is based uppon the IRRlicht license (Zlib type)

Appendix 1:
Programming overview

The first king project, will be programmed using the C++ language, the IRRlicht open source library for graphics and rendering, IRRklang for audio engine, IRRai for AI engine

The main developping platform is Windows(Win32), DirectX, and DEVCPP
Other port could be developped with by volunteers. (Macintosh, Linux)

All source will be created using C++ Classes; grouping classes and functions categorized in includes files so other projects could use the source for their own game project. Game Level design will be done extensively using IRRedit and the custom developped editor with specific plugins (AI, perhaps other). Level loading will be done from IRR scene files.

Source will be available on sourceforge (http//:first-king.sourceforge.net - First King Project.) and will have SVN subversions available for download.

The game engine programming and design will done in « phases ». The first phase will start when the developpement will reach the alpha state, once all the phases are completed, the game developpement will reach beta state. The estimated release date to reach beta 1 is around april 2009.

Development overview

From each « phases » completed, we will have reached our objectives. This developpement planning document will be surely updated in the developpement of each phase. The current developpement is now in pre-production.

Here are the phases descriptions:

- ***Phase zero (Pre-production)***: Defining the base of the game as a loader for the level, and creating the camera rigs. Be able to navigate thru a test level with the new rig. Create a base for the level editor. Create a basic prototype for the game and have a informative web site, forum, and starting game design documentation. Recruting team members.

- ***Phase one (Alpha)***: Modeling the first level (Cairo Egypt), and the Stargate mesh (low detail) to being used as reference. Creating the other camera rigs with elements (ladder and rope rigs and place the marker in the base level). Fine tune the camera-rigs. Enhance the editor.

- ***Phase two:*** A shader working phase. In this phase, we'll work on shader implementation and basic lighting. Models will be refined and normal/specular maps will be produced to test the shaders. High level poly and normal maps baking will occur in this process.
  Some interactive elements will be worked on (stargate, doors, digger robots). Prepare the work for the cutscenes. Recruit voice talents. (English first)

- ***Phase three:*** Particles will be worked on. Refining the textures of the imported meshes for the level. Add some more functionnalities of the camera rigs (earthquake?). Refine the shaders and check for adding shader effects (motion blur)

- ***Phase four***: Creating the stargate animation and start of the modeling (low detail) for the Sumerian City. Modeling of base character for soldiers and jackal warriors. Animate the soldier and jackal warriors. Polish the cutscenes, enhance the level editor.

- ***Phase five***: Fully integrating the IRRai system into the game. Implementating pathways, and AI so that characters can interact with the user. Work on a player body mesh, weapons system.

- ***Phase six***: Adding sound effects and music to the game using IRRKlang. Link the AI informations with the music.

- ***Phase seven***: Creating a GUI menu system to configure the game, save the game, create a profile, etc. Creating intro ou outtro for the game. New cinematic rig to create for this need. Check for multilingual support (French, English, etc) Perhaps adding voices. Adding of written events in the game/maps displays using GUI elements.

- ***Phase eight (beta 1):*** Clean up the code, fix the known bugs, check for adding other features (as of Network support for multiplayer, full player character animation, physics engine integration, etc)