**APOLLO**

**RISK ASSESSMENT**

**VERSION 4**

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# Revision Tracking

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| --- | --- | --- | --- |
| Version | Revisions | By Whom | Date |
| 1.0 | Document Created | Tarl Raney & Dave Hasle | 7.15.09 |
| 2.0 | Updated for PPM3 | Core Leads | 9.9.09 |
| 3.0 | Updated for PPM4 | Core Leads | 10.23.09 |
| 4.0 | Updated for PPM4 | Core Leads | 10.30.09 |

**NOTE:** We've defined our Risk Assessment by **Risk Level**, **Production Phase** and **Update**.

**Production Phases** - This defines the area of production where we foresee the greatest risk:

* **Global**
* **Pre-Production**
* **Production**
* **Post Production**
* **External**

**Risk Level** - This defines the level of each of our risks:

* **LOW** – We understand the technical challenges and do not foresee any issues arising during implementation.
* **MED** – The majority of the presented challenges are understood, but there is a risk of unforeseen issues arising during implementation.
* **HIGH** – Due to the unknown nature of these new systems, we cannot fully assess the potential issues that may arise during implementation.

**Update** - This states the last time this specific risk was updated by us.

# Design

## 3rd Person Viewpoint - Camera

|  |  |  |  |
| --- | --- | --- | --- |
| *Risk* | *Risk Level* | *Production Phase* | *Update* |
| 3rd Person Viewpoint - Camera | **Medium** | **Production** | **11.30.09** |

Our skill set has been first-person and we have moved to third-person and currently have a working 3rd person camera system albeit it needs much further iteration.

**Engineering**: 3rd person cameras can be very complex and require a lot of iteration to ensure the player has an appropriate viewpoint for all actions and states the player can possibly be in, regardless of any obstacles that may be hindering the camera from getting to the optimal viewpoint.

Mitigation: We currently have a good 3rd person baseline camera that is a strong foundation and is extensible. We've evaluated what extensions we need which is part of the >Camera Eval doc< as well as we will continue with refining of the current camera foundation, essentially in the areas of collision.

## 3rd Person Viewpoint - Movement

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| --- | --- | --- | --- |
| *Risk* | *Risk Level* | *Production Phase* | *Update* |
| 3rd Person Viewpoint - Movement | **High** | **Pre-Production** | **10.20.09** |

We’re overhauling our whole animation system to cope with this (which carries risks of its own). We’ve never had to make the player movement responsive, extremely fluid and externally beautiful before.

**Engineering:** Our 3rd person movement system is heavily driven by animations. We are currently developing a new parameterized motion animation system that will allow for more fluid and seamless animations without the need for creating the source animations for all possible motions. This is a brand new animation system for us that requires a lot of iteration and additional tools support. Any delay in getting features or tools of the new animation system will delay our ability to get responsive and fluid player movement.

**Mitigation:** The new system has been in development early in the concept phase of Apollo. We continue to work on player movement features in parallel with other gameplay systems. We continue to offer an open position for an senior animation engineer to help with our efforts and are extending an offer to a very promising candidate.

## 3rd Person Viewpoint - Combat

|  |  |  |  |
| --- | --- | --- | --- |
| *Risk* | *Risk Level* | *Production Phase* | *Update* |
| 3rd Person Viewpoint - Combat | **High** | **Pre-Production** | **11.30.09** |

3rd person brawler combat is another area that many studios have mastered over many game cycles. This is our first try.

Mitigation: *Movement and Combat*: Both of these systems were something we started working on right away as we realized what a large risk they were. We are playtesting and iterating at every step to ensure the game feels great.

**Update:** We do have a combat designer who will be starting on Apollo on December 7th.

**Engineering:** We have developed an extensive set of AI and Player systems over the past decade geared primarily for first person, ranged combat. Old systems will need to be refactored and new systems created to support 3rd person melee combat. Additionally, the combat system will make use of animations and has the same risks as player movement if animation features or tools are delayed.

**Mitigation:** Our combat strike team was one of the first put together to help identify changes and additions that need to be made to our tools and game systems to support 3rd person combat. Getting basic combat mechanics was an early goal of the strike team and we successfully met those goals. Moving forward, we are currently making use of a combat tool developed by Snowblind for helping create these more complex mechanics.

## 3rd Person Viewpoint - Environment

|  |  |  |  |
| --- | --- | --- | --- |
| *Risk* | *Risk Level* | *Production Phase* | *Update* |
| 3rd Person Viewpoint - Environment | **Medium** | **Pre-Production** | **9.09.09** |

Our artists have gotten extremely good at knowing where to draw the line on poly count of props, how many props to place in a space, etc… but third person view changes the rules of thumb that our art team has grown comfortable with in first person.

Mitigation: World Art/Tech Art and Engineering have been working very closely together to define the systems that are being used to build the environments in the game. A lot of great stuff has already come out of this close collaboration; LOD system, transparent glass fading, etc. We're also working on our 'Hot Pocket' which is our beautiful corner for the Vertical Slice. This is allowing us to focus on creating more accurate estimates. The 'Hot Pocket' is part of the hub which we are focused on for pre-production which will help us minimize this risk.

## Stealth Game Play

|  |  |  |  |
| --- | --- | --- | --- |
| *Risk* | *Risk Level* | *Production Phase* | *Update* |
| Stealth Game Play | **Medium** | **Pre-Production** | **10.23.09** |

Technical limitations of our lighting model combined with levels that are larger than anything Monolith has created before makes this a difficult feature to implement and still maintain the fun factor.

Mitigation: We've gotten good feedback on the current lighting model with hard stealth shadows and if that doesn't work, we have done some tests with an effect to highlight stealth shadows. As progress is made, the system will be put into playtesting and iterated upon.

We will redesign the stealth gameplay experience to be independent of lighting if engineering and tech art can’t find performance-friendly solutions.

## Expansive Overall Game Scope

|  |  |  |  |
| --- | --- | --- | --- |
| *Risk* | *Risk Level* | *Production Phase* | *Update* |
| Expansive Overall Game Scope | **High** | **Pre-Production** | **10.23.09** |

With so many new systems, it is going to be very difficult for any discipline to accurately estimate their workload. This has already manifested in poor estimation accuracy on some of the concept/pre-production work done thus far.

Mitigation:

* We have prioritized the features we are planning so that if things are not getting done as fast as hoped, we can cut smaller low priority features to avoid missing the schedule altogether.
* We're going to go through a series of Feature scrubs in November/December to identify which features we can cut if feasible to allow us a better buffer for our Pre-Production process.

## Vehicle Game Play

|  |  |  |  |
| --- | --- | --- | --- |
| *Risk* | *Risk Level* | *Production Phase* | *Update* |
| Vehicle Game Play | **Medium** | **Pre-Production** | **9.09.09** |

We’ve never done vehicle gameplay to this extent and we’re started it later than ideal. Making it fun and making it work will be a challenge.

Mitigation: The unknowns of vehicles are largely mitigated by the addition of a few key engineering hires. Both came from the Mercenaries 2 team and had extensive experience in building and maintaining that game’s vehicles. This also helps us make up for the late start. Using prototype code from the Zulu project and by taking someone experienced we have been able to get vehicles up and running rather quickly. The system is being designed to give the designers as much control as possible to minimize the need for engineering time while iterating/balancing.

We currently have an offer out to a Senior Engineer who has experience working with Vehicle AI.

# Engineering

## Multiple Teams using Core Technology

|  |  |  |  |
| --- | --- | --- | --- |
| *Risk* | *Risk Level* | *Production Phase* | *Update* |
| Multiple Teams using Core Tech | **Medium** | **Pre-Production** | **10.20.09** |

Another team (Siren) is using an older version of the Monolith tech (Loki/FEAR2), but has no tech team to provide engine level support. This has potential to take resources from the Apollo team to help resolve engine level issues in the Loki tech.

**Mitigation:** Apollo Engineering is working with the Siren team to ensure that they understand what features they do and do not have access to in the Loki tech. Once they have committed to using it, they will be on their own. Upper management will need to be the gate-keeper to keep Apollo resources from being taken away from Apollo tasks.

**Update:** Apollo Engineering has helped out with a few support issues and technology questions that have taken some time from addressing Apollo specific features but so far this has not negatively impacted our schedule.

## Expansion of Technology to Larger Spaces, including Streaming, Visibility and LOD

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| --- | --- | --- | --- |
| *Risk* | *Risk Level* | *Production Phase* | *Update* |
| Expansion of Tech to Larger Spaces | **Medium** | **Pre-Production** | **11.30.09** |

We've made significant progress in our Visibility and LOD systems to where we feel these two areas are low risk. Streaming is still a medium risk due to allot of work that is still needed and on track.

Mitigation: We'll adjust the fidelity and density in a single streaming region based upon the success of our streaming system. This system is currently planned to bed fully implemented by the end of Phase 1 Production.

## Migrating Technology to Multithreaded Architecture

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| --- | --- | --- | --- |
| *Risk* | *Risk Level* | *Production Phase* | *Update* |
| Migrating Tech to Multithread Arch | **High** | **Production** | **9.09.09** |

With the proliferation of multi-core architectures in PC and game console hardware we must move towards a much more multi-threaded architecture. This is a multi project endeavor that must be completed in-order for our technology to remain competitive

Mitigation: A multi-threaded architecture will be designed and built to allow systems to be converted individually. Systems will be identified as primary candidates for multi-threading for Apollo and work will be started immediately on those systems.

## Animation System for Fluid 3rd-Person Animations

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| --- | --- | --- | --- |
| *Risk* | *Risk Level* | *Production Phase* | *Update* |
| Anim System for 3rd Person Anims | **High** | **Pre-Production** | **10.20.09** |

Our animation system, tools, and workflow have been identified as problem areas from previous project's post-mortems. Integrating of 3rd party packages has been evaluated, but none of the available packages fully met our needs. Creating a new animation system, tools and workflow was determined to be our best option. A new animation system has the potential to cause large changes to workflow, existing content and legacy tools, runtime and game systems. We need to be careful that we are not exchanging one problem for another. This is a time intensive endeavor that needs to be completed early in the project in order to retrain the animators, modify existing game play systems to work with the new system and allow animation intensive new features to come online in time.

Mitigation: Research into the animation system began before we started the concept phase for Apollo. Work has already begun on the runtime and tools changes for the new animation system. In order to reduce the risk of this system we would like to get the new animation system working for the player as soon as possible with the goal of having key player systems using the new animation system by the end of pre-production.

**Update:** Our ModelEdit tool and model have been updated to support creating of parameterized animations as well as seeing changes to animations in realtime using our remote communication system between the tools and running game. Several debugging tools have also been added in pre-production. An additional tool for creating blends between animations will be researched and worked on during pre-production.

Update:

## Tool Extensions for Rapid Development and Iteration of Large Quantities of Content

|  |  |  |  |
| --- | --- | --- | --- |
| *Risk* | *Risk Level* | *Production Phase* | *Update* |
| Tool Extensions for Rapid Dev of Content | **Low** | **Pre-Production** | **11.30.09** |

A consistent theme of recent post-mortem discussions has resulted in the desire to enhance our toolset for zero-time iteration and WYSIWYG editing capabilities. This work is time consuming and calls for many modifications to our tools, runtime and game systems to fully support the desired goal. We need to be aware of diminishing returns where trying to achieve zero-time iteration for some tools or systems takes too long to develop and takes time away from other work that could possibly better increase productivity for content creators.

Mitigation: The most time consuming and bottlenecking tasks will first be identified as the tools or systems that should be modified to support zero-time iteration or WYSIWYG editing. Time estimates for those modifications will be weighed against other possible features that could boost productivity for content creators.  
**Update:** The ability to modify game database values in our GDBEdit tool and have the value immediately be updated to a connected running game has been implemented. It is up to the game teams to identify which values from legacy game systems should be exposed as editable and weigh the cost of making them editable vs. the benefit. All new game features will be implemented with this functionality in mind.  
**Update:** The work on FxEdit, CRCL and RemoteView are complete and allow runtime viewing and live editing of values and remote communication with multiple connected instances of the game, including the embedded RuntimeShell. We have also broken out our source Fx into individual files for each Fx that can be checked out and edited separately. This will greatly help with multiple people needing to edit Fx files.

**Update:** Resource Panes and Tagging of all assets and searching within World Edit has been added.

# Production

## Hiring of Specialized Senior Staff such as Tools/Runtime Engineers

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| --- | --- | --- | --- |
| *Risk* | *Risk Level* | *Production Phase* | *Update* |
| Hiring of Specialized Staff | **Low** | **Pre-Production** | **11.30.09** |

We currently have 3 positions open. 2 of the positions will be filled, hopefully, by current contractors working in CTT leaving only the Senior Animation Engineer position open. Filling these positions is crucial for us to advance our technology and tools to a more competitive level. If these roles are not filled in time we risk being un-competitive.

Mitigation: We are actively interviewing candidates for all open positions. WBG's new recruiting manager has a lot on his plate (WBG, Surreal and Snowblind hiring efforts, work relating to the two Midway Studios, shoring up our recruiting infrastructure and streamlining our interview process) but will hopefully move on to increasing our recruiting efforts soon.

Update:We have filled three important roles. Our mid-level and senior graphics engineers and senior network engineer have started and are all currently contributing to the project. We still have open positions for senior runtime, tools and plugins engineers that we would like to fill as soon as possible. We recently interviewed a very promising Senior Engineer for our open runtime position with positive feedback from all involved. Our recruiting manager has started the process of making him an offer but is waiting on background checks from both the US and Australia before proceeding further. He is also in the process of getting his green card so he would not want to leave his current position before October.

Update: Peter Higley, who has previously worked at Monolith on FEAR2, The Matrix and AVP2, has accepted and has joined the Apollo team. Adam Batters starts Dec. 21st in the Staff Software Engineer, Engine position.

## Strike Teams risk Creating Randomization and Overlapping Schedules while Working with All Disciplines.

|  |  |  |  |
| --- | --- | --- | --- |
| *Risk* | *Risk Level* | *Production Phase* | *Update* |
| Strike Teams Risk Randomization | **Medium** | **Pre-Production** | **9.09.09** |

Mitigation: Content, Design and Engineering all have designated schedule representatives that meet throughout the week to ensure that individual’s schedules do not get overlapped.

**Update:** We have evolved our team management structure to allow for easier coordination and more flexibility between design, content and engineering.

We’re conducting mini post-mortems on each milestone to identify anywhere that this was an issue and smooth out our process each time

## In-Sourcing Process Not Clearly Defined

|  |  |  |  |
| --- | --- | --- | --- |
| *Risk* | *Risk Level* | *Production Phase* | *Update* |
| In-Sourcing Process Not Clearly Defined | **Medium** | **Pre-Production** | **9.09.09** |

Internal QA is currently allocated as a shared resource. Internal QA teams know the tech they work with very well and are necessary for getting stable builds to the team. Having them as a shared resource that could at any moment be snatched up to help out somewhere else that they would not be effective is a concern. Similar concerns apply to Cinematics and Audio.

Mitigation: The QA Lead for Apollo is allocated to Apollo’s headcount exclusively. Re-assessing the need to have QA Analysts in the shared resources group may become necessary as we approach Production.

# Publisher/Filmmakers

## Approval entities (Nolan’s people, WB, or DC) Not Identified or Defined

|  |  |  |  |
| --- | --- | --- | --- |
| *Risk* | *Risk Level* | *Production Phase* | *Update* |
| Approval Entities Not Identified or Defined | **Medium** | **Pre-Production** | **9.09.09** |

To make our ship dates and project goals, at specific times throughout production we will need to make decisions about design, art, audio and story that we will not be able to reverse without impacting time, money and resources.

Mitigation: The first meeting with DC Comics was held 7.21.09 and was encouraging. More corporate level talks are needed before we will be able to begin using them as a sounding board for our ideas, but the foundation has been laid. Nobody seems to know anything about Christopher Nolan’s involvement at this point, but everyone knows we need his feedback on everything and are anxious to find out more.

We do have a meeting with Shane Thompson on Oct. 22nd top get feedback from the single person at WB who has worked the closest with Chris Nolan.

## Arkham Asylum 2 / Apollo Product Distinction

|  |  |  |  |
| --- | --- | --- | --- |
| *Risk* | *Risk Level* | *Production Phase* | *Update* |
| AA2 - Apollo Product Distinction | **Medium** | **Pre-Production** | **9.09.09** |

## Even though there is a year between Arkham Asylum 2 and Apollo's current release dates, we want to make sure that our products are distinctive and unique for better consumer appeal. With each Milestone, we are finding stronger similarities between AA2 and ourselves such as aspects of grapple/glide and interrogation.

Mitigation:

* We are having monthly conference calls with Andy  Abramovici and Ames and Ames Kirshen on the first Thursday of every month to coordinate our develop efforts on Arkham Asylum 2 & Apollo.
* We have exchanged October Project Presentation slide decks to make sure we are distinct where necessary in our messaging.
* We will be reaching out through Kevin Stephens and Peter Wise to RockSteady, once the acquisition has settled, to share knowledge and code between the two team.