

Labs R&D: Rendering Deus Ex: Mankind Divided

Anton Kai Michels, Peter Sikachev, Samuel Delmont, Uriel Doyon,
Francis Maheux, Jean-Normand Bucci, and David Gallardo
Eidos Montreal, Labs R&D Department



Figure 1: In-engine capture of Adam Jensen.

Abstract

In this course/talk we aim to give a cohesive overview of the advanced rendering techniques developed for the upcoming 2015 blockbuster, Deus Ex: Mankind Divided. We will present a collection of diverse features, the challenges they presented, where current approaches succeed and fail, followed by our own solutions and implementation details.

Overview

We present a broad range of advanced rendering techniques developed by a team of R&D graphics programmers for the next iteration of the Deus Ex series, Mankind Divided.

One of Mankind Divided's signature graphical features is Adam Jensen's Titan Shield, which can be seen at the end of the CGI announcement trailer. For the in game version, we iterated through several prototypes before arriving at an approach that leverages hardware tessellation for a unique and convincing effect.

We also present Pure Hair, an evolution of the well-known TressFX hair simulation and rendering tech, developed internally by Labs. Compared to the previous version, we have significantly improved rendering, employing PPLL (per-pixel linked list) as a translucency solution. We have also significantly enhanced simulation and utilized async compute for better workload distribution.

A method we use to bring added detail and liveliness to the world of Deus Ex is parallax occlusion mapping. We discuss our approach in bringing this feature into our rendering pipeline as well as implementation details and the improvements we made.

Mankind Divided features realistic, high-quality motion blur. It consists of two sequential passes, sampling 4 texels each, which effectively results in 16 samples. The proposed method produces neither hard edge artifacts, nor geometry "shrink" effect. It can effectively run both in full (fullHD) and half resolution, depending on the platform.

Finally, we wish to give a brief but cohesive overview of our production and methodologies, discussing challenges that are common to our industry and the steps we took to overcome them.

References

- MARTIN, T., THIBIEROZ, N., YANGAND, J., AND LACROIX, J. 2014. *TressFX: Advanced Real-Time Hair Rendering*. In *GPU Pro 5*, CRC Press, 2014, pp. 194–208.
- KASYAN, N. 2013. Playing with Real-Time Shadows. *ACM SIGGRAPH 2013, Efficient Real-Time Shadows Course*.

Permission to make digital or hard copies of part or all of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for third-party components of this work must be honored. For all other uses, contact the Owner/Author.
Copyright is held by the owner/author(s).
SIGGRAPH 2015 Talks, August 09 – 13, 2015, Los Angeles, CA.
ACM 978-1-4503-3636-9/15/08.
<http://dx.doi.org/10.1145/2775280.2775284>