**Autodesk & Reality Capture**

**Industry Background**

* Reality capture is the practice of creating digital models of physical objects and spaces using photography, laser scanning and other technologies.
* Reality Capture sensors (cameras, laser scanners, etc.) produce 3D data used in design, construction, engineering, survey, architecture, forensics, historic preservation, and entertainment.
* Collecting and using Reality Capture data is largely tedious, time-consuming and cost prohibitive for professionals today.
* From aerial lidar to terrestrial laser scanning to photogrammetry, the 3D data capture industry is rapidly evolving. This ultimately changes the way customers collect data, how data is presented to clients and utilized in internal operations.
* Most point clouds generated by professionals consist of billions of points, a number that can be incredibly difficult to process. In situations where point clouds of this size are created, the complex algorithms that allow the software to function require highly optimized computing infrastructure.
* Historically, high end reality capture software packages are too costly and therefore out of reach for the average user. Autodesk is seeking to change that by introducing affordable, easy to use technology.
* Photogrammetry and laser scanning are becoming more commonly used in conjunction with each other. Capturing both types of data is incredibly useful because it provides additional information that might otherwise be missed. However, balancing all of these different forms of data collection can be challenging and expensive. The integration of laser scanning and photogrammetry will allow information to be represented in a more robust way.
* The BIM market is a key area where demand for as-built documentation will continue to grow. BIM projects are dependent on the development and distribution of information because of the high number of contributors that work on a single project.

**Autodesk Reality Capture Solutions**

* Autodesk continues to invest in developing sophisticated, easy-to-use reality capture technologies. The company has made several key acquisitions including Alice Labs and Allpoint Technologies as well as applied its own research and development resources to accelerate the mainstream adoption of these technologies.
* Customers are looking for ways to easily and accurately capture the world around them
* Autodesk Reality Capture solutions streamline Reality Capture workflows, making working with Reality Capture data *easy*, *quick* and *cost effective*.
* Autodesk is the only company who has combined laser scanning data and photogrammetry into one product family to address and streamline the entire workflow.
* Traditional point clouds look like clouds, but Autodesk technology can now visualize truly massive point clouds as realistic surfaces. The real magic is that we can also interact with these huge data sets doing CAD-like operations such as selection, tagging, moving, measuring, clash detection, and object extraction all with native points.
* Reality capture will be prominent feature in Autodesk’s new 2014 products and Suites, and central to the company’s growth.
* Laser scanning and photogrammetry are traditionally very expensive and data intensive. Autodesk’s goal is to democratize the process of reality capture so that anyone can capture the world around them to create high quality 3D models.

**Executive Quotes**

“Autodesk has a long history of making design technology more accessible, and we continue to find ways to make it easier for our customers to start their design processes with models based on reality, instead of a blank page,” said Amar Hanspal, Autodesk senior vice president of Information Modeling and Platform Products. “We are committed to the development of new reality capture solutions that make the most of the nearly infinite computational power of the cloud.”

**Who Uses Reality Capture Technology?**

 For slightly over a year (Nov. 2011), consumers have been able to use Autodesk 123D Catch to quickly transform digital photos into photorealistic 3D models at no charge. Anyone capable of using a point-and-shoot, mobile phone or advanced digital SLR cameras to snap a series of photos of objects, people or scenes can use 123D Catch to generate impressive 3D models. Capturing your own personal avatar or favorite vacation scenes in 3D is both possible and easy. The app also has built-in sharing capabilities with short movies or animations for viewing on mobile devices, YouTube and other social media channels. The app subsequently became mobile on the iPad and iPhone in 2012.

Historic preservationists have long worked with Autodesk reality capture technology, *e.g*., the Pompeii archeological site used it to document and analyze the architecture of one of the city's largest, but least understood buildings.

Customers across multiple industries utilize reality capture technologies in different ways. Service Providers, such as Surveying firms, Engineering firms, and Modeling firms; Asset Owners such as manufacturers and studios; and content providers for mapping and navigation, historic preservation and forensics all have a need to capture, validate or modify new and existing structures. Some customer examples include:

AEC

* In-context general and conceptual design (many industries)
* As-built floor plans (AEC)
* Construction verification (Construction)

ENI

* Infrastructure assessment (Civil/Transportation)
* Pipe routing and documentation (Plant/Oil&Gas)

Manufacturing

* New equipment layout (Factory)
* Reverse engineering (Metrology)
* Asset documentation (HP/Forensics/Transportation)
* Mapping (Navigation/Automotive)

Media & Entertainment

* Photorealistic models/environments (Film/Games/Advertising)

Example: Large data collection projects that document entire cities can benefit from the use of photogrammetry for visualization purposes. As a result, this technology is and will continue to be most effective for people such as urban planners because planners are able to get answers to specific questions such as the amount of roof surface that is oriented in a particular angle or how much of that surface is covered by shadow or vegetation.

**Making Reality Capture a Breeze**

While reality capture technologies are increasingly being used by more and more professionals across industries, there are still many challenges to address. The current workflow of capturing reality and turning it into usable data models is lengthy and complicated. Autodesk reality capture solutions help to streamline workflows, making working with Reality Capture data *easy*, *quick* and *cost effective*.Some of the challenges addressed with Autodesk solutions include:

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| --- | --- |
| Customer Challenges | Autodesk Reality Capture Solutions |
| * Extensive field setup
 | * Eliminate the need for field setups
 |
| * Capture happens onsite, QA happens offsite
 | * QA onsite
 |
| * Data takes time to load and manage
 | * RCP format optimizes loading and visualization
 |
| * Cameras have inconsistent accuracy
 | * Workflows to improve camera accuracy
 |
| * Capture requires expertise
 | * Simplify data capture process for all levels of user
 |
| * Few data consumers
 | * Web storage and access opens data to broad range of users
 |
| * Too many software packages
 | * Capture to deliverable is handled in Autodesk
 |

**Autodesk Reality Capture Stats**

* Autodesk renders 11,000 123D Catch projects each week
* More than 28,000 123D projects are shared in the public gallery

**Industry Reality Capture Stats**

* Still looking for some…

**Other Questions to Consider**

* Does Autodesk ReCap support multi-beam sonar data capture?

As long as the sonar data provides an xyz coordinate, the data can be used in Autodesk ReCap.

* What about the e57 data standard?

Autodesk ReCap supports the e57 data standard for both import and export. As Autodesk, we support the ASTM standard.

* Autodesk says no one else can convert photos to 3D models, but accute3D has been doing this for a few years now. How is Autodesk ReCap different?

Autodesk ReCap licenses Acute3D technology for use in our photo engine.