
The John Molson Undergraduate Case Competition

Presents

CREAFORM
SCAN & 3D DIGITAL SOLUTIONS

Measure Twice, Cut Once

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Measure Twice, Cut Once

Creaform specializes in 3-dimensional (3D) technology products and services: handheld scanning devices, software and support. Offering fully integrated solutions, Creaform has carved out a strong position within the growing micro metrology¹ segment of the 3D scanning industry. Since its founding in 2002, management has seen the company rapidly grow from \$2M in revenues in 2003, to over \$28M in 2008. What is most impressive, considering its rapid growth, is that Creaform has maintained profitability without undermining its ability to create and bring to market innovative scanning devices.

Growth opportunities are abound, as applications for this cutting-edge technology are virtually limitless. This puts into question two focal issues: (1) which industry offers the greatest opportunity for growth, and (2) how can the company establish a sustainable revenue stream?

Creaform History

Creaform was established in 2002 by Charles Mony, the current acting President. With an extensive educational background in engineering, mechanical design, innovation, conception and production management, and the accumulation of over 20 years of experience with specialty technologies, Charles has led Creaform successfully alongside his highly skilled management, R&D, and sales team.

Having founded two companies prior and helped with the launch of Kaiplast, (now called Modelex) in 1996—starting a technology based business venture was becoming second nature to Charles. He started Creaform as a third-party 3D scanning and measurement solutions reseller, the initial step that brought the required financial capital to invest in his own side project. This side project would become Creaform’s first product: a handheld scanning device. In October of 2002, Martin Lamontagne left Modelex to join forces with Charles at Creaform as a Project Manager. Martin would later become the CEO & Executive Vice President.

By 2003 Creaform was the winner of Québec’s Entrepreneurship award in the “Technological and Technical Innovation” category for his 3D scanning device. During this time he also began to integrate various software technologies to increase the product’s scope and capabilities. With the help of André Coutures in 2005, Creaform opened a European subsidiary in France (Euroform), and the United States (Creaform USA). André had been working with Creaform between 2002 to 2004 as an advisor for administrative, human resources, and financial related issues, he also helped with the business development plan and permanently joined in January of 2005 as manager before becoming VP of Finance & Corporate Development in 2006.

The launch of the subsidiaries came coupled with the release of Creaform’s *REVscan* handheld laser scanner, which by 2006 had already sold 100 units. The continued growth also

¹ *The science of measurement.*

meant expansion of its distribution network, to provide greater reach for its products. 2006 & 2007 were marked years for Creiform as it was the recipient of numerous awards reflecting its innovative and ambitious spirit.

In 2007, the 400th REVscan had been sold; Creiform introduced the *EXAscan*, expanded its market reach by tapping into the multimedia and medical sector, and further expanded its international presence this time to Asia with a subsidiary in China. This had come with the addition of another individual, Oscar Meza, to develop the Asian and South American markets.

Creiform was on a roll by 2008, the rapid (organic) growth meant a new organizational structure was needed to incorporate production, marketing, HR, and Handyscan divisions. Since its first Handyscan sale in 2005 sales from the proprietary handheld scanning and measuring devices grew from \$800,000 to almost \$13 million in 2008.

Finding itself in such a strong financial position, Euroform, the European division, strategically acquired ActiCM's a French-based manufacturer and distributor of specialized 3D technology. This enabled Creiform to expand its offering, reinforce its market position, and leverage Acti's distribution networks. Acti's devices were more expensive offering higher margins boost to Creiform's bottom line. Although many of Acti's products had not yet been commercialized, they had been highly praised by automotive giant Renault, effectively creating new avenues for Creiform in the inspection segment. Continuing in to 2009 Acti's product line would continue to be integrated in to Creiform's.

Creiform currently has two major R&D hubs: Lévis (Canada) focusing on product development and Grenoble (France) tasked with consolidating the Handyprobe and Advent. The company has global reach with sales offices located in Atlanta, Chicago, Boston, Houston, Los Angeles, Montréal, Orlando, Paris, Seattle, Shanghai, and Yokohama. Over 500 customers have purchased 3D scanning technology and services from Creiform over the past 5 years in a variety of industries as illustrated in Appendix A.

Table: 1

Parent/Subsidiary	Regional Coverage	Primary Business Responsibilities	# of Employees	Budget 2009 Sales
Creiform Inc.	Canada, USA, Latin America, Asia Pacific	Administration, R&D, Sales and Services	129	\$20.1M
Creiform France	EMEA	R&D, Sales and Services	17	\$5.5M
Creiform Shanghai	China	Sales and Services	9	\$2.4M
Creiform Japan	Japan	Sales and Services	2	\$2M
Total			157	\$30.0M

Industry Trends

3D scanning serves an array of customer needs—dimensional metrology (3D scanning and measurement), inspection, design, reverse engineering, and digital manufacturing—across a variety of industries—aerospace, automotive, consumer products, medical, entertainment and multimedia, and education. Increasing market acceptance has been fuelling growth as various applications for 3D technology become more widely known. End users are not only looking to buy scanning devices but are increasingly seeking fully integrated packages and tailored solutions. Consequently, a key driver of innovation has come from the demand side; the market has grown at an estimated 15% per annum and is forecasted to continue at this rate until 2012. Such demand, for example, has come from the inspection industry where scanning would be beneficial to repetitive inspecting tasks.

There remain obstacles hindering rapid adoption of these technologies however. Though scanners are decreasing in cost, the market is price sensitive with some mid-size companies not having the financial means (or sufficient need) to warrant the purchase of a 3D scanner. Purchases are mainly based on return on investment and product capabilities rather than solely on price. This has led to the growth in scanning services, and may eventually lead to greater price pressure. Other issues yet to be fully tackled concern shiny surface materials and how to properly scan these, optimizing optics, broadening the application range of 3D scanning, enhancing data throughputs, developing point cloud processing software and post development processing software packages.

Opportunities in the industry lie in cultivating customer loyalty through reputation and differentiation based on product speed, accuracy, and versatility. Accordingly success stems from intellectual property and patents along with production efficiency, as the basic scanning device (hardware) is slow to change.

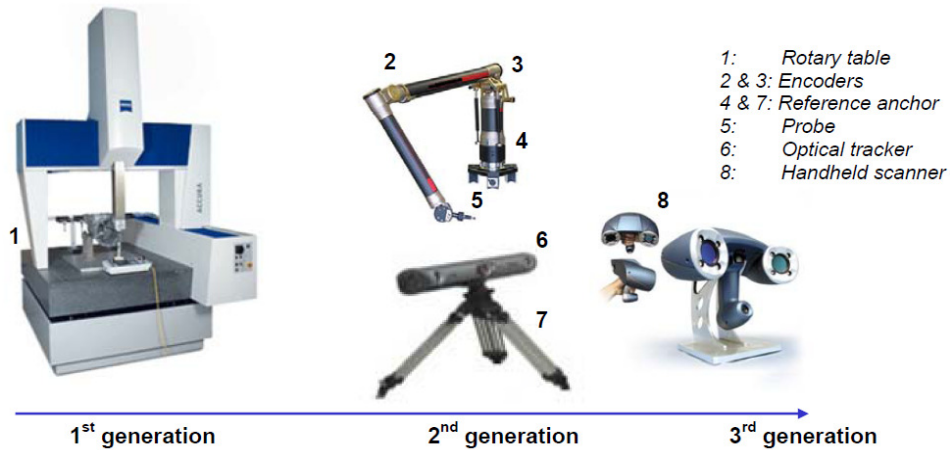
Metrology Industry

The push for more capable technologies has come from the customers' end, spurring incredible innovation within a short period of time. First generation scanners consisted of fixed, non-portable devices usually with a rotary scanning table. Drawbacks came from measurement inaccuracies due to movement of the rotary table during the scanning process. Second generation scanners were thus born - they were portable, consisting of a jointed arm with an attached pivoting scanner. However, they too experienced measurement inaccuracies due movement and vibrations during scanning.

Finally, it is third generation scanners that present greater overall versatility, as they are small enough to be handheld. This generation is incredibly precise and accurate in their measurements due to self-calibrating system. Hence as 3D technologies proceed to improve

faster than hardware, differentiation amongst competitors will stem from ease of use, speed, versatility and accuracy.

Figure: 1



Competitive Landscape

There are multiple industry players that compete within three segments – nano, micro and macro. Creaform participates in the micro segment which has a market size of \$6.2B (Exhibit #). The market for such devices still remains niche as further applications are continuously being discovered and deployed for other markets.

Within the micro-segment market demand is fuelled by the automotive and aerospace industry that benefit from strong financial backing. These players want precise, accurate, high speed tools and are on the look out to test innovative new technologies that could boost productivity. The readiness of these clients to invest in testing products has meant 3D technology capabilities are only getting better. Other industries are having production shifts to lower-cost producers in foreign markets prompting the need for quality control measures and systems. The largest competitor, Hexagon, is similar to its competition with diverse products and services roughly meeting the same ends, a strong sales force, precision and reliable tools and R&D. The basic competitive factors are: precision, accuracy, speed, data storage, distribution network, customer service and price.

Creaform

As a fully integrated 3D solutions provider, Creaform offers 3D solutions and services which represent 43.4% of 2008 revenues. The service aspect is broken down in to two components: *training* and *scanning*.

- Training sessions are used to educate clients on the use of 3D scanners, metrology instruments and software.
- Scanning usually also includes some form of post-treatment whereby clients who may not be able to afford a scanner or whom do not have regular need for one can still have access to the technology.

Creaform also operates as a distributor, developer and manufacturer of proprietary 3D scanners, representing 56.6% of 2008 revenues. This division is broken in to three components: *proprietary 3D scanners*, *third-party software*, and *third-party 3D metrology hardware*, representing 48.5%, 7.1% and 1.0% respectively.

- Proprietary 3D scanners are comprised of the *Handyprobe* and *Handyscan* product lines.
 - Handyprobes are portable coordinated measuring machines (CMMs) which use contact probing and/or optical tracking to scan objects. Such devices are mainly used for “off-line” production control and inspection.
 - Handyscans are handheld 3D self-positioning, auto-calibrated devices and include the *REVscan*, *EXAscan*, *MAXscan*, and *Ergoscan* within its product line; the main use is 3D scanning and reverse engineering. A key and notable feature of the Handyscan is that it uses Creaform’s *VXscan* software which is a data acquisition program that ensures maximal surface optimization with results displayed in real time making the Handyscan unique in its capabilities.
- Third-party software sales integrate Creaform’s scanner capabilities with these softwares. *Catia*, *Delmia*, and *3dVia* are for the use on *Dassault Systems PLM Suite* software, *Geomagic*, *Polyworks*, and *Rapidform* are software used for reverse engineering software, and *Prelude Inspection* and *Metrolog* for inspection software.

Further product and service development will be a key factor in Creaform’s growth. Hence the heavy reinvestment of revenues back in to R&D of approximately 10%. This investment is allowing for the development of plug-in applications for software, improving on current and creating new scanners, developing new assembly processes and methods testing of product and service lines.

With a compound annual growth rate (CAGR) of over 50% in Revenues from 2003 to 2008, Creaform stands far ahead of the pack with competitors CAGR estimated at 27%. The adjusted earnings before interest debt, tax and amortization (EBITDA) margins have however been negatively impacted due to both internal–addition of a highly skilled sales force, the

expansion in to foreign markets with several subsidiaries, continued investment in R&D—and external factors—a sluggish economy.

Creaform's success comes from its rooting in R&D. This has led to the development of an expertise in the creation and application of complex algorithms. These algorithms are the basis for the specialty features in its handheld devices such as self-positioning, auto calibration, maximal surface optimization, and real time results display which have made it unrivalled in the industry. As such there is heavy reinvestment in R&D and human capital while taking careful measure in patenting intellectual property. Hence proprietary technology is the backbone to the 3D scanner industry especially considering that hardware has not really changed over time. Couple inexpensive hardware with Creaform's focus on lowering costs, via lean manufacturing and production efficiencies, allows Creaform to compete as a low cost player. Low productions costs has also translated to higher achieved margins on 3D scanning devices compared to Creaform's service related revenue streams.

Creaform Product Line

3D Scanner Product Line

Revenues in 2008 for proprietary 3D scanner sales accounted for 48.5%. Handyscans, representing 46.5% of the 2008 revenues, were sold through direct channels accounting for 36.3% of sales, VARs sales accounted for 34.1%, and OEMs for 29.6%. Handyprobe sales (formerly Actiris) represented 2% of total 2008 revenues.

The Handyscan Product Line

Figure: 2



The Handyscan product line comprised of REVscan, EXAscan, MAXscan, and Ergoscan (see table 2), comes with Creaform's own VxScan data acquisition windows-based software. This product line is characterized by its self-positioning ability allowing for complete freedom of movement. There is no need to maintain fixed positions as movement does not impact the proper functioning of the instrument, eliminating inaccuracies. Unlike other scanners on the market, Handyscan does not gather high density points of clouds; rather, with repeated scanning

it picks up multiple cloud points and optimizes these surface points with the use of complex algorithms, reducing post-treatment work. This is featured on its real time optimization and 3D measurement display. It also has auto-calibration meaning the scanner adjusts to its environment (temperature, colour, brightness etc...) automatically to maintain scanning accuracy. As such advantages include portability, functionality, handheld, lightweight, high accuracy, versatility, cost effectiveness, user-friendly solutions, plug and play system, dual scanning mode (ability to scan large parts and complex surfaces), and file exportation.

Table: 2

Device	Function	Description and Distinctive Features	Unit Price	Primary Application
REVscan	3D laser scanner	<ul style="list-style-type: none"> Handheld, lightweight and ergonomic Self-positioning system with no external tracking devices Maximal surface optimization in real time Auto calibration Adjustable resolution levels requiring little post treatment Two high-accuracy cameras (up to 50 µm accuracy) Competitively priced Ability to scan objects of different sizes, shapes and colors Ability to scan moving object Ability to scan in confined place User friendly Plug-and-play system Supported by VxScan software for data processing Compatible with most CAD and post-processing software Class 2 and Class CE product certification <p>Key Feature: Reverse Engineering and mock-ups: ability to create 3D virtual models for use in 3D CAD, CAM or CAE software. Facilitates design process from handmade models to prototyping. Inspection: parts scanned and compared to CAD for quality control. Ability to make quick production line adjustments</p>	\$15K - \$65K	3D scanning Reverse Engineering Styling, Design and Analysis Digital Manufacturing
EXAscanner	3D laser scanner	<ul style="list-style-type: none"> Same technology and basic features as REVscan, but additional features include: <ul style="list-style-type: none"> Three high accuracy cameras (up to 40 µm accuracy) Automatic multi resolution setting and no post treatment Dual scanning modes for large or complex surfaces Additional applications and solutions (part inspections) <p>Key feature: Higher measurement accuracy and speed. Post-treatment reduced as objects scanned at highest mesh resolution for any surface obtained in high resolution.</p>	\$30K - \$90K	3D scanning Reverse Engineering Styling, Design and Analysis Digital Manufacturing Inspection

VIUscan	3D laser scanner	<ul style="list-style-type: none"> Same technology and basic features as REVscan, but additional features include: <ul style="list-style-type: none"> 3D Color scanner – the only truly portable handheld 3D color scanner to deliver such accurate and hyper realistic results 	\$15K - \$75K	Entertainment / Multimedia Museology / Heritage Preservation Web Development / E-Marketing Industrial Design
ErgoScan	3D laser scanner	<ul style="list-style-type: none"> Same technology and basic features as REVscan, but with limited features, Characteristics include: <ul style="list-style-type: none"> Special design adapted to medical environments Class 1 medical certification <p>Key Feature: Certified Laser Class 1: can be used in medical environments.</p>	\$5K - \$35K	Medical application
MAXscan	3D laser scanner	<ul style="list-style-type: none"> Portable and handheld laser scanner featuring the Handyscan 3D technology, combined with photogrammetry level <ul style="list-style-type: none"> High accuracy on large parts Limitless working volume Merge-free, one-step process Truly portable MAXimum freedom Self-positioning True automatic multiresolution 	\$45K - \$150K	Reverse Engineering Offline Inspection

The Handyprobe Product Line

Based on optical-tracking, Handyprobe is a free moving system with no link between the probe and the system. It essentially triangulates surface points with optical tracking reflectors.

Figure: 3

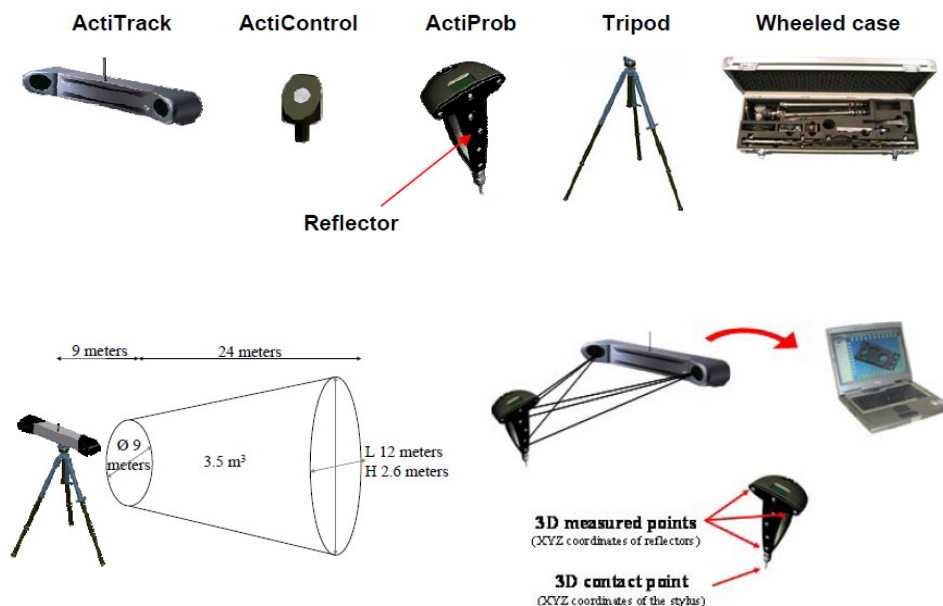


Table: 3

Device	Function	Description and Distinctive Features	Unit Price	Primary Application
Handyprobe	Portable CMM	<ul style="list-style-type: none"> Handyprobe (vision-based technology pack includes: Three high accuracy cameras (up to 40 μm accuracy) <ul style="list-style-type: none"> ActiTrack: optical tracking heads (two cameras). Mounted sensor acts as position and tracking system. ActiControl: reflectors placed and scanned to provide surface points ActirisProb: lightweight wireless stylus probe PowerInspect metrology software Tripod Laptop Fast and easy set up Truly portable (approximately 20 pounds) High accuracy User friendly Automatic alignment setup Dynamic reference frame Measurement volume extension Self-monitoring calibration Results appear simultaneously on probe and PC screen <p>Key Feature: Positioning system eliminates inaccuracies and comes with software that compares cloud points with user-defined inspection parameters. Offers surface point measuring, reverse engineering capabilities and geometric measurement.</p>	\$50K - \$90K	Reverse Engineering Offline Inspection

Third- Party Software

Third-party software is correlated to the number of scanners sold and represents 7.1% of 2008 revenues. The following (table 3) are distribution agreements Creaform has with third-party software providers.

Table: 4

Software Description
<p>Dassault Systems: Dassault Systems is a French-based company specializing in 3D and product lifecycle management software including CATIA, a multi-platform CAD/CAM/CAE commercial software suite marketed world-wide by IBM. Creaform has entered into a strategic partnership with Dassault Systems in June 2006. It has launched the Handyscan Scanning Module (HSM), a data acquisition software that fully integrates the 3D scanning process with the Handyscan 3D laser scanner into CATIA V5. HSM offers high efficiency gains in terms of post treatment, model re-construction, surfacing and inspection and effectively allows organizations using Dassault Systems’ CATIA platform to reduce product development time. This partnership brings new opportunities to Creaform, as the company’s portfolio of products grows to fulfill the 3D technology needs of a wider range of clients.</p>

Geomagic: Geomagic software enables the creation of digital models from physical parts. It offers a scan data collection and preparation module, with the ability to interface directly with major scanning devices as well as a point cloud and polygon mesh editing module, with extensive creation, repair and modification tools. Additional functionalities include a surface generation module that allows manual, semi-automated or automatic surface creation, as well as an automated control module that enables users to digitally inspect as-built versus as-designed parts. It serves as a link between CAD and CAM. The various software developed by Geomagic are mainly used for 3D scanning, reverse engineering, design, inspection, digital manufacturing and medical applications.

PolyWorks: PolyWorks Modeler is a software solution for creating polygonal models and surfaces from high-density point clouds. PolyWorks Inspector uses high-density point clouds obtained from 3D sensors and contact probes systems on articulated arms to control the quality of parts and tools during the manufacturing process. This software uses the scanned prototypes and assembled parts' point clouds in order to identify distortions, solve problems and approve manufacturing processes early in the production cycle. Both software are primarily used for 3D scanning, reverse engineering, design, inspection, digital manufacturing and medical applications.

Prelude: The Prelude INSPECTION software is a 3D metrology solution compatible with most measurement instruments (including CMMs and laser trackers) and all CAD standards. It offers complete measure and control functionalities: through noncontact sensor scanning, this tool enables the comparison of a digitized part with its CAD model by doing a three dimensional control and shape imperfections analysis. The Prelude INSPECTION software is mainly used for metrology and conformity assessment applications.

Rapidform: Rapidform XOR is a solid and surface modeling system for designing parametric CAD models from 3D scan data. It offers CAD deviation analysis as well as geometric dimensioning and tolerance analysis of 3D scanned parts for inspection and computer aided verification. The software is used for turning raw 3D scan data into polygon mesh models. It offers comprehensive point cloud clean up, multi-scan registration and hole-filling functionalities. Rapidform XOR is built around customers' inspection processes and can automatically inspect highly detailed parts without any code writing or macros. It is mostly used for 3D scanning, reverse engineering, design, inspection, digital manufacturing and medical applications.

Solutions & Services

With some companies lacking the capital to purchase 3D scanners and some that won't use a scanner often enough to warrant its purchase, Creaform offers 3D solutions and services. This leg of the company accounts for 43.4% of 2008 revenues and broadens its market reach by servicing companies who would otherwise forgo using such technology.

Table: 5

Services	Description and Distinctive Features
3D scanning and post-treatment services	<ul style="list-style-type: none"> • Scanning objects of any size, at the client's or Creaform's facility • Post treatment of data (correction, reconstruction, conversion in generic CAD and native formats) • Prototyping assistance • Possibility of using data (.stl files) acquired by Creaform or provided by client • File preparation for machining and prototyping (data conversion) • Management and delivery of turnkey projects
Computer-assisted design services	<ul style="list-style-type: none"> • Employs over 70 specialists • Reverse engineering and CAD services may be performed at the client's or Creaform's facility • Use of the CATIA, Pro-Engineer, Unigraphics and ICEMSurf CAD platforms

Metrology and conformity assessment services	<ul style="list-style-type: none"> • Contact and non-contact inspection services • Conformity assessment of 3D models against original parts or production tooling • Conformity assessment of manufactured parts against originals • Parts inspection • Inspection in a controlled environment • Generation of inspection and colorimetric reports • Production tooling and jig adjustments • In-process control, on the machines or production line • Robot adjustment and production line tuning
Training	<ul style="list-style-type: none"> • Theoretical and practical training, including hardware and software • Training services at the client's or Creaform's facility • User training for Handyscan products and VxScan software • Certified training on the use of the CATIA V5 software by Dassault Systems • User training for Geomagic, PolyWorks or Rapidform reverse engineering software • User training for Zephyr sensors • Basic training on the use of the Prelude Inspection software from MTDVision

The Need for a Stronger Distribution Network

A new branding position has been taken on by Creaform, reflecting its innovative and go-getter style. This can be seen in its website, available in eight languages, with various marketing tools used to increase traffic. The website is mainly oriented at offering pre- and post- purchase customer support.

Creaform's sales network can be divided into three channels: direct sales, original equipment manufacturer (OEM) agreements, and value-added resellers (VARs) network. Having recently deployed a customer relationship management (CRM) software to track leads and exploit opportunities, these channels further benefit from marketing tools offered by Creaform. Although Creaform has established these invaluable channels there is much to build upon in order to get a stronger grip of the 3D scanning industry. To do so the company will have to further broaden their network's reach.

Direct Channels:

Creaform's worldwide sales force (Canada-6, U.S-5., Europe-6, China-4, Japan-2) must adhere to strict guidelines to obtain their 7% sales commission on all Handyprobe and Handyscan devices, solutions, and services: attend 20 exhibitions per year, generate 600 leads per month, meet a sales quota of 16 scanner sales per year, generate 6 leads on 3D services, make 50 client demonstrations and attend 1 seminar per year. The sales cycle for any product varies from 3-9 months, with larger clients this may require up to 24 months. Once a customer has been landed, the sales cycle drastically drops.

VARs Network:

Over a 100 distributors built over 5 years, make up Creaform's VARs network with an additional 40 to be added by the end of 2009. A VAR partner must purchase one demo unit at a 25% discount (including an annual license fee) and training. Partnerships are selected according to geographic area, industries served, and distribution of complimentary products and services. No partner can obtain exclusivity, but with achieved sales of more than 5 units a member will not have another reseller placed within its territory. Canadian and U.S. members further benefit from Creaform and Dassault's partnership allowing them to sell CATIA V5 and Dassault Systems solutions to customers.

OEM Agreements:

OEM agreements are agreements where the manufacturer allows the licensee to resell its product under the licensee's brand name usually within a specified target market or industry. This allows for rapid market penetration gained through the licensee's current customer base. The non-exclusivity of such agreements allows Creaform to broaden its reach across a multitude of industries. OEMs must purchase 10 units but obtain a 40-55% discount. Current agreements are:

- Z Corporation – Zscanner: with a global network of 200 distributors, it develops, manufactures, and markets 3D printers for model making and prototyping.
- Ohion Willo Wood – OMEGA scanner: manufacturers of orthotic and prosthetics
- Ontario Orthotic Lab: manufacturers of orthotic and prosthetics

Human Resources

Creaform has a lean and highly skilled labour force. From its 157 employees, about 44 are engineers and 60 are 3D scanning and measurement specialists. There is incredible loyalty amongst employees due to the positive work environment, training and advancement opportunities and reward programs. Creaform's team is thus well-trained and knowledgeable as is reflected qualitatively in their professional manner and expert customer assistance as well as quantitatively in the strong financial position Creaform finds itself at present.

Table: 6

Segment	Creaform	Creaform France	Creaform Shanghai	Creaform Japan	Total
CAD	59				59
Scan & Inspection	22	2	3		27
Direct – Production	3				3
Indirect – Production	4				4
Support & Systems	4				4
R&D	7	7			14
Marketing	4				4
Sales	16	7	4	2	29
Administration	5	1	2		8
HR & Management	5				5
Total Employees	129	17	9	2	157

Growth Avenues : Measure Twice...

The management team has been looking in to several industries where Creaform could excel and continue its growth initiatives. Some of the following industries Creaform already compete in, others fall within unknown territory. The main goal of this growth initiative is to penetrate new markets with its Handyscan product line.

Aerospace, automotive, and consumer products: Creaform has established relationships mainly in the automotive and consumer product sectors and have been increasing their integrated solutions packages specifically for this sector. Aerospace and automotive companies usually have the capital required to purchase 3D digital technology and have helped spearhead growth.

Education & Research: This sector, and more specifically engineering, architecture, medical, design and multimedia faculties, tend to have budgets that include the purchase educational equipment and thus price may not be as high a barrier. This industry category however may not be as apt for the purchase of services. Creaform has current partnerships with Eureka and Pre-Carn.

Medical: In the medical sector Creaform already works within the orthopedic, prosthetics, plastic surgery, burn trauma care, and breast implants segments. Something to be noted about the medical field is that the adoption of new processes and technology is slower and more conservative this however may be overcome with turnkey solutions and outsourcing of 3D scanning and services.

Entertainment & Multimedia: This high growth segment is characterized by highly innovative companies often with deep pockets, offering rapid technology innovation and incredible opportunities for partnerships.

Table: 7

Creaform Clients

Product or Service	Automotive	Aerospace	Consumer Products	Multimedia & Entertainment	Medical	Education
Handyscan	Renault, Toyota, Chrysler, Honda	NASA, Boeing, Pratt & Whitney	American Standards	Meteor Studios	Ohio Willow Wood Resonandt Medical	ECN, MSOE
Services	Faurecia, Renault	Dassault, GE, CAE	Nike Bauer, Black & Decker	Buzz Meshwerks		ETS PennState
Solutions	Volvo, Toyota	Cessna, Raytheon	BRP	-	-	Ohio State University

... Cut Once

Creaform has created a modest international distribution network to pursue its growth initiatives but still wishes to broaden its reach. Financially, however, it is not recommended to pursue all industries that could benefit from 3D scanning technology. The management team has been left wondering where to invest their time and money to grow the business.

Which industries should Creaform pursue with the Handyscan, which international markets should it penetrate, and how should it approach and market itself to this industry?

Should it leverage its current client base to capture a new one or build new relationships in a new industry?

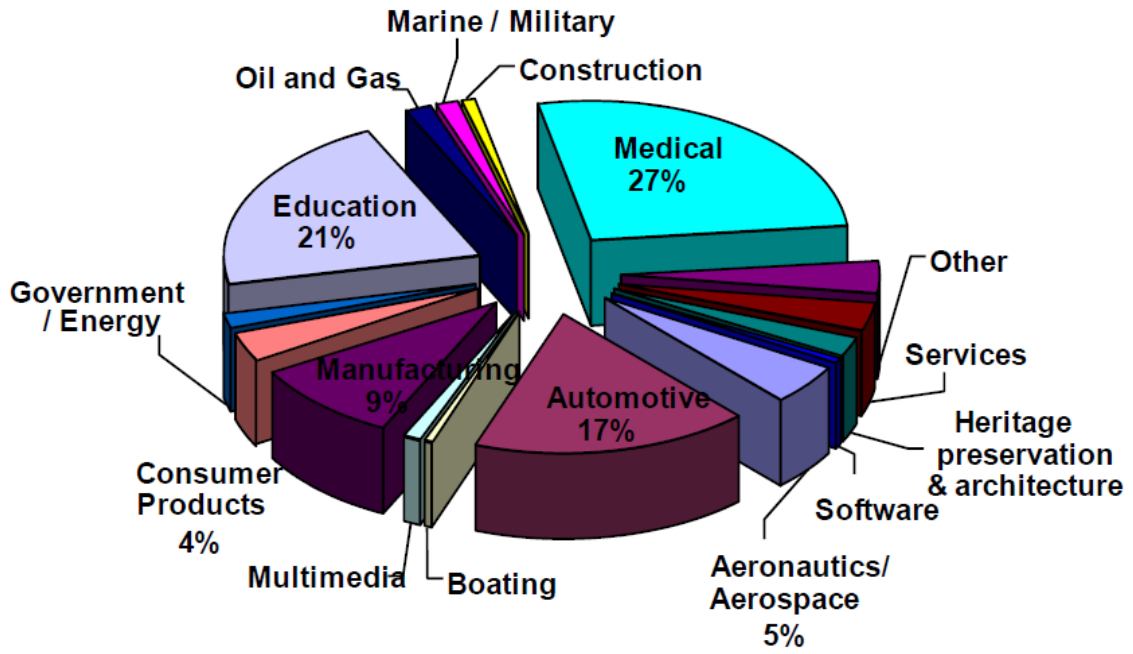
Other questions that face the team include: *how to increase recurring revenue streams, increase margins in its service segment and whether it should maintain or increase the average selling price of the Handyscan considering its capabilities versus the competition.*

The Creaform team are pleased with their achievements but realize much work is required if they want Creaform to continue on a path of success.

They look forward to hearing your input.

Appendix: A

Client breakdown



Appendix: B

Metrology industry segments

Segmentation Aspect	Nano Segment	Micro Segment		Macro Segment	
Objects to be scanned	Microchips, Atoms	Airplanes, Automobiles, Consumer products, Manufactured parts		Buildings, Roads, Bridges, Tunnels	
End-markets	Electronics, Medical	Automotive, Aerospace, Energy, Consumer Products		Surveying, Cartography, Construction, Mining, Aerospace	
Total market size	\$2.5B	\$6.2B		\$8 B	
Annual growth rate	>10%	6%		10%	
Market size – Creaform	n/a	\$400 – \$600 M		n/a	
Annual growth rate – Creaform	n/a	15-20%		n/a	
Measurement precision	<30 μm	<10 μm		<30 μm	
Selected competitors	Cari Zeiss KLA Tencor Topcon Veeco Zygo	API Carl Zeiss Creaform Faro Technologies GOM Hexagon	Kreon Metris Mitutoyo NDI Perception Renishaw Steinbichier	Hexagon Sokkia Topcon Trimble	
Technology	Light Micro Optics	3D tactile Laser scan Laser track	Laser radar Optics Photogram	GPS Laser scan Laser track	Laser radar Optics Photogram

Appendix C

Competitor Analysis

Company	Hexagon	Metris	Fard
Status	Public Company	Public Company	Public Company
Reporting currency	SEK	€	USD
Revenues	\$ 2,015.9M	\$ 39.5M	\$ 228.5M
EBITDA	\$ 399.5M	\$ 7.6M	\$ 16.1M
Total assets	\$ 4,029.9M	\$ 353.4M	\$ 269.8M
Employees	8,084	544	959
	Hexagon AB develops and markets engineering technology products and services, focusing on measurement technologies and polymers worldwide.	Metris NV provides metrology solutions for dimensional quality control to the engineering and manufacturing departments	FARO Technologies Inc. designs, develops and markets portable computerized measurement devices
Industries	Aerospace, security and defense, automotive, engineering, construction, mining and oil, electronics, computing, and medical industries, as well as government departments and authorities.	Automotive and aerospace companies, and suppliers worldwide.	Manufacturing sector
Products & Services	Measurement technology products, including hand tools, fixed and portable coordinate measuring machines, GPS systems, level meters, laser meters, total stations, sensors for airborne measurement, aftermarket services and software systems for one, two or three-dimensional measurements.	Measuring hardware, application software and customer services. The company's products consist of a coordinate measuring machine (CMM).	Measuring arms, laser scanner and laser tracker and software.
Product use	Measurement of mountains, cities, roads, tunnels, bridges and other construction projects; industrial components, such as large aircrafts; and micro-components.	Mechanical motorized system designed to move a measuring probe (or sensor) to determine the coordinates of points on the surface of an object.	Allow manufacturers to perform 3-D inspections of parts and assemblies on the shop floor.
Sales Network	Sales organization and distributors.		
Headquarters	Nacka Strand, Sweden.	Leuven, Belgium, est. 1995	Lake Mary, Florida, est. 1981

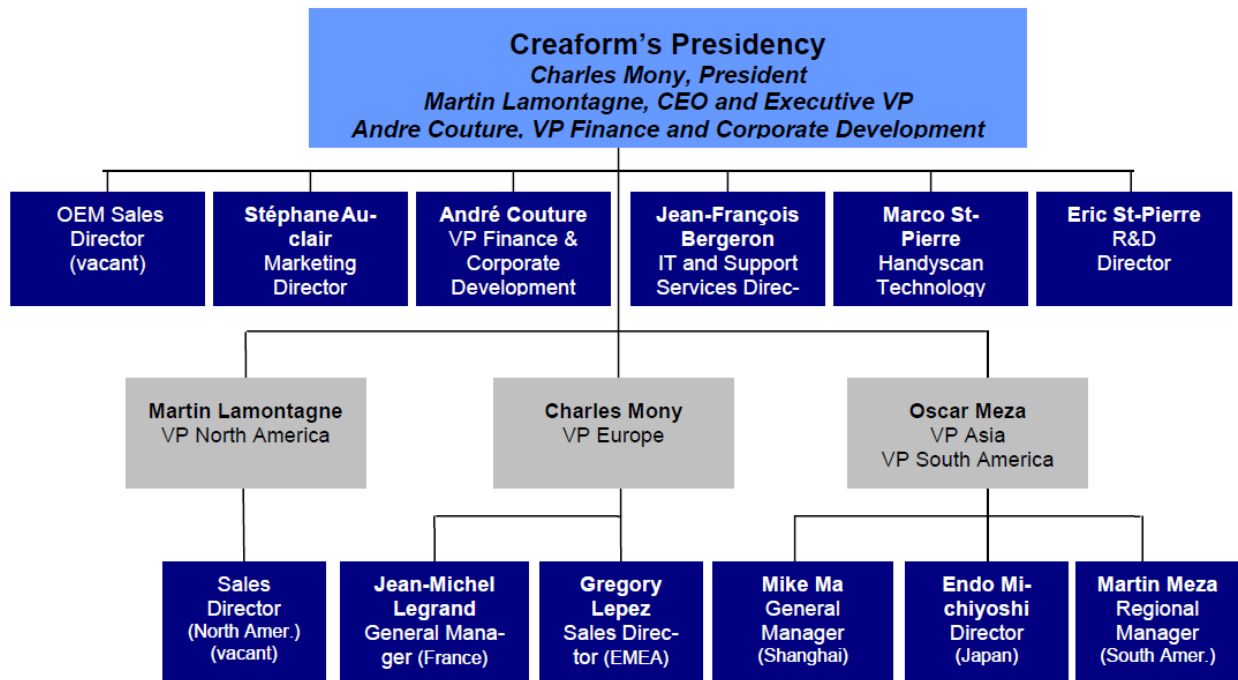
Appendix D

Metrology Instruments

Fixed CMMs	Portable CMMs	Handheld scanners	Laser trackers	Contact Probes
				
<p> Carl Zeiss Hexagon KLA Tencor Metris Mitutoyo Topcon Veeco Zygo </p>	<p> Creaform Faro GOM Hexagon Metris Mitutoyo NDI Steinbichler </p>	<p> Creaform Metris Steinbichler Polhemus </p>	<p> API Faro Hexagon Metris Sokkia Topcon Trimble </p>	<p> Kreon Renishaw Perception </p>

Appendix: E

Management Organizational Chart



Appendix: F

Launch Dates of R&D Projects

Launch Date	Product	Distinctive Features
2008	New REVscan	Higher accuracy ; automatic multi-resolutions setting
2008	NEW Ergoscan	Better mechanical stability and class 1 laser
2008	ColorScan	Color scanning
2008	Actiris 700	7m3 operating volume
2008	Actiris 1000	10m3 operating volume
2008	Handyscan LS	Dual technologies: self-positioning and photogrammetry for scanning of large parts (macro metrology segment)
2009	Rouch scan NDT	Specially designed scanning kit for nondestructive testing application in the oil & gas industry
2009	Long range scanner	Active scanner that uses laser light to probe a surface: the scanner determines the distance of a surface by timing the round-trip time of a pulse of light.
2009	MicroScan	Ability to scan very small parts (nano metrology segment)
2010	Advent LS	Ability to scan large parts (macro metrology segment)
2010	Universal scanner	4th generation scanner combining innovative technologies

Appendix: G

Income Statement

As at December 31st In thousands of Canadian dollars	2004A	2005A	2006A	2007A	2008A
Sales	3,141	6,304	13,805	21,053	28,002
Cost of sales and services	1,798	3,374	6,453	10,078	14,056
Gross Profit	1,343	2,930	7,352	10,975	13,946
Gross Margin	43%	46%	53%	52%	50%
Expenses	690	1,211	3,386	4,672	3,478
Operating margin	22.0%	19.2%	24.5%	22.2%	12.4%
Other revenues (expenses)	163	(374)	(157)	(1,543)	(6,086)
EBITDA	816	1,345	3,809	4,760	4,382
Adjusted EBITDA Margin	26%	21%	28%	23%	16%