

Proposal

Analysis of the Markets and Technologies for Industrial 3D Printing

Multi-client Sponsorship

May, 2014



CEDAR
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Why 3D Printing?



3D Printing has recently gained traction for a broad range of applications, from precise titanium aerospace parts to designer chocolates.

- The novelty of the concept is giving way to serious consideration of the advantages of speed, precision, and “distributed manufacturing”, that is, the ability to quickly set up manufacturing in any location.
- The cost of 3D printing equipment now runs the gamut from multi-million dollar machines to those costing under \$5,000, giving potential users wide choices of capabilities and features.
- The availability of materials is also expanding; driven by new powders, inks, and gels. Ferrous and non-ferrous powder metals, reinforced and unreinforced thermoplastics and thermoset plastics, ceramics, food, and bio-engineering materials are being developed for applications in 3D printing.
- An industry is evolving that includes major well capitalized companies and supply chains for equipment, feed-stocks, and other consumables.

3D Printing represents opportunities for both manufacturers and investors

Why Cedar?



Cedar and its antecedents first became involved in 3D printing in 1985 with studies completed on the Solider 3D printing system for Scitex, an Israeli printing equipment company.

- Cedar has significant understanding of the 3D printing industry, end use markets, technologies, and opportunities and challenges
- We have extensive experience from both industrial market and technology perspectives in materials, including metals, plastics, ceramics, and composites.
- Cedar has offices throughout the world, staffed with technically-oriented consultants.
- Substantial client experience both with corporations and investment firms.
- Recognized for great work, high integrity, and rapid execution.

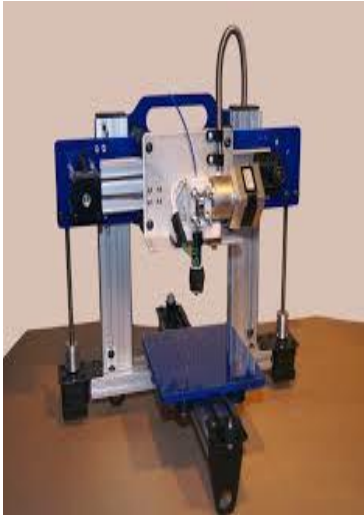
Global Presence

- Chicago
- New York
- Sao Paulo
- Mexico City
- London
- Paris
- Brussels
- Munich
- Dubai
- Mumbai
- Pune
- Delhi
- Seoul
- Shanghai
- Tokyo

Cedar's network has a presence in all key markets

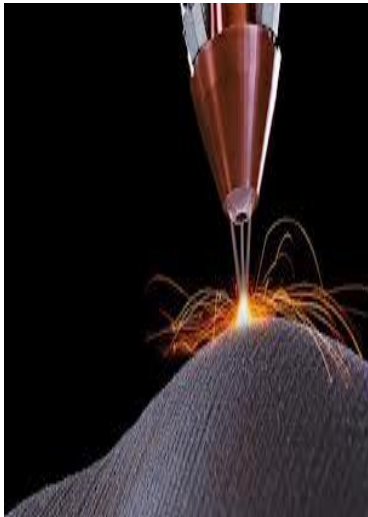


Project Background



- 3D Printing is becoming a viable manufacturing technology where speed and precision are important.
- Up to now, its use has been limited to rapid prototyping and temporary tooling. Improvements in the equipment and availability of new materials specifically designed for industrial 3D printing applications are moving the technology toward more manufacturing applications.
- The industry is maturing enough to attract large multinationals and investment firms to invest and participate in the supply chain and/or manufacture of finished products.
- Incremental improvements in performance and cost of the equipment and materials will continue to drive the development of the industry.
- Cedar believes that 3D printing will find its place in the industrial manufacturing sector and provide attractive returns for corporations and investors.
- The purpose of this multi-client report is to identify these future opportunities and to understand 3D printing market risks.

Program Objectives



“The primary objective is to provide clients with a comprehensive overview and forecast of global industrial 3D printing markets and technologies.”

The program consists of 3 sub-objectives:

- **Sub-objective 1: Industrial Market Overview**

- Analysis of the size, segmentation, and growth of the industrial 3D printing market including technologies, equipment, materials, and other consumables, applications, and end use markets. Supply chain and routes to market.

- **Sub-objective 2: Competitive Environment**

- Identification and profiles of the leading suppliers of industrial 3D printing equipment and materials. Market share analysis, current and future. New entrants. New technologies.

- **Sub-objective 3: Opportunity Assessment**

- Develop forecasts for industrial 3D printing equipment and materials. Identify market growth drivers including new technologies, new applications and other factors.
- Identify the key success factors for participation in this market.
- Identify and qualify the main opportunities in this market in the future.

Program Objectives



Sub-Objective 1: Industrial Market Overview

- Determine the value of the industrial 3D printing market for 2013 for equipment, materials, and consumables.
- Provide a comprehensive segmentation of the 3D printing market by geography, equipment, materials, applications, and end use industry. Value and % of value.
- Segment the equipment market by price point.
- Map the industrial 3D printing supply chain.
- Summarize the 3D printing market in terms of largest segments.

Program Objectives



Sub-Objective 2: Competitive Environment

- Identify and profile the leading industrial 3D printing suppliers of equipment, materials, and inks.
 - Prusa
 - Ultimaker
 - Rep Rap
 - PrintBot
 - Leap Frog
 - 3D Systems
 - Stratasys
 - Solidscape
 - Voxeljet
 - SLM
 - Others as important
- Determine market shares and likely future positioning.
- Identify new entrants/new technologies.

Program Objectives



Sub-Objective 3: Opportunity Assessment

- Identify key market drivers and barriers.
- Develop detailed forecasts by geography, product, material, application, and end use market segment for 2013 through 2018.
- Identify the largest and/or fastest growing market segments.
- Discuss most attractive areas for market entry.
- Identify acquisition candidates based on technology and market position.
- Identify critical success factors for long-term market participation.

Program Scope



The scope of this program is defined by industrial technologies, materials, applications, end use markets, geography, and time frame.

- Technologies covered include:
 - Electron beam
 - Laser sintering
 - Ink jet binding
 - Fused deposition
 - Others as important
- Materials include:
 - Metals, ferrous and nonferrous
 - Plastics
 - Ceramics
 - Composites of the above
 - Inks (colloidal, fugitive, nano-particle, sol gel, etc.)
 - Others as important
 - Excludes food, jewelry and other consumer products

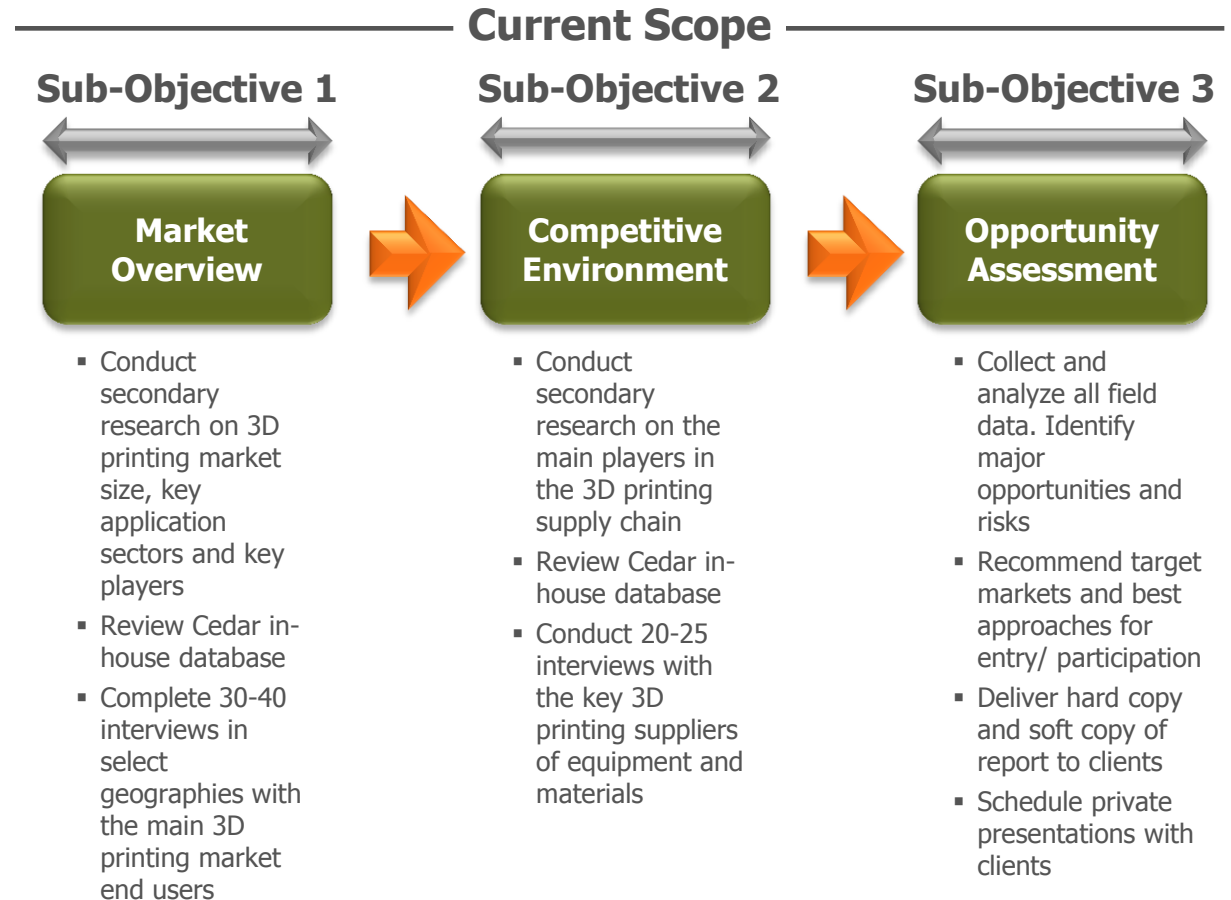
Program Scope



The scope of this program is defined by technologies, materials, applications, end use markets, geography, and time frame. (Cont'd)

- Applications to include finished products, rapid prototyping, proof of concept, tooling, and others as important.
- End use markets covered include:
 - Military/Aerospace
 - Automotive
 - General manufacturing
 - Medical and bio-engineering
 - Others as important
 - Excludes food, jewelry and other consumer products
- Geographic coverage is limited to the U.S., Western Europe, and Asia Pacific.
- The Time Frame for this program uses 2013 as the base year for data. Forecasts are developed for 5 years, through 2018.

Program Methodology



Leadership Team Profiles



Donald A. Goodwin, Senior Director, North America

Don has 33 years of experience in counseling global clients in the areas of market assessment, partner/JV selection, technology assessment and business strategy formulation. He has completed programs in North America, South America, Europe and Asia. His clients include BP, GE, Curtiss Wright, DuPont, 3M, Mitsubishi, Hitachi, Fujitsu, Fuji Xerox and private equity firms such as Bain Capital, Carlyle, KKR and Riverside. Prior to joining Cedar, Don has held positions at PWC, Gulf & Western Industries and Burns & Roe, Inc. He holds an MBA from the Wharton Graduate School of Business and a BA in Economics from the University of Pennsylvania.



Amit Jain, Senior Engagement Manager

Amit has over 7 years of management consulting experience in the areas of Market Assessment, Entry and Growth Strategy formulation/implementation, Partner Search, Balanced Scorecard Development and Implementation, Commercial & Financial Due Diligence across multiple geographies and industries.

Amit holds a MBA in Investment Banking from S.P. Jain Center of Management, Dubai. He also holds a Masters of Commerce and a Bachelors of Management Studies degree from University of Mumbai, India. He recently completed a valuations program at London Business School. He is also a Six Sigma certified Green Belt.

Time & Fees



- The project will be completed in 12 weeks.
- The cost of sponsorship in this program will be US\$7,500.
- The cost will be up 10% after completion of the report.
- 100% of the program cost is due upon receipt of the report.

お問い合わせ先

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Conclusion



- Cedar is developing a comprehensive analysis of the industrial markets and technologies of 3D printing.
 - We have significant experience in industrial 3D printing, applications and end use markets
 - Cedar maintains offices and trained professional staff in the key global markets for 3D printing
 - Senior management commitment from Cedar
- Cedar is pleased to provide you with this opportunity and looks forward to working with you.

Proposal Submitted by

Don Goodwin
Senior Director
Cedar Consulting
May, 2014



We Make Strategy Work