RAPID PRODUCT DEVELOPMENT
ASSOCIATION OF SOUTH AFRICA

2012 CHAIRMAN’S REPORT

November 1\textsuperscript{st}, 2012

RAPDASA
Annual General Meeting
Kwa Maritane Bush Lodge
Pilanesburg National Park
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1. Introduction

The Rapid Product Development Association of South Africa (RAPDASA) was formally founded at the First Annual General Meeting of the Association on 8 November 2000, at the CSIR Conference Centre in Pretoria. Since its inception, RAPDASA has been a cornerstone in the development of the Additive Manufacturing industry in South Africa.

In 2012, the development of the Additive Manufacturing Industry in South Africa became tangible with the launch of a number of world-class facilities and technologies throughout the country. These do not only bear acknowledgment of the vast amount of research that have been performed over the years and the capabilities that have been generated in the country. It also gives an indication of the level of acceptance and confidence that have been created towards this enabling technology.

This report highlights some of the successes that will form part of the AM history of 2012. This includes workshops, seminars, publications and outreach programs. Another highlight is the commitment and participation that RAPDASA created with ASTM on the development of standards for the industry. Highlights include not only those of RAPDASA but, more so, those of the industry it serves.

2. Management Committee

The management committee for 2012 was elected by the Annual General Meeting on November 2nd, 2011, held in Vanderbijlpark. The management committee for 2012 was as follows:

- Mr. Marius Vermeulen (Chairperson)
- Prof. Deon de Beer (Vice Chairperson)
- Mr. Piet Bezuidenhout (Secretary)
- Mr. Eugene Erfort (Treasurer)
- Mr. Gerrie Booyens
- Dr. Willie du Preez
- Mr. Hardus Greyling
- Mr. Neal de Beer
- Mrs. Jenny van Rensburg

The picture shows the RAPDASA Management Committee for 2012. Not present is Mrs. Jenny van Rensburg who was elected during the year when Mr. Piet Bezuidenhout tendered his resignation due to alternative responsibilities.
Management Committee meetings were held on 1 March 2012, 3 May 2012, 5 July 2012, 23 August 2012 and 4 October 2012.

At the first management committee meeting, the following member portfolios were defined and assigned to specific members.

- **Conference Organizer – Willie du Preez & Hardus Greyling**
  Responsible for all matters regarding organization and execution of the yearly conference or, alternatively, to act as interface between the committee and the conference organizer if the organizer is not on the RAPDASA committee.

- **Education and competitions – Deon de Beer**
  Responsible for the interface to schools and tertiary institutions with the aim of increasing the knowledge base at school level regarding Rapid Product Development technology.

- **Electronic Media – Neal de Beer**
  Responsible for administration and maintenance of all RAPDASA electronic media such as the website, Facebook, Linked-in etc.

- **Workshops and Outreach – Gerrie Booysen**
  Responsible for all workshops and outreach programs, to increase the visibility and knowledge base of Rapid Product Development technology and applications in South Africa.

- **International Standards and Collaboration - Marius Vermeulen**
  Responsible for international collaboration and interfacing with standards organizations such as AMTS and ISO.

- **Treasurer – Eugene Erfort**
- **Secretary – Piet Bezuidenhout (later Mrs. Jenny van Rensburg)**

3. **RAPDASA Members**

   All RAPDASA Conference participants receive a full year membership to the association.

4. **Annual conference**

   The theme for RAPDASA 2012 is “Additive Manufacturing in Industry” and the conference was hosted from the 31st of October to the 2nd of November at Kwa Maritane Bush Lodge (Pilanesburg National Park) by the Counsel for Scientific and Industrial Research (CSIR). The Materials Sciences and Manufacturing group (MSM) and the National Laser Centre (NLC) co-hosted RAPDASA 2012. The conference organisers are as follows:

   - Dr. Willie du Preez, CSIR Materials Sciences and Manufacturing
   - Mr. Hardus Greyling, CSIR National Laser Centre
   - Prof. Federico Sciamarella, Northern Illinois University
   - Mr. Kevin Land, CSIR Materials Sciences and Manufacturing
   - Mr. Shaun Coetzee, CSIR Materials Sciences and Manufacturing
   - Mr. Neels Babst, CSIR Materials Sciences and Manufacturing
   - Mrs. Kelly Matthews, CSIR Materials Sciences and Manufacturing

   The RAPDASA 2012 conference once again proved to be a huge success this year with 115 attendees of which ~30% are international delegates. Attendees
represented academia, research institutions, industry, OEM’s, government and funding agencies. The conference hosted 10 keynote presentations, 4 workshops and 43 other presentations running in three parallel sessions.

The conference once again boasted with a very impressive exhibition hall and the following exhibitors were present:

- 3D Solids (Stratasys)
- CSIR
- CUT, CRPM
- CUT, PDTS
- Department of Science and Technology
- EOS
- Idea2Product Lab
- Rapid3D
- Technology Innovation Agency
- Voxeljet
- VUT, MPTS

RAPDASA is pleased to announce that the South African Institute for Industrial Engineers once agreed to publish a select group of papers from the conference in the SAIIE Journal – an ISI accredited journal.

The technical committee for RAPDASA 2012 consisted of 33 local and international members from universities, research institutions and industry. The technical committee was led by Prof. Federico Sciammarella from the Northern Illinois University, USA.

RAPDASA 2012 also hosted a number of workshops including two design workshops, a SAMI-LAM workshop and an ASTM workshop.

On behalf of RAPDASA, I would like to express my appreciation to the generous sponsors for this year’s event. First and foremost, to our “Platinum” sponsors, I would like to thank the CSIR and the Technology Innovation Agency (TIA) for their generous sponsorships. The CSIR, specifically, has not only made a tremendous financial contribution, but also hosted the annual conference this year.

I further wish to thank the “Golden” sponsorships for the year that was made by EOS, the Vaal University of Technology (VUT) and the Department of Science and Technology (DST). I am also grateful to report that the DST made a three year commitment to RAPDASA with regards to sponsorships and that the Department will be “Platinum” sponsors for RAPDASA 2013 & 2014.

Regarding the “Silver” sponsorship, I would also like to express my gratitude to SASOL who, as always, sponsored generously.

Special thanks go to all other sponsors for their confidence in the association and ensuring the success of the conference through their contributions:

- Aerosud Innovation & Training Centre
- EDM-Shop
- Materialise
- Stratasys
- TLS Technik

Lastly, a very special thanks to the conference organisers, especially Dr. Willie du Preez and Mr. Hardus Greyling, for making the event possible. I would also like to thank Kelly Matthews, the conference secretariat, for her tireless efforts in this endeavour.
5. Workshops, seminars and publications

In terms of outreach programs under RAPDASA, a number of seminars and workshops have been held during 2012 with regards to additive manufacturing technologies. As always, a number of workshops will also be held in conjunction with the annual conference. Further, a number of articles have been published in the South African Journal for Industrial Engineering.

This section highlights some of these events for 2012.

Seminar on Additive Manufacturing of Titanium Parts

The second Seminar on “Additive Manufacturing of Titanium Parts,” was held on the 6th of September 2012 in Bloemfontein and co-hosted by the Central University of Technology and the Titanium Centre of Competence. The seminar covered the exciting new field of titanium part manufacturing, a programme that CRPM is closely involved with.

The seminar focussed on all aspects of additive manufacturing of Titanium on a national level including the future development which will benefit many sectors in the South Africa such as the manufacturing industry, aerospace and medical fields.

From inputs made at the seminar by national experts, the trend emerges that titanium-related research is a high strategic priority for the government and industry, as South Africa is the second largest supplier in the world of raw titanium material. At present no beneficiation on raw titanium to secondary products is being done in South Africa.

Local RAPDASA / ASTM F42 Workgroup

Since 2010, RAPDASA has been an organisational member of ASTM on committee F42 for Additive Manufacturing standards. “ASTM International, formerly known as the American Society for Testing and Materials (ASTM), is a globally recognized leader in the development and delivery of international voluntary consensus standards.” Committee F42 is developing standards specifically for Additive Manufacturing and has already produced 4 standards. A number of other standards are currently under development.

As a member of Committee F42, RAPDASA is contributing to these standards and have voting powers in the implementation of these standards. The RAPDASA committee have also nominated and funded a delegate to represent RAPDASA at all ASTM main committee meetings (twice a year).

In order to contribute efficiently with regards to the standards development process, and to support the local community in this regard, it was decided to initiate a local workgroup. The first RAPDASA / ASTM F42 Workgroup meeting was held on the 28th of June at the Aerosud Innovation and Training Centre in Pierre van Ryneveld, Pretoria. The meeting was attended by 12 RAPDASA members (with 5 apologies).

The meeting was aimed at defining RAPDASA’s involvement in ASTM committee F42 and the following was discussed:
• The contribution RAPDASA and its members can have on the development of ASTM standards and the benefits thereof.

• Formation of a South African workgroup of interested members that would like to contribute and vote on specific ASTM topics.

A follow up meeting will be held on the 2nd of November during RAPDASA 2012. The workgroup currently consists of 18 members and all interested RAPDASA members are invited to join the workgroup.

**SAMI LAM**

With the growing popularity and technological advances in Additive Manufacturing, it is imperative for South Africa to have a consistent and aligned effort in this field to ensure its success for academia and industry alike. Often, many technologies are introduced into a market, but fail due to the fragmentation of efforts. The additive manufacturing community in South Africa is uniquely positioned as it carries experts in various areas of additive manufacturing across the continent. As such, the idea was to establish a cohesive structure to bring these resources together and strengthen the additive manufacturing community. With this in mind, the overall goals of this work group are:

• Facilitate and support activities in LAM research across various disciplines
• Identify and coordinate the needs of various research communities as it pertains to LAM
• Bring together researchers from various disciplines to stimulate new thinking and create new innovative research directions
• Examine strengths and gaps in South Africa’s LAM community
• Liaise with industrial end users to ensure relevance and impact of research.

The first SAMI-LAM (South African Manufacturing Industry for Laser Additive Manufacturing) meeting will take place during RAPDASA 2012. The aim of the meeting is to try and coordinate the requirements of the South African manufacturing industry, interested in using LAM, to further their research and develop new research directions. This will be done in close cooperation with the academic institutions involved in additive manufacturing to ensure relevance and impact of research programs. Presentations from the various academic institutions will be given so that industry is made aware of the ongoing efforts and industry will have time to present their ideas. This will then facilitate research areas into localized clusters.

This workgroup would also help to organize and schedule local discussions and workshops to enable continued input into South Africa’s future LAM research (via PISA website). Another important component of this workgroup will be to identify and also help create training and education opportunities in additive manufacturing. In order for this technology to continue to grow and succeed it will require an investment in making sure there are individuals interested in this technology.
**Design workshop**

During RAPDASA 2011, the Vaal University of Technology, organised a "Design for Direct Digital Manufacturing" (DDM) workshop to discuss design topics related to Additive Manufacturing.

Following last year’s workshop, the VUT and international collaborators will attempt to take it one step further this year by setting the scene for direct digital design, complemented by collaborative/co-design groups. This will form part of a challenge to put heads together and jointly create new concepts - to be built and explored for report back at the next RAPDASA. The goal is to stimulate joint design projects and related outputs, as well as to kick-off a design and product development competition for future RAPDASA events!

**Publications**

The following articles were presented at RAPDASA 2011 and were selected for publication in the South African Journal for Industrial Engineering (SAJIE):

- Residual stress measurements and structural integrity implications for selective laser melted Ti6Al4V by CR Knowles, TH Becker and RB Tait
- Assessment of surface finish and dimensional accuracy of tools manufactured by metal casting in rapid prototyping sand moulds by K Nyembe, DJ de Beer JG van der Walt and S Bhero
- High-speed 5-axis machining for tooling applications by M Saxer, N de Beer and DM Dimitrov
- Geometric complexity analysis in an integrative technology evaluation model (ITEM) for selective laser melting (SLM) by S. Merkt, C. Hinke, H. Schleifenbaum & H. Voswinckel
- The concept of hybrid manufacturing for high performance parts by K. Boivie, R. Karlsen & P. Ystgaard
- Limited run production using Alumide tooling for the plastic injection moulding process by J. Combrinck, G.J. Booysen, J.G. van der Walt & D.J. de Beer
- Application of laser additive manufacturing to produce dies for aluminium high pressure die-casting by M.F.V.T. Pereira, M. Williams & W.B. du Preez
- Physical modelling of terrain directly from surfer grid and ARC/INFO ASCII data formats by Y.K. Modi, D.J. de Beer & S. Agrawal
6. RAPDASA on the web

I would like to thank Neal de Beer for his efforts in managing and maintaining the RAPDASA website during the year. RAPDASA is accessible online at:

www.rapdasa.org


http://www.linkedin.com/groups/RAPDASA-Rapid-Product-Development-Association-3982231?gid=3982231&trk=hb_side_g

7. GARPA

“The Global Alliance of Rapid Prototyping Associations (GARPA), and its annual meeting, the Global Summit, were formed to encourage the sharing of information on rapid prototyping and related subjects across international borders. As a part of this sharing, GARPA members from around the world participate in activities that include technical presentations at industry conferences, the publication of application case studies, business meetings, social events, and the formal and informal exchange of information. “

RAPDASA has been a member of GARPA since 2001. Membership entails that RAPDASA is allowed to nominate 5 members to become GARPA fellows. The following RAPDASA members are GARPA fellows:

Dr. Willie du Preez
Prof. Dimitri Dimitrov
Prof. Deon de Beer

8. ASTM

“ASTM International, formerly known as the American Society for Testing and Materials (ASTM), is a globally recognized leader in the development and delivery of international voluntary consensus standards. ASTM Committee F42 on Additive Manufacturing Technologies was formed in 2009. F42 meets twice a year, usually in January and July, with about 70 members attending two days of technical meetings. All standards developed by F42 are published in the Annual Book of ASTM Standards, Volume 10.04.“ Committee F42 is developing standards specifically for Additive Manufacturing and has already produced 4 standards:
• F2921-11 Standard Terminology for Additive Manufacturing – Coordinate Systems and Test Methodologies
• F2915-11 Standard Specification for Additive Manufacturing File Format (AMF)
• F2792-10e1 Standard Terminology for Additive Manufacturing Technologies

A number of other standards are currently under development.

RAPDASA has been an organisational member of ASTM committee F42, since 2010, with the goal of supporting the local Additive Manufacturing industry with regards to the development of standards. As a member, RAPDASA is contributing to these standards and have voting powers in the implementation of these standards.

RAPDASA aims to provide a link between its members and the activities of ASTM committee F42 to ensure that members have access to the standard development process, as well as and the global direction and objectives of ASTM F42. The RAPDASA management committee have nominated a delegate to represent RAPDASA at all ASTM main committee meetings (twice a year). The delegate, Mr. Marius Vermeulen, is co-sponsored by RAPDASA and the Aerosud Innovation and Training Centre.

Marius Vermeulen was also invited as member of the ASTM F42 executive committee.

RAPDASA was represented at the last two ASTM F42 main committee meetings:
• 6th ASTM F42 meeting held during January, 2012 in Salt Lake City, Utah
• 7th ASTM F42 meeting held during July 2012 in Nottingham, UK

The following meeting is from 15-16 January in Atlanta, Georgia.

Two local RAPDASA/ASTM F42 workgroup meetings have also been organised during 2012. The first RAPDASA / ASTM F42 workgroup meeting was held on the 28th of June at the Aerosud Innovation and Training Centre, Pierre van Ryneveld, Pretoria. The second meeting was held on the 2nd of November during the annual RAPDASA conference at Kwa Maritane Bush Lodge, Pilanesberg.

9. Financials

RAPDASA currently has a healthy financial status as per treasurer’s report. On behalf of RAPDASA, I would especially like to thank the conference organisers for their commitment in maintaining this status. I also want to express my appreciation to our Treasurer, Eugene Erfort, for his tireless efforts over the years in this regard.

In 2011, it was reported that a number of large investments was made in the field of Additive Manufacturing in South Africa. These were focussed specifically on research and capital equipment in the so called “high-end” Additive Manufacturing systems – mostly related to metal technologies.

The culmination of these efforts and investments were clearly visible in 2012 with the “show casing” of a number of new world-class facilities, as well as high-end equipment. Some of the highlights include the inauguration of the new CRPM facilities at the Central University of technology and the launch of the two new EOS M280 metal sintering machines that they procured. The Vaal University of Technology also launched the “Southern Gauteng Science Park” which includes a high-tech Additive Manufacturing precinct.

In Stellenbosch, two new systems were launched this year. The one system, a new M2 LaserCusing machine, was launched by the SUN Mechanical department for use in metal AM for tooling, aerospace and medical industries. The other, a high-end x-ray microCT scanner was launched by the department of Forest and Wood Sciences. Amongst other, the system is used for the analysis of parts produced by Additive Manufacturing technologies.

The CSIR was also involved in the launch of two programs this year. The newly acquired Optomec LENS system was show-cased at the CSIR National Laser Centre during a high level launch. On the same day, project AeroSwift was launched in conjunction with the high-tech Aerospace R&D facilities at the 2nd phase of the Aerosud Innovation and Training Centre.
The Centre for Rapid Prototyping and Manufacturing (CRPM) officially launched its new facilities on 5 September 2012. This function was attended by around 100 guests, which consisted of industry, government and CUT management. Sophisticated laser sintering and ultra-modern prototyping facilities were showcased in the new facility.

These rapid prototyping/additive manufacturing machines are used in the product development process and can manufacture prototypes directly from three dimensional designs by fusing loose powder particles with a laser to form the required design/shape.

The CRPM also installed two new Direct Metal Laser Sintering (DMLS) EOSINT M280 machines from EOS Germany in the new facility. These machines were funded jointly by CUT and CRPM (R8 mil investment). The one machine will be dedicated to manufacture titanium parts for the medical and aerospace industries. The second machine will be used to manufacture parts and moulds in maraging tool steel, as well as stainless steel materials.

The inauguration of the CRPM was linked to the second Seminar on Additive Manufacturing of Titanium Parts, held on 6 September 2012 and co-hosted by the CUT and the TiCoC.

The event was also linked to a Titanium Centre of Competence (TiCoC) planning meeting which was held on 5 September 2012 at the Central University of Technology (CUT) in Bloemfontein. Delegates involved in titanium related research attended the meeting and planned/mapped out the future key research areas. Presentations were done by members of the TiCoC and Department of Science and Technology (DST). The TiCoC is being funded through the DST.
Launch of the VUT “Southern Gauteng Science Park”

The VUT launched its Southern Gauteng Science Park on the 4th of June, 2012, which includes an AM driven Advanced Manufacturing precinct. An I2P+ lab is planned as part of support for accelerated/new product development.

In addition, as part of the Southern Gauteng Regional Innovation Centre, approval has been given for the ordering of a Voxeljet Vx1000 and Vx500 as part of a foundry innovation centre within the AMP and Science Park. The AMP will most probably also receive an EOS P760, P395, P110, ZPrinter and Objet printer as part of the SAFLIA Innovation Centre project. A number of I2P labs, including high-end equipment will be added as part of the regional cluster innovation centre strategy.

Stellenbosch University launches new “M2 LaserCUSING” machine, from Concept Laser

The Mechanical Department at the Stellenbosch University held the launch of their new “M2 LaserCUSING” machine, from Concept Laser, on 25 May 2012. More than 60 students and representatives from industry and academia attended this event. “It was a great success and we received good coverage in the specialised press – Metalworking News, Plastics SA and Engineering News” said Prof. D Dimitrov.

The University received funding from TIA from the IAT programme for the acquisition of a Concept Laser M2 Laser Cusing system in 2011. Funding was based mainly on development work for the tooling industry, but also for the Aerospace and Medical industries.

Current work includes establishment of the capabilities of the machine from a technological, mechanical and metallurgical perspective. Various student projects are under way using mainly tooling steel at this stage as a material. In parallel, the system is also used on a few industrial projects – tooling inserts for various injection moulds.

As a small souvenir for the launch, this small object was produced for every attendee, to demonstrate the capabilities of the machine. Left: the CAD model. Right: the physical item
National Laser Centre (CSIR) launches new Laser Engineered Net Shaping (LENS) system

27 January 2012 saw the launch of a multidisciplinary research and development platform, in support of the South African additive manufacturing community, at the National Laser Centre of the CSIR. The LENS 850R was procured from Optomec, a leading US manufacturer of AM systems, with funding support provided by the NRF and the dti-AISI.

The LENS 850R is a state of the art embodiment of the “blown powder” or freeform approach to additive manufacturing and, as such, will be complimentary to the well established “powder bed” research platforms at CUT and SUN. Compared to the powder bed platforms, the LENS system is capable of significantly higher build rates, manufacturing of much larger components, deposition of functionally gradient structures, as well as hybrid manufacturing where challenging features are added to conventionally machined components.

In addition to all the standard advantages associated with AM, the LENS technology also supports alloy development and the refurbishment of damaged components. Since the LENS 850R offers a high integrity inert build volume, which makes it ideally suited to the processing of titanium, it is well positioned to contribute to the beneficiation aspects of the Titanium Industry Initiative.

The NLC offers open access to this unique infrastructure to researchers from HEI’s and Industry through its Rental Pool Programme.
Launch of project Aeroswift – the development of a large area, high speed AM platform for the Aerospace industry

Project Aeroswift was officially launched on 27 January 2012. The event was planned and coordinated between Aerosud and the CSIR National Laser Centre. The same event was also used to launch the CSIR’s Additive Manufacturing technology platform, and the Aerosud Innovation and Training Centre Phase II, which forms part of the Centurion Aerospace Village. During the CSIR Additive Manufacturing technology platform launch, the newly acquired OPTOMEC LENS 850-R Laser-based Additive Manufacturing system was also unveiled. As part of the Aeroswift launch, visitors were taken to the Aeroswift laboratory, where the newly acquired 5kW IPG laser was on display.

The Aeroswift launch was attended by the Deputy Minister of Science and Technology, Mr. Derek Hanekom, officials from the DST and from the dti, CSIR and Aerosud Executives, and industry representatives. In total approximately 110 people attended the event at the CSIR campus and at the Centurion Aerospace Village.

The event was also covered by various technical journalists from several media publications, as well as television crews from e-tv news and Engineering News.

AeroSwift project team in the new lab facilities, at the National Laser Centre, where the 5kW laser is located
New industrial micro-CT scanner facility launched at Stellenbosch University

A new x-ray micro-Computed Tomography (CT) scanner, funded by both the National Research Foundation (NRF) and Stellenbosch University, was recently commissioned at the Department of Forest and Wood Science of the University of Stellenbosch. CT Scanners have been used widely in the medical industry since the early 1970’s, but what makes this type of instrument unique is its resolution, which can be as low as 1 micron for small samples.

The equipment is however not limited to small objects, reasonably large and dense objects, even metal components can be scanned. This technology has been used widely internationally for non-destructive testing of medical, automotive and aerospace parts, amongst others.

Prof. Thomas Seifert, who received the grant for the equipment, pointed out that this world-class equipment shows great potential for quality research at the university, as well as opportunities for local industry to make use of this high-end technology.

The CT scanner generates virtual data sets, based on x-ray attenuation, which represents the scanned object. These 3D data sets can provide 3D images (Figure 1) as well as high-contrast 2D slice images (Figure 2). This kind of data can be very useful to identify defects, quantify porosity and compare manufactured products to their CAD model or to each other, as well as to make accurate internal measurements inside objects, for example of wall thicknesses.

The instrument is operated as part of the multi-user Central Analytical Facilities of the University of Stellenbosch, and is open to academics from all disciplines as well as industry clients, also for routine analysis.

Figure 1. An example of 3D imaging of porosity inside titanium blocks, pore spaces coloured in red. Image courtesy Dr Debbie Blaine, SUN.

Figure 2. Thin slice views showing defects in one layer inside an additively manufactured component. This kind of analysis is useful in process improvement as well as quality control. Images courtesy Gerrie Booysen, CUT.
**Idea2Product Lab**

As part of an innovation and job creation strategy-driven solution, the VUT introduced a unique concept, the Idea2Product Lab™, in 2011. This concept, as a strategic intervention, allows entrepreneurs from the region to be provided with appropriate skills development and infrastructure to develop new products that can be tested and modified in the market place, according to customer needs.

The initiative is currently growing from strength to strength. The VUT is participating in the Gauteng E-skills initiative, and as part of its regional innovation strategy, is rolling out seven new I2P labs within the VUT Southern Gauteng Science Park, Iscor Innovation Centre, Satellite campuses in Ekhuruleni, Upington and Secunda, as well as within the VAAL-regions' FET colleges. The I2P lab is breaking further ground with an MoU in process with CSU (Colorado State University) and requests to tender for installations in Mozambique, Kenya and Botswana. ArcelorMittal furthermore requested support for the roll-out of I2P labs in its current science centres.

**Service Providers:**

The following technologies are currently being represented by resellers / agents in South Africa:

- Stratasys (3D Solids)
- 3D Systems (CAD House)
- Z Corp (Rapid 3D)
- Solidscape (Rapid 3D)
- Objet (Demaplastec)
- MCor (Perform Set Technologies)

Worldwide, the growth in this sector is substantial and South Africa is no exception. Advances in machine technologies and materials, as well as the continued “education” of industry and the wider public with regards to the technology are reflected in system sales.

As predicted, the introduction of low cost 3d printers had a significant impact on machine sales in SA. The total number of installations grew from 450 in

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2011 (reported at RAPDASA 2011) to a staggering 786, as per the research of Deon de Beer (74.6% increase).

Furthermore, interesting trends are coming to the fore:

1. South African activities are starting to impact on Africa and SADEC, again proving SA’s position as portal to Africa. SA AM agents reported sales in Mauritius (two different agencies and technologies), Nigeria, Kenya (also more than one agent/platform) and Namibia. Reported applications are in the jewellery industry, architecture and construction.

2. It has been reported that Incredible Connection ordered their first batch of Fabbsters, which is another significant vote / trust in AM development in SA, considering that it is now available in a commercial retail chain as part of an ICT value chain (may well be the first reported output of this nature internationally?)

3. Various high-end transactions are in process of concluding and will be reported later (at least seven high-end systems).

4. A significant increase in the acquisition of 3D scanning equipment is reported, which is viewed as both a spin-off and a further indication of adoption of AM technologies and related accelerated product development processes.

The following graph indicates an estimate of the total number of AM platforms in South Africa over the last 21 years (Prof. D. De Beer)
11. Conclusion

The year 2012 has, once again, been a most exciting year for South Africa in terms of Additive Manufacturing. From the achievements made, it is clear that local researchers and industry alike is tirelessly exploring and exploiting this technology to the fullest. It is also evident that the “hype” in Additive Manufacturing is not dying away in South Africa, as previously predicted, but it is slowly being replaced with firm knowledge and solid business plans, as is reflected by the confidence of funding agencies and industry alike.

During this year, SA experienced an unheard of influx of high-end system, attracting researchers, industry and media in a number of “show-casing” events. At the Central University of Technology, the current (very impressive) range of AM systems was supplemented with 2 new generation metal sintering machines from EOS (M280’s). At the Stellenbosch University, the first Concept Laser system in SA was installed, expanding tooling capabilities even further. At the CSIR National Laser Centre, an Optomec LENS system was installed, being the first “powder-blown” machine in the country. It is also reported that the Vaal University of Technology will be investing in Voxeljet technology for the casting industry, as well a number of polymer systems from EOS. Under “supporting technologies” it should also be noted that a microCT scanner was installed at the Department of Forest and Wood Science of the University of Stellenbosch, giving access to high-end NDT equipment for the AM industry.

South Africa, however, did not only see the installation of new technologies, but world-class facilities were show-cased. The Vaal University of Technology launched the “Southern Gauteng Science Park” with a technology-dense Additive Manufacturing precinct and the Central University of Technology launched the new Centre for Rapid Prototyping and Manufacturing (CRPM) with, by far, the largest display of AM system in the country.

However, the excitement of AM in SA does not end at the implementation of technologies developed outside the country, but high-level R&D programs are also seeing the light in SA. At the CSIR Materials Sciences and Manufacturing unit, funding has been allocated for a Titanium powder pilot plant, based on technology developed in the country. Aerosud and the CSIR National Laser Centre, in a collaborative project, also officially launched the Aeroswift program that is focussed on the development of a local Titanium Additive Manufacturing platform.

These are only some of the highlights that have been seen in South Africa over the past year. Sales by system resellers are growing exponentially in South Africa with an estimated 786 AM platforms in the country. It should be noted that these systems are mostly being sold to industry, rather than research institutions, implying commercial viability of the technology. Educational programs, such as Fablabs and Idea2Product Labs are also expected to have a significant impact on the industry in the near future.

In the mean time, internationally, focus is placed on the development of standards for the AM industry (once again highlighting the shift towards commercial manufacturing.) Standards development agencies ASTM and ISO both have committees dedicated to this task and a unique co-branding agreement between these entities are in place to fast track the development of standards. RAPDASA is not only highly involved in these processes, but are also represented on the executive committee of ASTM committee F42 on Additive Manufacturing Technologies.
I’m standing at the end of a two year term as Chairman of RAPDASA, looking back at the advances that have been made in the South African Additive Manufacturing industry during the last two years. Gauging these activities, it is impossible not to think about what the future may hold for the industry and the country. If the last two years are indicative of the growth of this sector, where will we be a decade from?

I would like to congratulate the AM community in South Africa for taking the industry to where we are now and I would like to thank the RAPDASA management committee for the dedication and hard work in steering RAPDASA and for, not only keeping the association alive, but for ensuring that it excel.

Finally, I would like to thank the conference organisers for orchestrating an excellent event and a truly international conference. It has not been achieved without hard work and dedication and your efforts are noticed and appreciated.

I truly believe that the momentum in the AM industry, and the dedication of the community, will ensure that 2013 will bring even greater successes and I wish you all the best on your endeavours in ensuring this.

Yours sincerely

Marius Vermeulen
(Chairman)