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10 Questions for Peter Weuta, Founder and CEO of WEPA-Technologies

March 11, 2016 8:45 pm | by David Bullock - Senior Editor

1. **1st Screen: When NSG Analysts look at a NewSpace company, they consider the founders' track records very important. Please tell us about your entrepreneurial track record prior to working with WEPA-Technologies.**

Before founding WEPA-Technologies I was working for about thirteen years in a branch of the chemical engineering industry with a strong focus on process and pilot plant development at a very large international company. I was actually responsible for the custom focused design, development and scale-up of chemical engineering processes. Besides the pure technical part I managed the individual technical and individual needs of each customer. In parallel to this activity I had been working in an already existing small mechanical engineering company focused on manufacturing of metallic parts. One of my core activities has been related to increasing the companies market share by tailoring our product range to the needs of the customers. The company later was split between my business partner and myself. Customers and activities fitting my own development strategy I did transfer to WEPA-Technologies. Other, more traditional activities of the first company did remain at my former business partners entity.



Peter Weuta, Founder and CEO of WEPA-Technologies

2. **1st Screen: What are management's primary objectives at WEPA-Technologies?**

We have three different fields of business activities: Automation, mechanical engineering and rocket technology. Automation does encompass application to general processes or CNC machine tools. We provide machine control retrofits as well as completely new developments.

The second field is general mechanical engineering. We offer custom design of mechanical parts and its production as well as different machining services. In our 700 square meter workshop we are able to cover conventional and advanced manufacturing requests for CNC-milling with a 5 axis, CNC-turning with a 5 axis, or wire eroding. Our specialty is the processing of parts with up to 1.5 meters in diameter and 4 meters in length.

The third field of activity is rocket technology. As we state on our website we are focused on rocket propulsion related technologies. We offer customer designed development and production of turbo

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NSG 100

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NSG 100

10 Questions for Craig Clark CEO of Clyde Space

1st Screen: When NSG Analysts look at a NewSpace company, they consider the founders' track records very important. How important do you think it is to have entrepreneurial experience prior to launching a company like Clyde Space? It would...

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pumps and liquid propellant rocket engines. In the near future we plan to offer complete rocket stages and sounding rockets as an additional part of our business. We do not offer services for the aircraft industry.

Some portion of the cash flow earned in the traditional fields of automation and mechanical engineering is transferred to our rocket development activities. It is our clear objective to end up soon with a self-sustained business in the field of rocket propulsion and rocket stages.

3. 2nd Screen: What is WEPA Technologies' strategy to capture market opportunities?

The main business idea is to offer highly efficient, but lower cost propulsion systems, primary targeting the NewSpace community. Our strategy has two branches: communicative and a technical part. For the communication part, we publish our results to keep the community informed. Next events will be the presentation of our latest results at Space Propulsion 2016 in Rome. Past presentations involved participations at Space Propulsion 2014, two NanoSatellite conferences, 2013 and 2015, and Reinventing Space 2015 at Oxford, United Kingdom.

For the technical part we are highly focusing on customer needs and developing individual solutions. We combine proven rocket technologies and designs with advances in manufacturing technologies and material sciences, to end up with a high performing, highly reliable and lower cost design. We prefer a balanced combination of theoretical and "hands to hardware" approach to an excessively managed and bureaucracy focused development process. To prove reliability and high performance we develop technology demonstrators. We think the presentation of running hardware is most promising for customers and cooperation partners. Currently we are investing a lot in the development of a turbopump demonstrator for a liquid rocket engine with about 3.5 tons of thrust. Nearly all manufacturing steps are conducted in house: we think this is very important to speed up manufacturing and assure a maximum degree of confidentiality for later customers. Propellant combinations do include liquid oxygen and liquid methane respective alcohol. Testing of pump components will commence this summer.

On the propellant side we also consider the use of rocket grade Hydrogen peroxide very interesting for certain applications. We are offering fully automatic concentration plants delivering 90–97% Hydrogen peroxide using a feedstock of 50–70%. Capacity can be adapted from 50 to at least 1500kg per day. At least in Europe it is very hard to receive Hydrogen peroxide in concentrations less than 87.5% in bulk quantities on a commercial basis.

We are looking for partners to intensify certain parts of the development process. Therefore at present we are finalizing boundary conditions of a prospective collaboration with DLR. One focus of the planned activities will comprise aspects of high performance turbo pumps and thrust chamber technology.

4. 2nd Screen: How do you project and describe growth in the coming years for WEPA-Technologies?

We are very optimistic concerning our companies grows, as we expect the activities of the NewSpace community to further expand in terms of technical capabilities and number of active entities. Even though we intend to serve customers all over the world, we are glad to notice, that NewSpace thinking finally did arrive in Europe as well. In the last couple years over here an increasing number of smaller companies were found in order to develop products and services to finally drive down the costs to access space.

We expect that a very big market will be providing propulsion technology. Besides traditional expendable technology, an increasing share will be taken by reusable systems. The huge success of SpaceX in landing a launcher stage of Falcon 9 will inspire many companies in terms of considering reusable systems as an option. The main technological demand we expect in the field of low cost launch vehicles and highly reusable vehicles to serve space tourism applications.

Consequently we plan to focus on the product lines turbo pumps, liquid propellant rocket engines and concentration plants for rocket grade 90–97% Hydrogenperoxide for selected applications.

5. 3rd Screen: What does WEPATEchnologies' cap table currently look like? Have you found it difficult to raise capital?

In Europe, it is a lot harder than in the US to get access to venture capital. This means that if you have a sound idea for a rocketry related project but are a small company it is not that easy to receive money from the government in terms of small or medium enterprise contracts or funding programs. Rocketry related activities not covered by big major players still are a bit of an exotic endeavor in Europe.

There exists programs of the European Community to support developments in terms of public funded programs. One program is focused on "Independent Access to Space" – one of the two winners of this grant is planning a small satellite launcher right now. We are on the team and involved in some propulsion related aspects of the planned launcher.

We are thankful for the opportunity to work in a highly motivated team on such an interesting project.

6. 4th Screen: Could you tell us more about what types of space technologies WEPA-Technologies is offering?

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Currently we are focusing on several technologies: turbo pumps, liquid propellant rocket engines and rocket-grade Hydrogen Peroxide concentration plants. The very central scheme of our activities is to provide all technologies at a significantly lower cost than traditional industry. Some aspects of high performance turbo pumps and thrust chamber technology are planned to be evaluated in collaboration with DLR. Details still have to be finalized. Furthermore we are cooperating with a well known German university.

Both turbo pumps and liquid propellant rocket engines are required to develop an efficient, high performance propulsion- and launch system. At present our turbo pumps are planned to be driven by an open gas generator cycle. In order to further increase performance and efficiency we are already planning in a next step to evolve the technology to a closed cycle system, a staged combustion process. These technologies for sure are not new to the market in general, but have been practiced since the 1960s. However making them available on a custom tailored basis for significantly lower costs will be a true enabling technology for lower cost access to space. Many groups would have the chance to use a propulsion system tailored to their needs instead of having to take the cumbersome path to develop propulsion technology themselves.

To be specific, at present we are focusing on manufacturing and testing of the turbo pump able to be used with a 3.5 tonnes propulsion system. Both parts are planned to be a technology demonstrator unit, however could be used for flight demonstration as well. These activities fit very well into the second business line we have: mechanical engineering. We have extensive in house workshop capabilities and manufacturing experience. Our workshop does encompass around 700 square meters and is able to cover all conventional and advanced manufacturing techniques needed: CNC-milling and CNC-turning wire eroding and sheet metal work. Our largest CNC-machines can process parts up to a diameter of 1.5 meters and 4 meters in length. We plan to adapt these machines, so that composite cases and tank structure can be wound soon as well.

Concerning the thrust chambers we are working on further evaluation and improvements of ceramic thrust chambers. The mechanical setup and manufacturing effort is a lot less complicated than with traditional metallic thrust chambers. Realization of very efficient cooling processes is possible. Due to certain characteristics of the cooling method, there are very strong indications for those kind of thrust chambers to be highly reusable. Compared to traditional metallic systems, this will significantly extend the lifetime of thrust chambers. This should really make an impact in the rocket engine market, as those engines could be used for reusable launch vehicles, in space applications or reusable space tourist applications. As our turbo pumps are developed with the intention to realize multiple reusability as well, we can expect these two technologies together to be a true game changer.

For lower cost propulsion systems we are focused on using liquid oxygen as an oxidizer. Fuels to be considered in our activities are kerosene, liquid methane and alcohol. We by far prefer the combination of oxygen and methane, as its propellant characteristics show a very high potential to end up with a reusable propulsion system. In addition the overall system architecture of a launch vehicle will be simplified significantly.

Rocket grade Hydrogen Peroxide we consider very promising for some applications in rocketry. It is a storable, non-cryogenic oxidizer which--in combination with non-cryogenic fuels--can be used in the design of very reliable rocket stages. The use of this oxidizer is especially attractive, as at concentrations in excess of 95%, the performance on a volumetric basis is equal or even better than with oxygen. One reason for the limited use of this oxidizer is its non-commercial availability at least in Europe. We offer fully automatic and very safe production processes with a capacity of 50 to around 1500kg per day, 90-97% Hydrogen Peroxide. Our service does include conceptual design including: safety concept, detail engineering, equipment purchase, erection and commissioning. The plant can be delivered in a containerized setup enabling mobile, flexible operability.

7. 4th Screen: What is WEPA-Technology doing to address the growth of space tourism and new launch entrants?

For both applications we plan to provide higher performing and lower cost propulsion systems. This would enable larger payloads, an increased number of passengers or a higher flight apex than around 100km, envisioned by most groups so far. Our impression concerning space tourism is that the developers have access to propulsion systems, somehow, sufficient to do the job, but higher performing propulsion systems at an acceptable price will be highly desired.

8. 4th Screen: What can we expect in the future for WEPA Technologies' products?

In the first place we want to successfully demonstrate our rocket engine turbopump's capabilities and increase its TRL level. Especially some really promising improvements in terms of new materials and simplified design will undergo further development. Additional advancement is planned in the field of ceramic thrust chambers and related technology, which is thought to be a significant step towards simplified design, lower weight and cost, higher reliability and maybe even full reusability. After successfully completing the evaluation of the present turbo pump, we are planning to increase its capacity to feed a 12-16 tons rocket engine. This thrust class is very common in many designs of small satellite launch systems. We expect with this size of pump to meet the requirements of many groups being active in the development of small launch systems. Propellants to be used are liquid oxygen in combination with liquid methane, kerosene or alcohol.

As we are working on the use of our propulsion technology in sounding rockets, we plan to extend this

expertise to the design of small satellite launch systems. An example would be the combination of four engines at 3.5 tons thrust each to drive a first stage of a characteristic small satellite launch system, with 14 tons of thrust at lift off. We find the idea to fully design, build and test complete launcher stages within a team very appealing and are open for contacts.

9. How do you see the NewSpace industry in the next five years? How do you see it in the next ten?

Well starting with Europe, I think we will enter a similar path as the US. The awareness of space technology and launches will rise outside of the large, established space organizations and will encourage smaller companies to enter the market.

On a world wide basis I expect a number of groups to succeed in developing satellite launch systems with around 100-500kg to LEO and beyond capability in the next five years, finally resulting in heavy competition for smaller commercial payloads the years after. At the moment we have a much higher demand for launch capacities than available, but this may turn when some successful companies grow and generate an excess in capacity. At that point NewSpace will enter the traditional pathway of many commercial developments: in order to survive, launch costs will have to be lowered or performance increased. Both issues we intend to address with our propulsion related technologies. I am not sure about Europe on space tourism and don't think it will become available until the next 3-4 years.

In ten years commercial payloads and space tourists launched by what is nowadays non-established companies will be much more common. I expect the actual launch costs to drop, which will drive some companies to extend their portfolio with launches to higher orbits or even the Moon.

10. Last question: Do you want to go to space? Why or why not?

I would really love to go to space. The impressive experience to see the blue marble with your own eyes and feel the weightlessness has often been described by the few people who have already been up there. I would love to make this amazing experience on my own. By the way, my wife and my two little daughters, Eugenie and Valerie, would like to join, so I have to keep on pushing to make this come true.

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