MMEC Forward Focus

Montana's PFM and Land Tamer Climb To New Pinnacle of Growth

Key Points

- Determining function & attributes for a defined market moves innovation forward.
- Carefully select partners and alliances for more profitable outcome.
- Follow dream one small step at a time and never look back asking "what if I had…"

By Deborah Nash, MMEC Staff Writer

PFM Manufacturing Inc. climbed to a new pinnacle of growth and innovation in April with the opening of a new 11,600 sq. ft. production facility and offices five miles north of Townsend. The move is a readiness step for production of an all terrain vehicle platform for Lockheed Martin's Squad Mission Support System (SMSS), leveraging robotic technologies for future combat support systems.

The Montana Manufacturing Extension Center (MMEC) is working with PFM on refinements to the plant layout before final walls go up in the production area. It is also teaming up on several other continuous improvement initiatives to ensure that a Lean enterprise and certifiable quality system are in place for SMSS trials and follow on series production expected by 2012.

PFM manufactures the Land Tamer®, an extremely versatile remote access vehicle. It can travel on land, through water, in mud or snow, and up and down very steep inclines. Its platform is easily adapted and comes in six and eight wheel configurations with an optional 20-inch wide track-over-tire system and a 60 or 80 horsepower diesel engine. It even has an amphibious version that uses the company's custom-built water propulsion system. PFM has moved away from earlier heavy steel construction; today each unit is a welded, all-aluminum uniframe chassis.

PFM Manufacturing and Land Tamer, a remote access vehicle, climb to new pinnacle of growth; right: new 11,600 sq. ft. facility.

PFM experimented with an unmanned radio controlled unit several years ago and attracted interest from three very promising defense-related organizations: Lockheed Martin; Carnegie Mellon, a national robotics lab; and a US Air Force research lab, said Pat Miller, founder and President of PFM. "They have been impressed with the platform and conducted studies successfully with the radio controlled unit. They interfaced their equipment with it and saw real possibilities."

Considered a major defense contractor, Lockheed likes working with small companies like PFM, because of the agility and fast response time. PFM has been growing incrementally for 12 years. A 2009 licensing agreement with Lockheed put the company in a good financial position for significant expansion.

"I surrounded myself with people on a team that helped make the climb," Miller said. That team includes Todd Daniels and others from MMEC, vendors, employees and customers. "It's a package deal. It supports the community, bringing in good money. It's a win-win for everybody."

PFM now has seven employees. Miller said they like working for him and have good ideas to offer as they prepare to build 20-50 units by next year, which would double or triple current hires.

Opportunity Unfolds

Though Miller didn't know it at the time, a map to current opportunities unfolded for him and his young family more than 20 years

ago. His forward focused reaction to a layoff put science behind his “tinkerer” tendencies, increased his sales and marketing skills, and later triggered the dream that has now taken PFM from its former, cramped rental space in the town south of Canyon Ferry Reservoir to the new building it owns on 10 acres. Now expansion is possible to accommodate continued growth as the military market grows in response to the Lockheed plan to market the vehicle platform as an SMSS. Lockheed has forecasted a potential market of 4,000 SMSS-type vehicles, and the corporate website http://www.lockheedmartin.com/products/smss/ states that such a “squad-size manned or unmanned support vehicle is critical to today’s asymmetrical and urban battlefields.” The SMSS will have “a greater perception of surroundings on the battlefield [using laser sensors, or Ladar] and extraordinary mobility …to follow the war fighter across any terrain.”

Patrick Jr. (left) and Pat Sr. (right)

Miller’s son Patrick agrees that Lockheed likes the agility, the simple maintenance free platform and the vehicle to cargo ratio of the Land Tamer. In addition to his many other duties, the younger Miller creates the marketing videos and graphics that showcase the Land Tamer on the PFM website www.landtamer.com .

Both father and son said that additional modifications will likely be made to the current platform during trials phase of production. “It is all about minimal maintenance, time and labor. A lot of engineering goes into each one,” Patrick added.

Current Growing Pains

“We are going through some growing pains right now, converting from a job shop environment to a series production facility,” Patrick said. Finding ways to reduce lead time is one issue, especially getting parts from suppliers more quickly. Some require quantity purchases that can take five to seven weeks to get. “We’re working to shorten that.”

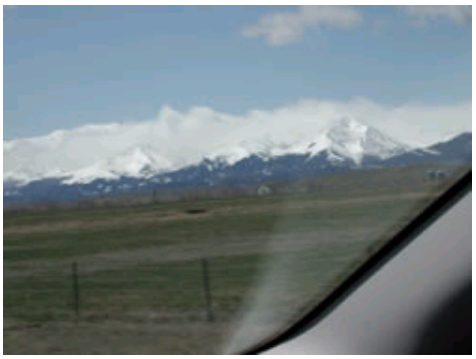
The biggest challenge is balancing all the pieces for well planned growth, such as getting all staff on board with adopting Lean manufacturing techniques and completing the necessary steps for ISO9001/AS9100 quality management systems certification in a short timeframe. “That is a bit more difficult, putting systems in place without more production history behind them,” he said. But PFM plans to get it done by the end of the year and has looked to MMEC to lend its expertise to the process.

MMEC has assisted PFM with various stages of growth since about 2002. One of the earliest assists was a detailed, color coded Demand Analysis Tool built to enable Make/Buy decisions based on projections. By inputting forecasted demand, expenses, number of workers and hours, the tool can provide needed data for various growth scenarios. The demand analysis tool has been useful, though some processes have changed since it was built, according to Miller. “But it ballparks results, shows constraints and man hours for a justification on decisions.” He especially likes how the spreadsheet was designed to turn calculations into highly visual, color coded results. “It allows me to manage more effectively; it helps pre-plan and budget.”

Evolution of Land Tamer

The life changing choices Miller made two decades ago began with pursuing a degree in Mechanical Engineering from Montana State University after a layoff. A self-described tinkerer from his youth on a farm in Ohio, he said he also gained knowledge about how airplanes are put together after spending 15 years in the airline industry. The engineering degree put science behind his natural capabilities. After graduating, he took a sales engineering position, repping industrial equipment to the mining industry. “That’s where I gained insights into selling and how to rep mechanical products,” he said.

It was during that time that road-warrior imaginings started Miller thinking about how great it would be to have an off-road vehicle that could traverse the varying terrains he would see enroute to sales calls across the Northwest.



"I saw beautiful country and thought, 'Wouldn't it be great if you could traverse all the types of terrain, from the streams at the bottoms, up the hillsides and on to the tops of mountainsides.' I looked on it as a challenge and began thinking and designing in the evenings during my travels."

It was not long before he had a design "engineered out and was itching to build a prototype." The next step was to buy all the components to do it, but with a wife and children, no extra money was in the budget. He was short about $800. Believing that no success is worth losing your wife and four great kids, he put the dream on hold.

But again fate stepped in, and an unexpected company-direct check for $850 in recognition of his strong product sales arrived in the mail. He made the needed purchases and later explained it to his wife. "She was okay with it; she knew I always followed through on my plans," he said, like building the home he said he would. "I always do what I say I will."

Creating Opportunity

Once the rig was built it became apparent it would go places no others would, Miller said, so he invested $200 to put it in a nearby Helena fair to gauge potential. Despite the rough prototype, it drew interest.

"I sold my first one to the largest ranch in Montana; the owner handed me a check," he recalled.

An engineer at heart, Miller knew he didn't want to always be working for someone else, so he put another prototype in a local fair and parade. Again it drew interest, and a second sale was made to a Boulder custom fencing contractor. With two sold locally, Miller wondered what a website would do for sales, even though not too many small companies were using the tool at that time. "I started a crude website and got orders from Michigan, Virginia, and South Carolina and then others."

When orders created too much work, he took a sabbatical from his job. "It never did fizzle," he said. He never went back. Instead, he made his first hire, Mike Seymore, who has been with the company for more than ten years.

Market Focus Needed

The market for the Land Tamer was still not clearly defined even after about 40 units had been sold in the U.S., and a few in other countries. Miller decided it was time to focus and found a niche for a heavy, multi-faceted vehicle. He started communicating to customers that this was not a recreational vehicle. He targeted markets where the Land Tamer could become the four-in-one replacement for customers who were using four different vehicles types to accomplish tasks; he specifically targeted the Canadian oil fields and the military. He began with a trade mission trip to Canada and then with modifications that would improve the vehicle's features for military use, such as the aluminum chassis. The calculated market diversification efforts are now paying off with a much larger facility than he had planned just two years ago and seven employees that are helping strengthen the community he calls home.

Re-engaging with MMEC

When a viable product for military markets came into play a couple of years ago, PFM re-engaged with MMEC. Members of its diverse team included Daniels and Field Engineers Dale Detrick, a design specialist who owned a design firm for 25 years before joining MMEC, and Bill Nicholson, a former Honeywell Lean expert; Al Deibert, MilTech Program Manager; and graduate student engineers from the University Technical Assistance Program (UTAP).

MMEC Assists PFM with Capability & Capacity Projects to Support Growth Plan

- Facility and equipment layout with time studies and space & equipment needs analysis -- UTAP;
- Design improvements to consider before a layout redesign – Detrick;
- Lean facility design that looked at the optimum layout in cells and balancing time between cells; further analysis to balance operations in cells -- Daniels & Nicholson;
- How to use Lean standard/strategic work in process (SWIP) to reduce lead time and better manage inventory by identifying the common part each custom unit shares – in PFM's case, the frame -- and keeping a strategic amount in production -- Nicholson;

- A simulation using Process Model software to show how the proposed Lean design optimizes production; demonstrated to the Lockheed review team that capabilities were achievable -- Daniels;
- A spreadsheet to help with kanban cards for inventory management -- UTAP;
- 3-D drafting software assistance from MilTech resulting in $5,000 investment in software -- Deibert;
- Site tours for management to Kids Up in Belgrade to demonstrate the use of kanbans to drive production and to Spika Welding & Manufacturing in Lewistown, a fast growing company that built a new facility to respond to a military market -- Daniels.

Acquiring the 3-D high-tech drafting software enabled PFM to interface design with Lockheed in an essential way, Miller said. “They were surprised that a company in Montana could do that.” He credits MMEC and MilTech with helping land the Lockheed Martin licensing agreement as a result of the software project and from an MMEC presentation during a Lockheed site visit.

“I tend to think ‘if it is to be, it’s up to me’,” Miller said. “But of all government programs, MMEC and MilTech are the best for the betterment of mankind that I’ve ever seen. Everybody benefits and business is taken to new heights.” The site tours were great confidence builders as he moved forward, too. “There was no real manufacturing support in Montana until MMEC came along,” he added. (MMEC services were first launched in 1996 at about the time Pat sold his first prototype; he met Daniels several years later.)

Land Tamer all-aluminum platforms in stages of assembly (SWIP) at May 28 open house; containment walls will be completed after flow decisions finalized.

Licensing Agreement Was a Win-Win

Product interest from Lockheed came when Miller was developing interest from other investors, hoping to land an investment of $1 million to continue growth efforts. “But typically those guys want a part of the company as a return on investment, so I was hesitant,” he said. “Lockheed was not looking for that but rather a commitment to priority when orders come.”

Late last fall when the industry giant was coming to evaluate PFM capability here in Montana, Miller asked Daniels to make a presentation on the capacity/capability projects. “I didn’t want them to just hear it from me,” he said.

Again, fate was in play. A scheduling conflict put the presentation in the hands of Deibert, MilTech program manager, who has familiarity with military field issues and who has worked on PFM projects as well. Deibert demonstrated that PFM had calculated the necessary plant size to meet order trials and had expansion plans, has the manpower and depth to adapt the design and to fill orders if the trials take off in the military as they hope. Miller termed Deibert’s presentation “exactly perfect.” It reaffirmed that PFM has invested money in upgrading capabilities and was using added expertise from MMEC and MilTech to be ready for full-scale production.

“The presentation was a real stepping stone to signing the licensing agreement,” Miller said. “I recognize that I need someone like [Lockheed] to reach into the military market. It’s a top notch company.

“They came to the table, and I didn’t have to give up any of my company, just an assurance that they will have priority for their military sales. They gave me a check up front. If we can meet capacity and quality, we will build all the machines.”

Fast Forward...

“Now I’m using the Web to get it out to the world,” Miller remarked, sitting in his office where a world map is filled with pins showing where the Land Tamers have been shipped; it extends from the Canadian oil fields all the way to Malaysia and Africa. He has shipped the Land Tamer to commercial customers in over 30 states in the U.S., in Canada and five other countries.

The new licensing agreement enabled pay back of earlier loans received from banks and economic development organizations. Lockheed has the budget to really showcase and launch his product in military circles and “has put a lot of their own money into marketing the SMSS to the military,” he said.

If orders exceed PFM’s capacity, it will receive royalties if production is added elsewhere. While the profit margin for production would be about five times greater than for royalties, Miller is not concerned. The new facility is designed for future expansion, and “either way we make money. Lockheed believes in integration, not in stealing a small company’s technology.”

“It has been exciting – challenging – scary at times – but very satisfying,” Miller said.
