

HydrAssembly™: a manufacturing collective for the 21st Century

Contacting credit and global recession threatens the US economy. Staggering deficits and a dependence on foreign oil are sinking the dollar. Governments of the world are trying to stave-off an economic disaster.

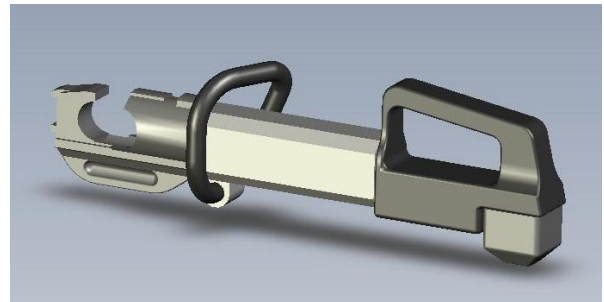
While storms come and go, history shows that doing nothing is not an option. Companies that respond to an economic downturn with innovative new goods have prospered at the expense of their competitors. The deeper the downturn, the greater is the imperative.

LatchTool Group controls the patents to a technology that makes self-contained hydraulic systems possible and affordable. The implications for industries vulnerable to lighter, cheaper and more compact fluid power systems are sobering.

HydrAssembly is being formed as a new entity to produce products based on LatchTool's *FastFlow*® technology. Manufacturing consists of assembling proprietary electro-mechanical and microhydraulic components together in a single manifold that is filled with fluid and then certified. A production plant can achieve an unprecedented economy of scale by focusing on a mix of products that share a common platform.

While literally thousands of applications for the *FastFlow*® technology are envisioned, two areas stand out that share an *inline* platform - *high force* linear actuators and compression tools for [cold weldments](#).

Standalone **high-force microhydraulic** actuators can articulate everything from excavator arms to control surfaces on aircraft without the ancillary need of pumps, reservoirs and umbilical connections. Their use can dramatically reduce weight, save space and cut costs of even the most basic aerospace platform.



22" Battery powered 12-ton tool weighs 10 pounds

High-force compression tools are used for crimping electrical cables, swaging hydraulic lines, shearing & swaging wire rope and shearing & swaging rebar. Their use avoids the deleterious effects of heat and fluxes on the electromechanical properties of the material.

FastFlow® Microhydraulics is proven technology that has been engineered as a 12-ton compression tool for the electric utilities industry. The discovery that o-ring seals can double as valves enables compact hydraulic systems. The savings in weight, space and complexity hold disruptive implications for the fluid power industry and those industries that depend upon their products; automobiles, aviation, oil & gas production, off-road equipment and tools of all shapes and sizes.



The rebar and post-tensioning applications of the technology are timely given President-elect Obama's goal of putting Americans to work rebuilding a crumbling infrastructure with massive public-works projects.

Replacement of existing infrastructure that has failed or is failing is currently estimated at \$1.6 trillion. The American Society of Civil Engineers has estimated that more than a quarter of all existing US bridges are structurally deficient and will require \$9.4 billion annually for the next twenty years to correct. US airports are also in need of repair.

LatchTool's technology is well suited for [post-stressed concrete construction](#), where battery powered units with a 2-inch ram could deliver 30,000 pounds of tension to the cable-tendons. The 12-ton tool pictured above has a 1.75-inch ram with an embedded 10,000 psi pump. The \$1,000 unit replaces a [separate ram and pump](#) combination costing 10-times as much.

Innovation stops in an economic downturn: LatchTool Group has been fighting the downdraft of a slowing economy for three-years. The Company was buffeted by the China outsourcing craze, the collapse of residential construction and now the unraveling of our economy and banking system.

HydrAssembly is LatchTool's response - rather than wait for someone with the gumption to make our products, we will make them ourselves. By pulling together licensees and strategic partners, HydrAssembly can make game changing product affordably that compete worldwide.

LatchTool Group is the Colorado Company that has developed the *FastFlow*® technology. Five US Patents have issued and over a dozen more are pending around the world. HydrAssembly is a limited liability company formed to contract manufacturer *FastFlow*® Microhydraulic products. HydrAssembly is to be capitalized by and for the benefit of its stakeholders; the members.

Members are either *FastFlow*® Partners purchasing licensed product from HydrAssembly, prime vendors supplying critical components or active management with skin in the game. The Company's business consists of managing a supply-chain, product assembly at a company *lean manufacturing* plant. The location of the manufacturing plant has yet to be decided. LatchTool receives a 12% *carried* interest in the venture and chairs the membership committee.

Initially, HydrAssembly will use the LatchTool Group [Operating Agreement](#) conformed to it purposes. A reasonable time after formation, a more comprehensive operating agreement will be submitted to members for ratification. In the interim, members will be transparent subscribing to a policy of non-disclosure with third parties. A member maybe removed for cause upon a majority vote of the membership.

Professional management reporting to the member committees will be seconded from the members. As duties become clear, management will be hired. Management will negotiate supply contracts with LatchTool licensees and suppliers.

Game Plan: Working with Top Notch Machining, Inc. a high-end prototype machine and design shop, LTG has designed a 12-ton compression tool. Top Notch is a LatchTool Group founding company. They are ready to build the alpha-prototype of the 12-ton tool that will permit validation of the design. This phase which also includes testing and fine-tuning the design, is estimated to take two months and cost \$40,000.

If the rework becomes too extensive, a decision to rebuild a revised alpha-prototype may be made. That would cost an estimated \$20,000 and consume another month.

Once the alpha-prototype phase is complete, a design review will determine what modifications can be made to simplify production and assembly while assuring maximum integrity. It is during this phase that the economics of different manufacturing alternatives for part production are investigated.

The goal is to develop the pre-production design for the 12-ton tool and then build multiple prototypes that are the basis for pre-series production. It is estimated that the pre-production prototypes will cost 3x that of pre-series production product or \$1,800 each. Consequently, \$20 to 30 thousand are allotted for the initial pre-series prototype production. These models will be used to sample users and buyers and generate initial orders for the product.

Quantity is the linchpin for economy of scale; the more you make, the cheaper they are. The *inline* design borrows heavily on a *chainsaw* configuration, a particularly hazardous tool that has proven safe because of the inherent safety of the design. The compactness of *FastFlow*® Microhydraulics and flexibility of investment cast aluminum manifolds yield powerful tools that are as easy to wield as they are economical.

The 12-ton compression tool licensee will introduce the product to their market and then to their competitors as a private labeled product for the world. Additionally, this platform is well suited for rebar cutters and collapsed building rescue tools. Tools using the same standardized parts as the 12-ton compression tool and an identical assembly and filling operation contribute to an economy of scale.

The design of these additional products is expected to cost \$25,000 and will be performed by engineers participating in the *FastFlow*® Syndicate. Three groups will be commissioned to submit preliminary designs based on the 12-ton tool from which the winning design firm will be selected.

Given the state of the economy, HydrAssembly will second management from the LatchTool Group, vendor participants and licensees. An objective is to contain costs, but not to the detriment of the project.

The venture will be established as a regional venture within a supportive geographic area. This phase will parallel that of building prototypes and will be pursued simultaneously amongst competing city/state governments with the final location based on the best inducement. The Worldwide Philadelphia Gambit enunciates this growth stratagem and follows as Exhibit A.

The first HydrAssembly plant is analogous to the fabrication plants of the semi-conductor industry that grew up around Palo Alto California. The clustering of these plants in an area created high paying jobs protected by patents and the *first to innovate* mantra. It became known as Silicon Valley.

Financial Plan: HydrAssembly is formed for the benefit of licensees, vendors, LTG and the community in which it operates. Formed as an LLC, the Company relies on its member base for capitalization and operating sustenance. Licensees and vendors receive supply contracts that call for bonus or discounts in proportion to the capital invested. This is significant as payback is a function of top line revenue rather than bottom line profits. The highpoints are summarized in the textbox titled Term Sheet.

Term Sheet

Member contributions capitalize the construction of prototypes and production of inline or chainsaw configured *FastFlow*® microhydraulic products private labeled for LatchTool Group licensees. Licensees will receive back their investment in the form of a discount from the price negotiated with HydrAssembly. Likewise, participating vendors will receive back their investment in the form of bonuses on the negotiated price for their goods.

Discounts and bonuses will be calculated based on a member's contribution amortized over a 4-year period at an interest rate of *prime* as published by the WSJ, plus 2%. Discounts and bonuses will be paid in sync with the cash flows attributed to individual members.

Ownership of HydrAssembly will be in proportion to individual contribution with the exception of LatchTool Group and/or their assignees who will receive a 12.0% carried interest in the Company. A carried interest means that the percentage ownership of a member is not reduced by the inclusion of additional members.

LatchTool Group's operating agreement will be the model for HydrAssembly. The 5-member Steering Committee will be chaired by LatchTool and an additional designee. The balance of the committee will be appointed from the members.

Membership interests may be sold or assigned provided there are no objections. The Company will sell additional member interests should additional capital be required.

Startup Seed – Use of Proceeds	
Item	Amount
Build prototypes	\$ 80,000
Engineering	20,000
Sales & business development	50,000
Total	\$150,000

A clear objective is to supply *FastFlow*® based goods to licensees at prices that rival in-house manufacture or outsourced to low cost labor markets.

The concept behind HydrAssembly is to recruit licensees and vendors into an ecosystem that manufactures and services LTG based goods. The plan overcomes the current economic plight and gives participants a say in their destiny. It launches a technology and a business model that could have profound influence on our fu-

tures. See Business Model Sequel.

The startup seed is \$150,000, the amount required to build the alpha-prototype of the 12-ton tool, spark publicity and recruit other members. As an inducement for first participants, LatchTool will match investments in HydrAssembly dollar-for-dollar with notes in LatchTool Group convertible into its equity where \$1,000 of such debt in convertible into 0.0100% of the LatchTool Group. This conversion rate effectively values LTG at \$10,000,000.

Provided full subscription to HydrAssembly, the capitalization table will approximate the following:

Member/Expertise	Contribution	4-Year Payback	% Ownership
Management/Technology	<i>carried interest</i>	-	12.0%
Sweat equity	\$180,000	-	15.8%
Operations/Entrepreneurs	250,000	\$317,246	22.0%
	430,000	317,246	49.8%
Licensees: Rebar Cutter	150,000	190,348	13.2%
Compression Tool	150,000	190,348	13.2%
High Force Actuator	150,000	190,348	13.2%
Vendors: Foundry	60,000	76,139	5.3%
Motor Drives	60,000	76,139	5.3%
	570,000	723,322	50.2%
Capitalization	1,000,000	1,040,568	100.0%

Production costs for the 12-ton *inline* tool platform based on a 40% operating margin are estimated to be:

Margin	Cost	Price
40%	840	1,400
Pricing	720	1,200
	600	1,000
	480	800

Financially, HydrAssembly performance will be predicated on many known – unknowns. The licensee, vendor and technology matrix are comprised of tested veterans; no one has all the answers. By God’s grace and shooting straight with each other we will prevail big-time. It is all about faith, trust and stewardship.

Unit Performance

Gross revenue	100.0%	\$ 1,000.00
LTG Royalty	3.0%	30.00
Cost of Sale	0.0%	-
Cost of Goods	60.0%	600.00
R&D	2.0%	20.00
Overhead	15.0%	150.00
EBITDA	20.0%	200.00

LTG is prepared to postpone manufacturing royalties until the operation is established.

Net cash flow provides capital for expansion and/or is distributed to the members.

Business Model Sequel: In summary, HydrAssembly offers licensees and vendors a consolidated supply chain devoid of third party financing and the cost for their accommodation. Formed to produce products based on LatchTool *FastFlow*® technology, manufacturing consists of assembling electro-mechanical and proprietary microhydraulic components together in a single manifold that is then filled, certified and shipped. A HydrAssembly production plant can achieve an unprecedented economy of scale by focusing on a mix of products that share common platforms; the basis for mass customization.

HydrAssembly plants are to be located close to industrial/professional users and offer repair and upgrade services. The service dimension in close proximity to the assembly operation minimizes stocking concerns, assemblers' expertise and component integrity. **It provides a unique business model opportunity;** the benefits of product ownership without the angst of maintaining the hardware.

The aim is to develop a slate of low cost sensing options that could be recorded by the battery powered tool and subsequently transmitted to a reader for collection and analysis.

The primary purpose is to provide a database for managing a tool: How frequently is it being used? Is it being used correctly? Has it been dropped? By matching RFID tags, we know who is using the tool and generate a history of its use matched to specific operating data. With this information, a new business model becomes feasible. Rather than sell a tool with a warranty service, we can ***sell the benefits of tool ownership without the hardware headache.***

HydrAssembly is the operation that assembles, fills and certifies a given tool. Economy of scale is achieved by standardizing platforms rather than an individual tool. Product conformed to the inline or chainsaw platform can be assembled by the same technician regardless of specific application. In fact the assembly and filling of new or refurbished tools can be handled by the same production line.

A beneficial owner contracts for a number of tools for a given job. During the contract period, the contractor is assured of tools in mint-condition. If operating data suggests an incipient problem, the tool is replaced before a breakdown and the recalled tool sent back. Judicious uses of FedEx or UPS are integral to a seamlessly efficient operation.

User/use data facilitates optimum deployment. The proper number of tools is on-site when they are needed; the program accommodates peak and slack demand periods without tying up capital needlessly. Programs may also be developed to enhance worker productivity or facilitate piece-work compensation. Insurance can be a built-in component.

HydrAssembly is in the business of managing a supply chain that reaches out to the user. Motors and drive mechanisms histories as well as documented part failures facilitate vibrant supply-chain management. Tool components are monitored which hold vendors accountable. Recycling parts and reuse of materials such as aluminum keep the operation green and waste free. Reclaimed parts flow back into the primary production stream.

Implementation – launching the model of *selling benefits rather than hardware* requires a HydrAssembly community from which to nucleate and an IT/quasi telephony capability shadowing the build. Consider the dynamic Google or Apple could bring to the table.

Electronic Package for Tool Management

1. RFID/ Wi-Fi with Flash memory
2. Time of day – when things happen.
3. Pressure transducer for recording output along with the number of clicks.
4. GPS for location – where they happened.
5. Temperature – stress from heat or cold.
6. Accelerometer for sensing being dropped.

Based on capital costs of \$1,000 for a tool and \$1,200 for the electronics, the cost breakdown for a customer in the **benefits without headache** program follow. These are conceptual numbers intended to give an order of magnitude estimate.

Breakdown – Benefits without the Hardware Headaches

		Year 1		Year 2		Year 3		Period
Capital charges -	Tool	\$213.04	\$213.04	\$213.04	\$213.04	\$213.04	\$213.04	\$1,278.27
	Electronics	\$255.65	\$255.65	\$255.65	\$255.65	\$255.65	\$255.65	\$1,533.92
Retrofit charges		\$216.00	\$216.00	\$216.00	\$216.00	\$216.00	\$216.00	\$1,296.00
Program charges		\$255.00	\$255.00	\$255.00	\$255.00	\$255.00	\$255.00	\$1,530.00
Burden - 30% premium		\$281.91	\$281.91	\$281.91	\$281.91	\$281.91	\$281.91	\$1,691.46
	Total	\$1,221.61	\$1,221.61	\$1,221.61	\$1,221.61	\$1,221.61	\$1,221.61	\$7,329.65

Key Personnel:

Robert McPherson, 62 - CEO/Chair and Cofounder of LatchTool Group. Business and c-level management background with applied technology companies both private and public. Cornell University – Chemical Engineering. Has Multiple Sclerosis. A team of business, financial, legal and technical leaders backups a succession plan.

More -

Exhibit A

Worldwide Philadelphia Gambit

The Philadelphia Gambit contends the tanking US dollar bodes well for American manufacturing; particularly for innovative products protected by strong patents. The dollar's fall, relative to other currencies, offsets cheaper manufacture outside of the US and possibly regains a competitive footing for America on the world scene.

Yet nothing is static. Four-dollar a gallon gasoline threatens recession in the US and brakes global expansion. As nations wrestle with the politically charged theory that the world is running out of oil, worldviews galvanize on the hot-button issues of global warming and size of an individual nation's carbon footprint.

Meanwhile, transportation is becoming prohibitively expensive. Airplanes no longer fly affordably and transoceanic freight adds appreciatively to the cost of goods.

The world has entered a period of economic instability and perplexing uncertainty. People, both corporately and individually, are adapting by cutting spending and finding cheaper alternatives.

It can be argued that the models for low cost producer are superseded by those of a low cost supplier. Soon it will no longer matter who can make great products cheaper, but who can get them to the user for the lowest cost.

Factoring the cost of energy into the Philadelphia Gambit suggests HydrAssembly centers should be setup around the world close to the users/consumers. Philadelphia becomes analogous for all City-States with underutilized labor pools. Franchised with regional patent rights and trade secrets, local entrepreneurs assemble and supply microhydraulic¹ products within their region.

While most component parts can be produced locally, the investment castings can be shipped in or produced locally by certified licensees. A hub-and-spoke arrangement based on strong IP can be setup around the world to combat the cost of shipping.

Borrowing on [Chick-fil-A](#)'s success, LatchTool is hoping to form strategic alliances with local entrepreneurs active in their communities.

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¹ *FastFlow*® innovations in annular flow control and hydraulic circuit design has pervasive implications for the fluid power and motion control industries. These advancements hold disruptive ramifications in the design of machines, vehicles, tools and products.

Philly Gambit: Can the Silicon Valley lesson be a model for a Philadelphia/Industrial alliance?

Could a discovery as radical as the transistor energize the Pennsylvania economy...?

Radical Innovation: The LatchTool *Microhydraulics* Technology is a breakthrough in delivering and projecting Fluid Power. The basis of the technology is the discovery that O-ring seals can be engineered as annular valves. Hydraulic circuits have been miniaturized and embedded as closed systems. Tiny assemblies can economically leverage pounds into tons.

The [LatchTool Group](#) is a virtual organization of over 100 members; entrepreneurs, new business development executives, patent attorneys and engineers. They have invested twelve years researching and developing the science and investigating market applications, business models and gambits identifying commercial opportunities.

Five US patents have issued and over a dozen more are pending worldwide. Two fields for continued invention have been identified.

Open Innovation: LatchTool practices an open business model, exclusively licensing specific end-use applications of the technology. Likewise, the Company is forming a syndicate of Engineering Design Companies and Colleges of Engineering to *certify* designs and teach the *FastFlow*[®] trademarked technology.

The game plan is to anchor *FastFlow*[®] as both a product technology and as a manufacturing technology with strong roots in the USA. For the first segment, licenses are being established with branded industrial and professional tool suppliers. Current categories include compression tools for plumbers, utilities lineman and cement contractors.

The workholding project inaugurates LatchTool's move to establish a licensed-presence with US manufacturing. Workholding is presently a \$300 million dollar US industry with exports running around 7%. Yet workholding is an essential component for all manufacturing operations; machine tools, automation, literally all OEMs² such as automobile manufacturers, aircraft producers and petroleum recovery worldwide. US manufacturing represented 14.6% of the GDP in 2004, or \$1,659 billion.

***FastFlow*[®] Workholding Project:** LatchTool Microhydraulics Technology surpasses the clamping power of pneumatics without the mess of hydraulic fluids. The economics and compactness of the technology offer products a compelling advantage over anything in the world.

Clamping forces may be pre-set at the factory or dialed-in at the clamp; forces can range from a few pounds to multiple tons. Units may be manually powered or ganged⁴ together electrically for remote control.

In 2007, approximately 13.7 million of all US workers, or 10% of the non-farm payrolls, were manufacturing employees. For the same year in Pennsylvania, 656 thousand workers were employed in manufacturing, a decrease of 29.3% since 2000! The US as a whole lost over 2.8 million manufacturing jobs during this same period, a 16.5% loss. Pennsylvania's losses were double the nations! The Wall Street Journal (02/21/08) recent reported that according to the Federal Reserve Bank of Philadelphia the manufacturing sector in the Philadelphia region continues to weaken.

Gambit: Pennsylvania's woes are not unique. [The Association for Manufacturing Technology](#)³ warns of the dire consequences of an [eroding US manufacturing base](#)⁴ on American prosperity. [The mounting risks are frightening](#)⁵.

² Original Equipment Manufacturers

³ <http://www.amtonline.org/>

⁴ http://www.amtonline.org/document_display.cfm/section_id/93/document_id/19608/top/0/level/0/why-doweedmanufacturingtechnologymadeinamerica?

The sub-prime lending debacle exacerbated by record residential foreclosures infuses uncertainty into the economy. While the tanking dollar stimulates exports, soaring energy costs and commodity prices threaten a recession⁶. Federal Agencies are overwhelmed by vested interest groups and fail to see issues within a State's context. They are little help. LatchTool believes individual states will be left to sort out their problems and fend for themselves.

Pennsylvania is uniquely positioned to grasp what LatchTool offers; a disruptive technology that will change the way many products are now made, and enable many new products that are now impossible.

A New Industry: The transistor has had a monumental impact on the world and particularly on the State of California. The transistor is a switching device, an electronic valve that replaced vacuum tubes and spawned the semiconductor industry. Silicon Valley changed the way electrical circuits are made.

The *FastFlow*[®] valve is to hydraulics what the transistor was to the electronics. It enables hydraulic systems to be miniaturized and integrated into force amplifying circuits. These valves will spawn the microhydraulics industry.

The Palo Alto area anchors the semiconductor industry with the first fabrication plants of Intel, AMD and Cyrus Semiconductor. Similarly, Bethlehem Pennsylvania will host the first fabrication plant for LatchTool Group microhydraulics.

[Cera-Met LLC](#) acquired Alcoa's Howmet operation in Bethlehem last year. An investment casting foundry⁷, Cera-Met will cast the manifolds or bodies unique to FastFlow Systems. These castings are integral components for of the technology.

FastFlow castings supply hydro-assembly plants where workers assemble the finished product. As an example, Cera-Met will ship castings to an assembly operation outside of Albany NY that will produce LatchTool's PowerPliers™, a hydraulically boosted tool that gives plumbers a third hand and grandmothers the grip of Godzilla. A linemen's compression tool is presently in development that will require castings from Cera-Met. The location of this hydro-assembly facility has yet to be selected.

Besides the many [HUBzones](#)⁸ within Philadelphia, their [Navy Yard is a Keystone Innovation Zone](#)⁹; a technology commercialization initiative that promotes collaborative innovation between academic institutions, government research, and private industry. The Navy Yard KIZ supports the growth of research and business activity focused on six categories. *FastFlow*[®] microhydraulics impacts two categories directly, Power and Energy and Advanced Manufacturing.

Cera-Met is located next to Lehigh University¹⁰, a private institution with an acclaimed College of Engineering. Pennsylvania State University has a world recognized Mechatronics Laboratory where mechanical, electrical and computer science disciplines combine to produce advanced robotics & automated machinery.

⁵ http://www.amtonline.org/document_display.cfm/section_id/93/document_id/19537/top/0/level/0/us-manufacturinginnovationatrisk

⁶ China with a population of 1.3 billion is enjoying an industrial production growth rate of 12.9%. India with 490 million people has an IPGR of 10.0%. Even the European Union with a combined population of 301 million has a 2.6% IPGR. And where is the US with a population of 234 million? It ranks just below Zimbabwe in the CIA World Fact Book. Ranked at 168, the USA has a 0.5% IPGR.

⁷ Investment casting is also called the *lost wax* process. It is how golf club drivers are made. It is also how jet turbine blades are produced. <http://www.cera-met.com/>

⁸ <http://map.sba.gov/hubzone/hzqry.asp?CNTY=42101>

⁹ <http://www.navyyard.org/KIZAbout.htm>

¹⁰ A LTG director is a Lehigh graduate.

Similarly, Penn State hosts *the Process Mechanics-Work-Holding Research Laboratory* which supports the research and development of: A science base for manufacturing process-work-holding systems; Analytical models and software to support work-holding design; and, advanced work-holding technology.