



## Mission Statement

Our mission is to bring innovative manufacturing technologies within reach of the residents of the Northeast Kingdom. Our goal is to:

- Nurture individual business enterprises in the Northeast Kingdom.
- Work with schools to attract youth to the fields of science, technology, engineering and math, using a hands-on approach.
- Build a community where the arts and the sciences can work together and freely share ideas.
- Have a long-term positive social and economic impact on the Northeast Kingdom.





## Summary Description

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We propose to provide a community space where tools, equipment, expertise and technology that would normally be out of the reach of individuals, is made available to its members. This space will provide work areas where projects can be worked on with the collaboration of other members. The result is a place where new ideas and inventions can thrive.

Our organization will bring people of all ages together to learn, create and build. We will become a broad focus site that will support invention, design and development. The organization will appear different to each of the members and to the community at large: some members may work alone on their project, while others will work together on joint efforts. For the inventor and developer, it will be a location where they can find others with needed skills. For the young person, they may find an elder to teach them a skill and be a mentor. For an older person, they may find a youngster to help them harness emerging technologies. Artists and technical people will find fascinating areas of joint interests.

The space itself can be thought of as a laboratory, a workshop, a studio or a machine shop. We will initially concentrate on electronics, robotics, metal working, woodworking and 3D printing. The ultimate goal is to have a full featured idea factory and development space with nearly unlimited opportunities for partnerships and business creation. We want a safe space where young people can develop real skills and confidence while building real objects and relationships.

We believe the individual entrepreneur needs to be nourished and encouraged. Though the space will be open to anyone interested in building something, this space will support those individuals seeking to turn their ideas into entrepreneurial ventures. We will build on the strengths of local talent, innovation and entrepreneurial spirit.

Our other target audience is young people in the community. We will provide a place where they can learn the practical values of science, technology, engineering and math. Their projects will not be taught, managed and directed, but supported with a gentle hand.

Another benefit of The Foundry will be; enhanced training in manufacturing skills and technology for the local workforce. We believe that some community members will join specifically to develop employable skills. We will offer specific manufacturing skills classes.

We will also be operating specific events and activities.

Seminars	Typically 2-6 hours	Tool Sharpening, Plastic Welding, Dovetail Drawers
Classes	Between 8-12 hours	Turning, Wood Finishing, 3D Printing, Introduction to CNC
Training	Greater than 20 hours	Machining Skills, Woodworking Skills
Open House		Build relationships, Involve community
School Outreach		Visits to schools, open events for students
Community Projects		Community improvements and awareness

Our goal is to provide a space where members can work on projects, either individually or collaboratively with other members. Work areas and tooling will be provided. Work areas will be individualized for each specialty. For instance, electronics and robotics workstations will be equipped with soldering stations, power supplies, and testing equipment. For metalwork, vises, saws, grinders, and measuring tools will be available. For woodwork, specialized workholding benches, clamps, saws, and planes will be provided.

Other equipment and tooling will consist of drill presses, machine tools, saws, thickness planers, mills and lathes. Specialty equipment will include CNC mills and lathes 3D printers and a laser engraver/etcher. Although the emphasis will start out with electro-mechanical and woodworking projects, the ultimate direction of future growth will be guided by the members. We have heard interest expressed in Welding, Sheet metal, and Art.

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**802-424-0019**



## Organization

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The organization we envision derives from the popular Maker Space movement. Over two hundred of these organizations exist worldwide. These run the gamut from small scale after school projects, to hobbyist empowerment, to full scale development support for entrepreneur efforts. While technology is often a strong characteristic, many incorporate the artistic community and fill academic needs.

The Foundry will be a member driven organization with a shallow management structure. Patterned along a health club model, at The Foundry, we provide advanced equipment, tools and machinery. The direction of new equipment acquisition will be determined by member needs, interests and budgetary constraints.

The organization as envisioned will have a board of directors that is drawn from the community. Some may come from academia, some from local industry, and some from the membership.

A particular emphasis on safety and machine operation will be a mandatory part of the program. Successful passing of proficiency classes and tests will be required before any solo operation of the equipment.

## Background

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Historically, the Northeast Kingdom has been a difficult area to find employment. The economy, once dominated by either agriculture or forest products, has been steadily declining. In towns, employment was provided by commerce, often catering to the tourist trade, or light industry. Various attempts have been made to attract employers from elsewhere. When stable employment opportunities present themselves, individuals tend to 'hold onto' those jobs. With few openings for employment, local youths entering the labor market often leave the area to find employment. The result is a marginal economy that tends to keep wages low and provide few opportunities for youths entering the job market. Ultimately, the local economy remains sluggish and the constant 'brain-drain' does not allow the young to contribute to economic growth. In order to break this cycle new, locally created, businesses, particularly involving the youth, must be nurtured.

According to the Northern Vermont Development Association report, "NVDA-Strategic Industries in the Northeast Kingdom," issued in June of 2011;

*“employers in the Northeast Kingdom have not added much employment in recent years, there has been a marked increase in self-employment. Compared with the state and other counties, self-employed workers in the Northeast Kingdom compose a significant share (a third) of total employment.” (pg viii)*

## Project Details

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We will provide a space where members can work on their own personal projects. Some partnerships, group and community projects will be encouraged. We will provide tools and equipment for projects in the woodworking, metalworking and electronics. Equipment and tools for other specialties will be added as soon as practical depending on member requests. Appropriate workspaces will be provided for each type of activity.

An important part of the proposed space is a large conference space. This space will be used for special presentations, training, exhibitions, and public meetings. We will plan sessions, open to the public, put on by guest speakers on a variety of topics. Some might describe projects happening in the workshop, but others may be about business development, artistic projects, or single subject technical sessions.

Membership will be available to the general community for a modest monthly fee. Volunteers will receive free or reduced membership for hours worked. Our target membership fee is fifty dollars per month. We hope to be able to offer free membership to area High School and College students. Young students will be restricted from operating machine tools due to liability concerns, but will be allowed access to less hazardous areas such as hand tools, computers and electronics work stations.

Hours of operation will be determined by the availability of qualified supervision. Supervisors will be volunteers thus reducing costs. We expect operating hours to be Monday through Friday 5:00 PM to 8:00 PM and Saturday 9:00AM to 5:00PM. As the membership increases, the hours of operation will also.

The project will have an adult component and a high school/college student component.

### **Adult Membership**

We envision four somewhat different groups of adult users. Our primary target adult user is the person developing an idea that might lead to commercialization or a business. Anecdotally we can identify many members in this group over the years. Removing the hurdles and enabling their growth and development is the goal with the highest economic value. Unfortunately, the size of this group is likely small at any given time.

The second group is the hobbyist inventor. This group is often highly motivated and skilled, but not necessarily trying to develop a business model. We believe these members will be attracted by having machinery and equipment available. We see this group as a high value

resource to other members who do have a business concept. We are confident these partnerships will happen spontaneously.

The third group will be the home improvement builder. This group may have no interest in creating a business, but will still have skills and resources that others may tap. This group is most likely the primary users of the woodworking equipment and may provide the greatest income to the Foundry. This group may be the most likely to subscribe to classes and pay for storage lockers. This group will also be a primary way to publicize the availability of the space.

The fourth group will be the artist or craft oriented individual. Over time, with guidance from the members and interested potential members, we will expand the scope of the workshop to include the interests of this group.

Our goal is to have 40 to 60 active dues paying members at any given time. At this level, the workspace can be self-sufficient and persistent. While highly subjective, we have estimated the proportions of dues-paying members for the first several years.

The adult members will be drawn from people within about 50 miles. The population in this range includes about 40,000 adults. If we can attract 1 of 1000, it will be 40 adult members. A preliminary meeting in December 2013 with minimal publication attracted about 12 potential members. The current mailing list has 52 interested parties. We have had meeting every two weeks and interest is strong.

### **Student Membership**

Student members will come from Lyndon Institute, Lyndon State College and Saint Johnsbury Academy. Some student members may come from North Country Union High School, Danville, Concord and Lake Region. We propose that students at participating institutions be allowed free membership and faculty may have a reduced membership fee. Free membership for students will serve to benefit these institutions' STEM programs, as well encourage membership in such curriculum-related organizations as the Academy's Robotics Club.

We believe that The Foundry and the various programs offered by these institutions can work synergistically. The ability to work outside of the classroom on individual projects will create student interest and boost participation in STEM programs. This will help both students who would be candidates for such programs and some who might not. This site will serve college preparatory students, technical education students and art students. Instruction will be required for students before they can be allowed to operate certain machine tools. This instruction can be provided by the school or through adult education classes. As the site develops we expect to provide training beyond the required safety training.

	Adult Members	Student Members	Area Required sqft.	Relative Costs	Training Needs
Metal Working	4-6	4	1000	High	High
Woodworking	5-7	4	1000	Moderate	Moderate
3D Printing	2-5	5	400	Moderate	Low
Electronics/Robotics	4-7	12	600	Moderate	Low
Programming	1-3	12	600	Moderate	
Welding	2-5		300	Low	Low
Laser (etch, cut)	1-5	2	300	High	Moderate
Plastics/Composites	1-2				
Sheet metal	1-5		400	Moderate	Low
Artistic	3-5		600		
Conference Space			400		
Common Space			400		
Total	24-50		6000		

Note: Training needs describes the training required before a member can safely use the equipment

## Project Timeline

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3/14	Form exploratory committee.
3/14	Secure commitment of members.
4/14	File for Nonprofit Corp. Register Name.
4/14	Arrange for use of a partner 501c3.
5/14	Start collecting tools and equipment from donors.
5/14	Begin application for our own 501c3.
5/14	Create Board of Directors.
6/14	Using grant funds or promises, acquire a site.
6/14	Acquire any required permits.
7/14	Begin fit-up of site.
7/14	Assemble list of volunteers.
8/14	Define classes and tests for competency.
8/14	Publicize and recruit.
9/14	Sign up members.
2015	Grow.
2016	Add capabilities.
2017	Add capabilities.
2018	Be locally supported and self-sufficient.

# Budget

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The goal of this organization is to be self-sufficient and persistent. With adequate membership we expect the facility, equipment, insurance, utilities and wages to be paid by the users. We will always accept donations of equipment, tools and resources. We believe these donations may continue to be a significant source of revenue for the project. The incubation period will be critical. Without adequate equipment, members will have no reason to join. Alternatively, high expenses during startup can also limit the viability.

To begin, the program will need a source of funds to procure the space, fit it for use and purchase some tools and equipment. To continue operation, the space will need a positive cash flow. We believe we can build a stable member base in three years if we can find a large enough space and can properly equip it.

## **Multiple options**

Several startup options have been considered. One is to start small, on a shoestring; the second a more active start to attract members; and the final, a full service operation. There are advantages and disadvantages of each, but the mid-range active start is currently proposed.

With this plan, we attempt to acquire a more significant size space and provide more tools and equipment. This approach has higher startup costs and maintenance costs. The membership levels must be higher to support this activity. It is likely that this approach could be managed in 6,000 to 8,000 square feet. The activities operated in this site will start with electronics/robotics, light woodworking and light metalworking.

Our discussions have strongly reinforced that a highly visible site is strongly preferred. We believe it will help attract new members and maintain community interest.



Revenue	6/1/14	6/1/15	6/1/16	6/1/17	6/1/18
	5/31/15	5/31/16	5/31/17	5/31/18	5/31/19
Members (qty) <sup>1</sup>	11	20	30	40	50
Dues	5500	10000	15000	20000	25000
Donations <sup>2</sup>	22000	30000	30000	36000	40000
Fees <sup>3</sup>	715	1500	3000	6000	10000
Consumable Fees <sup>4</sup>	440	1000	1500	2800	5000
Classes	1320	2400	3600	4800	6000
Fundraising	3000	3000	4000	5000	6000
Space Rental	500	1000	1500	3000	3000
<b>Grants/Gifts</b>	49515	37220	21590	7360	80
<b>Total</b>	<b>82990</b>	<b>86120</b>	<b>80190</b>	<b>84960</b>	<b>95080</b>

### Expenses

Lease	9000	12000	12600	13200	13800
Insurance <sup>5</sup>	2750	5000	7500	10000	10000
Taxes	0	0	0	0	0
Electricity	10080	15120	15840	16560	17280
Fuel	6000	6000	6500	7000	7500
Fit-Up <sup>6</sup>	10000	5000	1000	1000	1000
Small Tools	3000	3000	2000	2000	2000
New Equipment	21000	25000	15000	10000	10000
Safety Equipment	2500	1000	2000	2000	2000
Repairs <sup>7</sup>	3000	3000	2000	2000	3000
Consumables	660	1500	2250	4200	7500
Labor	4000	4000	6000	8000	10000
Professional Services <sup>8</sup>	6000	1000	2000	2000	3000
Advertising/Office	2000	2000	2000	2000	2000
Miscellaneous	3000	2500	3500	5000	6000
<b>Total</b>	<b>82990</b>	<b>86120</b>	<b>80190</b>	<b>84960</b>	<b>95080</b>

Shortfall/member	4501	1861	720	184	2
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Grants for 5 yrs	<b>\$115,765</b>
Local Donations <sup>2</sup>	<b>\$179,000</b>

- 1- Full Time Equivalent
- 2- Donations of Cash, Equipment, Tools from Local Sources
- 3- Lockers, Tools, Damage
- 4- Material used by members
- 5- Liability and Building
- 6- Preparation of Building
- 7- Repairs to equipment and building
- 8 - Legal, Accounting, Rigging

# Summary

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The enthusiasm for this type of space is substantial. We want to duplicate the success of the Vermont Food Venture Center in Hardwick. With a fairly small level of support we believe we can meet our mission.

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- Nurture individual business enterprises in the North East Kingdom.
- Work with schools to attract youth to the fields of science, technology, engineering and math using a hands-on approach.
- Build a community where arts and the sciences can work together and freely share ideas.
- Have a long-term positive social and economic impact on the North East Kingdom.

**COMING SOON**




**THE FOUNDRY**  
A Creative Workshop

Woodworking · Metal Working  
Electronics · Rapid Prototyping · Robotics  
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*If you can't open it,  
You don't own it*  
-The Maker's Mantra



**THE FOUNDRY**  
www.TheFoundryVT.org

**WHAT IS THE FOUNDRY?**  
The Foundry is a membership-based public workshop, located in Vermont's Northeast Kingdom. We offer a community of entrepreneurs, inventors, tinkers, and engineers from all walks of life.



**CORE OBJECTIVES**  
The Foundry's primary goal is to foster a creative environment, where people can make the transition from a good idea to a good product., to help create locally owned and staffed small businesses. We also provide technical training, to help improve the earning potential for local residents. Thirdly, we provide educational outreach to local schools, increasing interest in STEM programs. Finally, we are simply a club with the tools and expertise to make things.



## **Project Leader Biographies**

This is the current group of project leaders. We expect to add other committed leaders as the project develops.

### **James Schenck**

Mr. Schenck has been a serial inventor. He has worked for nearly all the local manufacturers over a career of 35 years. He has designed products and manufacturing methods. He has managed numerous projects including an \$8 million facility expansion. He has provided consulting services including design, build and management including some with international reach. He has also taught technical subjects including mathematics and statistics in a variety of adult education and college settings. He has served as a School Director for the Barnet Public School for five years. He graduated from University of Michigan.

### **Thomas Bishop**

Mr. Bishop is a versatile consultant with wide industrial experience. He has worked in process development for 30+ years. He has wide experience in CNC and PLC programming to achieve process automation and control. He has designed automation machinery, tools, dies and fixturing for highly sophisticated operations as well as developed cutting edge manufacturing processes. He has taught machining, programming and blueprint reading on both a college and secondary school level. Mr. Bishop is a graduate of Dartmouth College.

### **Greg Schoppe**

Mr. Schoppe is our incredibly capable programmer. He has extensive experience in multiple languages and platforms. He is a co-founder of a high tech, internet-based marketing company in the area. He has managed high value projects for clients including the Department of Defense, OSHA, NFPA, and the VT Dept. of Education. He studied Computer Science at Carnegie Mellon University.

### **Mack Varnum**

Mr. Varnum is a multi-skilled manufacturing specialist. He started his manufacturing career as a CNC operator but quickly progressed through the ranks of prototyping, tooling, and shop supervisor. He has been responsible for setup and programming, statistical process control initiatives, ISO9001, safety leadership and now Continuous Improvement.

Our current group of leaders has experience in environmental health and safety, personnel training, manufacturing facilities upgrades, automation, machine and tool design, drawing and documentation.

## Current listing of existing and projected equipment.

**Existing or Promised Equipment**

MakerBot 1	Hi-Tech	4x5x5 PE	Optical Comparator Small	Metalwork	18"
Mini Lathe	Metalwork	4 x 6 Shopsmith	Optical Comparator Large	Metalwork	24"
Mini CNC Mill	Hi-Tech	4x4x3	CNC Router	Woodworking	4'x4'
Bench Lathe	Metalwork	5 x 12 Bench	Serger	Textiles	
Deskjet Plotter	Computer	D size roll plotter	Breadboard Kit	Electronics	

**Examples to be acquired**

Lathe #1	Metalwork	9 x 22 Enco lathe, inch & metric	Cold saw	Metalwork	Kalamazoo cold saw
Lathe #2	Metalwork	12 x 36 Enco geared head lathe	Horizontal band saw	Metalwork	Wilton 14" cut horizontal
Lathe #3	Metalwork	15 x 13 Leblond geared head lathe	Vertical band saw	Metalwork	Doall 16" metal cutting band saw
Lathe #4	Metalwork	16 x 60 South Bend lathe	Large Arbor press	Metalwork	Large manual arbor press
CNC Mill	Metalwork	10 x 50 Trionic CNC 3 axis mill	Small Arbor press	Metalwork	Small manual arbor press
Bridgeport #1	Metalwork	9 x 42 Bridgeport Series 1 3 axis	H-Frame press	Metalwork	50 ton H-frame press
Bridgeport #2	Metalwork	9 x 42 Bridgeport Series 1 3 axis	Surface plate	Metalwork	24 x 36 cast iron surface plate
Geared head drill press	Metalwork	Wilton 12" geared head drill press	Tool sharpener	Metalwork	Diamond wheel grinder
Delta drill press	Metalwork	Delta 14" variable speed floor drill	Metal sander	Metalwork	6 x 48 Powermatic stationary
10' Brake	Fabricating	10' x 16 gauge mild steel sheet	Shrinker/Stretchers	Fabricating	Shrinker/Stretchers
4' Brake	Fabricating	4' x 16 gauge mild steel sheet	18" Beader	Fabricating	Beader/ edger for sheet metal
Shear	Fabricating	52" x 16 gauge mild steel power	Notcher	Fabricating	6" sheet metal corner notcher
Slip roll	Fabricating	36" Barth manual slip roll	Turret punch	Fabricating	Diacro turret punch 1/8" – 1-1/2"
English wheel	Fabricating	Northern tool english wheel	Tubing bender	Fabricating	Hydraulic tubing bender 2-1/2"
Planishing hammer	Fabricating	Planishing hammer	Tubing notcher	Fabricating	Hole saw style
12" Bench shear	Fabricating	Hand operated bench shear	Bender	Fabricating	Compact bender with scroll
Throatless shear	Fabricating	Throatless shear	Mortiser	Woodworking	Jet JBM-5
Sawstop	Woodworking	10" Sawstop contractor saw	Delta sander	Woodworking	Delta 6 x 48 belt sander
Planer	Woodworking	15" Grizzly with spiral cutting head	Spindle sander	Woodworking	Jet oscillating spindle sander
Jointer	Woodworking	8 x 75 Grizzly with spiral head	Drum sander	Woodworking	Performaz 16-32 drum sander
Shaper #1	Woodworking	NorthTech 7-1/2 HP shaper	Unisaw	Woodworking	Delta Unisaw table saw
Shaper #2	Woodworking	Grizzly 3 HP shaper with router	Wood Lathe	Woodworking	Powermatic
Miter Saw	Woodworking	Dewalt 12" miter saw with stand	Scroll Saw	Woodworking	24" R. Hoe Scroll Saw
Powermatic drill press	Woodworking	Powermatic 14" bench drill press	Panel Saw	Woodworking	Safety Speed 50" panel saw
CNC Plasma table	Welding	Arclight Dynamics 4 x 8 table	120 volt spot welder	Welding	Chicago Electric
TIG Welder	Welding	Millermatic Sychrowave 180SD	240 volt spot welder	Welding	Chicago Electric
MIG Welder	Welding	Millermatic 251 with spool gun	Oxy/Acetylene	Welding	Oxy/Acetylene torch set
Hand Plasma	Welding	Thermal Dynamic Cutmaster 50	Forge	Grinding	
Small surface grinder	Grinding	6 x 10 Delta magnetic chuck	Foundry	Grinding	
Large surface grinder	Grinding	8 x 24 Brown & Sharpe	Blast cabinet	Grinding	Clarke sandblasting cabinet
Double pedestal grinder	Grinding	3 x 12 double pedestal grinder	Sandblaster	Grinding	Pressure fed sandblaster
Tool grinder	Grinding	Cincinnati tool grinder with indexers	Sharpener	Grinding	6" Universal surface grinder
Small buffer	Grinding	Powermatic 1/2 HP double ended	Enormous buffer	Grinding	Double ended buffer
Vacuum Former	Plastics	24 x 24 Vacuum forming machine	Strip Heater	Plastics	32" Quincy labs strip heater
Roller Die Cutter	Plastics	Sibe Automation roller die cutter	Oscilloscope	Electronics	BK Precision oscilloscope 1590A
Microscope	Electronics	SPZ-50 Zoom stereo microscope	Soldering station	Electronics	Weller
Laser Cutter/Engraver	Hi-Tech	1200mm x 900mm (47" x 35")	Walking foot	Textiles	Walking foot sewing machine
Vinyl Cutter	Hi-Tech	US Cutter TC 50" vinyl cutter	Embroidery machine	Textiles	
3D Printer	Hi-Tech	Makerbot Replicator 2	Standard sewing machine	Textiles	