



Graduate Student Council of the Massachusetts Institute of Technology

63.gsc.5 Resolution to Support MakerWorks Check Out Kits Using GSC Initiatives Fund

Authors: Michael Buchman¹ and GSC Treasurer Lisa Guay

The GSC Initiatives Fund was established to support campus-wide initiatives that benefit the MIT community, as determined by the GSC General Council. This Fund currently contains \$27,819.40.

MIT MakerWorks began working with the MIT Libraries earlier this year on a proposal to develop kits of tools and instruments that MIT students can check out and use for short-term projects. The kits will be supported by MakerWorks and distributed using the MIT Library system. Appendix A contains the full details of the project implementation plan, while Appendix B contains a detailed budget breakdown for the kit contents.

The GSC will contribute \$6,000 from the Initiatives Fund to cover the equipment costs for the initial kits offered by MakerWorks and the MIT Libraries.

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Appendix A: MakerWorks Check Out Kit Implementation Plan

Status as of 9/6/16: Currently this plan has the go ahead from both MakerWorks and the MIT libraries. Sample kits have been created, implementation plans are confirmed, and shelf space in the library has been set aside. In addition check out policy and library codes have been created. The intended roll out involves a soft opening in October. This will consist of making select kits available at Rotch library with minimal publicity. The soft opening is intended to find any issues with the program that can be quickly fixed. In November the program will be officially rolled out with the MIT maker conference. At this point all of the initial kits will be available and we will heavily publicize the program. Over the next year we will deploy additional kits as needed based on checkout data from the library. Once we get 6,000\$ of funding the initial kits will be procured and assembled. An additional 4,000\$ will be requested to fund additional high demand kits once the program is determined to be operating successfully.

Goal: To allow MIT faculty, staff, and students to make things at their own convenience. Sometimes it is simpler to take the tool to the project. In these cases the current MIT maker infrastructure is insufficient. This proposal leverages the current MIT library system and knowledge (librarians & MIT MakerWorks mentors) to provide a means for tool checkout.

Idea: People want to do small tasks from home, we should be able to provide them the means to do so. MakerWorks will put together a series of kits ranging from small tools, photography, electronics, and sensors. The long term goal is to make these kits available for check out from Rotch library, Hayden library, and Barker library. An initial pilot study is proposed with approximately 40 kits of varied types located in Rotch Library.

Implementation Overview: Kits will be available for 1 week checkout to all MIT affiliates. The kits will be cataloged and checked out the same way that library books are checked out. A MakerWorks mentor will procure, organize, and label the kits for easy use. The kits will then be transferred to the library staff who will catalog it. MakerWorks staff will train the library staff on how to use the equipment and check that it is in working order. MakerWorks staff will also be responsible for maintaining the kits through regular inspections of the kits.

MakerWorks responsibilities: MakerWorks will be responsible for procuring the tools and assembling the kits. The kits will be assembled into hard cases which contain a laminated list of what they contain to make it easy to track what's inside of them and training guides. Each case will be labeled with the MIT Library's logo, the MIT MakerWorks Logo, and a label describing what it contains. The kits will then be transferred to the MIT libraries for cataloging. MakerWorks staff will also train the relevant library staff on how to use the tools within the kits before they go into circulation.

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Once the kits are in circulation MakerWorks staff will be responsible for maintaining the kits. This will involve checking in on the kits on a weekly basis to make sure the tools are in functioning order. MakerWorks will be responsible for replacing broken kits and responding to any needs the librarians may have. MakerWorks staff will also work with the library to determine which tool kits are in the highest demand and order additional kits accordingly.

Library responsibilities: MIT libraries are an optimal partner for this initiative due to their inventory tracking system, operating hours, and accessibility. Initially the library will be responsible for cataloging the kits, allocating shelf space for them, and having some staff undergo training on how to use the kits. Once the kits are in place, they will be checked out like books. The library staff will be responsible for making sure the kits are returned complete and in working condition.

Storage, Checkout, and Return: All kits will be housed in hard shell cases stored on shelves. It is estimated that approximately 40 linear feet of shelf space, or a single wire shelving unit, will be needed to house the kits for the initial pilot study. Each spot on the shelves, and sides of each case will be clearly labeled for easy locating. There will be a laminated menu detailing kits and their contents on the library desk, and each case will have an attached inventory sheet. When a user wants to check out a kit they ask the librarian for a specific kit. The librarian gets the kit and confirms with the student that it is complete. The librarian may also give advice on how to use the tool (MakerWorks staff will train the librarians to do this). The kits can be checked out for a week at a time (with online renewal available if no one has the kit waitlisted). When the user returns the kit the librarian will check that it is complete and working.

Budgeting & Fundraising: We will seek a \$10,000 grant for the initial pilot program. After a semester the program will be evaluated. If the program is deemed a success additional fundraising efforts will take place in order to scale up the program. \$6,000 will go directly to tool purchasing and the materials needed to package the kits. \$4,000 will go towards overhead, unexpected expenses, replacing broken kits, and creating new kits for in demand tools.

Wear, Tear, and Charging: We understand that tools will get worn over time. This is expected, and users will not get charged for normal wear and tear. On an annual basis, MakerWorks staff will evaluate every kit and will replace worn and damaged tools. MakerWorks staff will also perform weekly evaluations of kits that are in stock. The librarians can also take kits that they deem to be worn out and old out of circulation. MakerWorks staff will take care of replacing those kits. The library will charge users if they return a kit incomplete, obviously broken, or fail to return the kit. Users who fail to return the kits on time will also be charged a late fee.



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Metrics for success: At six months, the tool checkout rates will be evaluated and additional high demand tools will be ordered. After a 1 year initial study the tool checkout program will be evaluated. It will be deemed a success if the checkout rate of the tools matches or exceeds the checkout rate for the average book. If the program is deemed a success it will be expanded to include more tools and to more locations. If the program does not meet the performance metrics set the library can choose whether or not to proceed with the program.

Safety: All of the tools and instruments selected are considered class I by EHS (the safest class). Clear instructions on proper use will be in every kit along with the appropriate personal protective equipment (safety glasses, gloves, earplugs, etc.).

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Appendix B: Project Budget Breakdown

Equipment Costs:

| Item | Number | Cost per item | Total Cost | Link to item |
|----------------------------------|--------|---------------|------------|--|
| Drill | 3 | \$99 | \$297 | https://www.amazon.com/DEWALT-DCD771C2-Lithium-Ion-Compact-Driver/dp/B00ET5VMTU/ref=sr_1_1?s=power-hand-tools&ie=UTF8&qid=1466010678&sr=1-1&keywords=dewalt+drill |
| Impact Driver + drill kit | 2 | \$159 | \$318 | https://www.amazon.com/DEWALT-DCK240C2-Lithium-Driver-Impact/dp/B00J0ALYS/ref=sr_1_4?ie=UTF8&qid=1466010842&sr=8-4&keywords=dewalt+impact+driver |
| Soldering iron & smoke absorber | 3 | \$56 | \$168 | https://www.amazon.com/Soldering-SOAIY-Adjustable-Temperature-Desoldering/dp/B01C9P7HDQ/ref=sr_1_2?s=hi&ie=UTF8&qid=1466012662&sr=1-2-spons&keywords=soldering+iron&psc=1 https://www.amazon.com/Aoyue-Benchtop-Solder-Smoke-Absorber/dp/B001RLZGKK/ref=sr_1_1?ie=UTF8&qid=1466014078&sr=8-1&keywords=solder+filter |
| Hot air station & smoke absorber | 2 | \$208 | \$416 | https://www.amazon.com/Aoyue-968A-Digital-Rework-Station/dp/B006FA481G/ref=sr_1_2?ie=UTF8&qid=1466014160&sr=8-2&keywords=hot+air+station https://www.amazon.com/Aoyue-Benchtop-Solder-Smoke-Absorber/dp/B001RLZGKK/ref=sr_1_1?ie=UTF8&qid=1466014078&sr=8-1&keywords=solder+filter |
| Function generator | 2 | \$359 | \$718 | https://www.amazon.com/Siglent-SDG1025-Function-Arbitrary-Generator/dp/B00GQNNVH4/ref=sr_1_3?ie=UTF8&qid=1466014243&sr=8-3&keywords=function+generator |
| Oscilloscope | 2 | \$399 | \$798 | https://www.amazon.com/Rigol-DS1054Z-Digital-Oscilloscopes-Bandwidth/dp/B012938E76/ref=sr_1_1?ie=UTF8&qid=1466014295&sr=8-1&keywords=oscilloscope |
| Socket Set | 4 | \$53 | \$106 | https://www.amazon.com/Stanley-92-824-Chrome-Etched-69-Piece/dp/B000KE6E1U/ref=sr_1_5?s=power-hand-tools&ie=UTF8&qid=1466014346&sr=1-5&keywords=socket+set |
| Hand tool set | 4 | \$40 | \$160 | https://www.amazon.com/Stanley-94-248-65-Piece-Homeowners-Tool/dp/B000UHMITE/ref=sr_1_1?s=hi&ie=UTF8&qid=1466014590&sr=1-1&keywords=tool+set |

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|--|---|-------|---------|---|
| Drill bits | 5 | \$24 | \$120 | https://www.amazon.com/Craftsman-100-Piece-drilling-driving/dp/B00692T2ZW/ref=sr_1_5?ie=UTF8&qid=1466090229&sr=8-5&keywords=drill+bits |
| Tap set | 2 | \$37 | \$74 | https://www.amazon.com/Neiko%C2%AE-00911A-Hexagon-Titanium-40-Piece/dp/B0012AQNXA/ref=sr_1_4?s=hi&ie=UTF8&qid=1466090334&sr=1-4&keywords=tap+set |
| Logger Pro set | 2 | \$200 | \$400 | http://www.vernier.com/products/interfaces/lq-stream/ |
| Assorted Logger Pro sensors | 2 | \$300 | \$600 | http://www.vernier.com |
| Calipers | 4 | \$36 | \$72 | https://www.amazon.com/Anytime-Tools-Caliper-Reading-Standard/dp/B00B5XJW7I/ref=sr_1_4?ie=UTF8&qid=1466090726&sr=8-4&keywords=calipers |
| Micrometers | 2 | \$90 | \$180 | https://www.amazon.com/Anytime-Tools-Micrometer-Precision-Machinist/dp/B0045UJZGSC/ref=sr_1_8?ie=UTF8&qid=1466090411&sr=8-8&keywords=micrometer |
| Clamps | 2 | \$37 | \$74 | https://www.amazon.com/Irwin-Tools-4935502-Quick-Grip-8-Piece/dp/B00L07E6XO/ref=sr_1_3?ie=UTF8&qid=1466090747&sr=8-3&keywords=clamp+set |
| DSLR camera | 2 | \$520 | \$1,040 | https://www.amazon.com/Canon-Digital-18-55mm-75-300mm-Accessory/dp/B00J34YO92/ref=sr_1_1?s=photo&ie=UTF8&qid=1466090778&sr=1-1&keywords=dslr+camera |
| Pelican case (for camera + logger pro) | 4 | \$40 | \$160 | https://www.amazon.com/dp/B0038VETHS/ref=psdc_3406401_t1_B003HH2024 |
| total | | | \$5,701 | |

An additional \$299 (5% of the total) is requested to cover possible Amazon price changes, item substitutions, shipping charges, and kit set-up and labeling costs.

Total Budget Request: \$6,000