College of Engineering and Physical Sciences
Engineering Shop

Title:

Tier 1 Funding RFP New Mechanical & Electrical equipment – FY25 – UW CEPS Shop

Requester(s):

Spencer Miller - Technical Engineering Manager
Gary Puls – Master Technician
Jason Haney – Master Technician
Brad Orr – Engineer

Department/Unit:

3295 – CEPS Engineering Machine Shop

Total Amount Requested ($ USD):

$ 35,000

Description of Request:

The UW Shop is requesting one-time funding to help meet goals of the Tier 1 Engineering Initiative. We believe the best way to bring maximum benefit to the College is by performing a major upgrade to the smaller waterjet machine that we have in the L65 Machine Shop:

1. **OMAX 2652 Software & Servo Motor Upgrade** *(Goals 1 & 2 of Tier 1 initiative)*
    a. ***What is it:*** This line item would be the cost to upgrade the computer system and machine hardware (for compatibility) from Windows 7 up to current Windows 11 on our small waterjet in the EN Machine Shop. This would include purchasing a refurbished computer from UW Surplus, along with some cost to have IT help us get the new computer online & integrated with the new OMAX hard parts. The majority of the cost will come from the hard parts and an OMAX technician to travel to Laramie for commissioning of the retrofit.

    b. ***Why do we need it:*** The current waterjet is running on the original software and setup from when it was installed in 2007, when Rob Erikson was the Shop Manager. As time has passed, in order to avoid this expensive computer upgrade, we've continued to run Windows 7 (which is no longer supported) and IT has put us on our own un-maintained network for security reasons. Unfortunately, it's only a matter of time until we can no longer use Windows 7 at all and the small waterjet machine will be down with it too. This smaller waterjet is the primary machine that we use to teach Engineering students, collaborate with faculty for the Manufacturing Processes & Senior Design courses, as well as cutting parts daily for research work. So without it, the shop's capabilities & services will be severely limited, when the Windows 7 system eventually fails. At that point, this will become an unplanned emergency and the cost to repair it will have to come from elsewhere, along with a longer lead-time, due to the unplanned nature of the emergency.

    c. ***How will we use it:*** With a proper upgrade from Windows 7 to Windows 11, we will be able to continue operating the OMAX 2652 waterjet as we have for years, without concern of the old computer system failing and the machine being down for several weeks or months until it's fixed. The "upgrade" will generally consist of the following:

        i. New computer tower (likely an old ESIG or other Engineering student lab computer, purchased from UW Surplus)
        ii. Re-using as much of the current monitor, keyboard, mouse & existing OMAX 2652 pump/controls system as possible

iii. Replacement/upgrade of several machine motion encoders and servo motors that drive the gantries and cutting head of the machine. OMAX states these must be changed when upgrading from Windows 7 to newer versions of Windows.
iv. Labor cost to have an OMAX technician travel to Laramie and help replace all necessary electrical/mechanical parts included in the "upgrade".

By using Tier 1 funding to complete this upgrade, the CEPS shop will continue to support all four of the Engineering Initiative's, as follows:

1. **Excellence in Undergraduate Education**: *The College of Engineering and Physical Sciences has solid educational programs that produce talented graduates, who are in demand by employers. Our goal is to enhance these programs and expand our local recognition to a national reputation.*

    1. Every year the CEPS shop teaches and trains 40-50 graduating Engineering seniors (Mechanical, Civil, Chemical & Electrical) about the waterjet technology, it's applicable uses and gives them hands-on training with the machine. These students take this knowledge and skill out into the workforce with them, giving them a leg-up over other universities who don't own or maintain machines of this caliber. We believe these are extremely valuable skills and learning experiences for these students as they seek employment with UW partners after graduation, making UW grads more attractive to employers than other universities.

2. **World-Class Research and Graduate Education:** *Research leading to discovery and innovation often happens at the interface of different disciplines, where ideas and talents intersect to solve pressing problems. We seek to build world-class interdisciplinary research capabilities in selected areas that will have significant impact on Wyoming and the nation and enrich student mentoring.*

    1. The staff in the CEPS shop use the waterjet(s) daily for cutting parts for researchers, cutting out rough shapes that are then further machined and utilizing the abrasive nature of the water-jetting process to cut unique research materials like stone, exotic metal alloys, coal/carbon fiber composites and complex shapes from a variety of materials. Without the OMAX 2652 machine up and running, the cost and lead-time to provide these services would be much higher to our research and teaching faculty at UW.

3. **Productive Economic Development through Partnerships:** *We will promote discovery and innovation and seek productive partnerships with the state, national agencies, and industry to actualize research findings and catalyze economic development in Wyoming.*

    1. Only about 10% of the CEPS Shop's work comes from outside funding (non-UW/RSO), but when those jobs do come along, we feel the best way to offer services and not "compete with private industry" is to offer our waterjet services.

        It's accurate to say that of the 10% of the "outside work" we do - 90% or more of that is water-jetting services. So, if we don't have the OMAX 2652 available to do that work, we'll be missing out on one of our streams of revenue (or at least partially) until the machine is back up and running. We do have the other OMAX 55100 in the EERB shop that could tackle some of this work, however, it would then be booked full-time, until the small waterjet is back online.

4. **K-14 STEM Education:** *Strength in K-14 education can enhance the quality and quantity of students who pursue STEM programs at UW and ultimately pursue high-impact careers in the State. We will introduce STEM concepts early in the K-12 educational experience, and we will also enrich the STEM skill sets of UW's freshmen and sophomore students to improve performance and retention.*

    1. The CEPS shop helps support K-14 education by hosting a group of Engineering Summer Program students each year which has always had a portion of the session revolving around part design and manufacturing, utilizing the waterjet.

       Historically, this has always been done on the smaller OMAX 2652 machine in the L65 shop, due to scheduling and location of the classroom portions of that program frequently being in the EN building.

       The Shop has also used both of the waterjets simultaneously when making cutouts/giveaways for events like Discovery Day, held annually over at the FE Warren Air Force Base in Cheyenne. If the small waterjet's computer system were to fail during the Spring/Summer months, it would limit our offerings of items to make for giveaways to students at those events.

The cost estimated to complete this repair (at this point) is no more than $35,000 based on historical information from OMAX and past shop employees experiences discussing this with OMAX in 2018. Unfortunately, we have not been able to receive a formal quote yet from OMAX due to delays on their end. We know that the cost around the 2018/2019 timeframe was around $25k, so $35k now should be a good estimate.

We hope to have a more accurate number by the end of next week January 17th at which time we will pass that along to the group for planning purposes. This upgrade is critical to ensure the future of the OMAX 2652 machine's use (likely for the next 10-15 years) and is something that needs to be done sooner than later, so we're hoping to capitalize on Tier 1 funding in order to make that happen.