

Our War Too: Women in Service

2024 Robotics Challenge



“Photograph of Women’s Army Auxiliary Corps (WAAC) Captain Charity Adams of Columbia, NC Drilling Her Company.” (U.S. National Archives)

Every American woman was presented with new challenges during World War II. On the Home Front, many women said goodbye to loved ones who left to serve overseas. Many women also took on new roles on the Home Front. Because so many of the country’s working age men were needed for the war effort, women filled positions in factories and shipyards. These women, sometimes referred to as “Rosies,” played an important part in making sure America’s manufacturing industry could continue to support the military’s needs.

A smaller but still very significant group of women supported the war effort in a different way. During World War II, nearly 350,000 American women volunteered for military service. They served in the women’s component branches of the Army, Coast Guard, Navy, and Marine Corps, as well as the Army and Navy Nurse Corps and the civilian Women Airforce Service Pilots (WASPs). Women filled important roles as mechanics, pilots, scientists, and much more. They brought their own unique skills to their military service, and they gained a lot of valuable experience along the way.

However, military service also offered a unique set of challenges for them to face. Many servicewomen, especially women of color, faced discrimination and biased treatment. It is important to tell the stories of women who served during World War II. By learning about them, we can celebrate their accomplishments, learn from the challenges they overcame, and honor their legacies.

This year’s challenge is inspired by the [Our War Too: Women in Service special exhibit](#) that is on display in The National WWII Museum's Senator John Alario, Jr. Special Exhibition Hall through July 21, 2024. More information about the special exhibit can be found on the Museum’s website.

Follow this link to watch the 2023 Robotics Challenge Introduction Video: <https://youtu.be/DhQQUo0BH2I>

Robot Game Rules

Headquarters



Your robot can only launch from the Headquarters area, but it can return anywhere in the Headquarters and base area. The robot, any attachments, and any mission manipulatives must fit inside Headquarters before launching. If a mission states that something must be returned to Headquarters, it must be brought to Headquarters before exiting the mat.

Touch Penalties

You can only touch your robot in Headquarters and in the free space to the left of your mat. If you touch your robot while it is on any other section of the Robot Game mat, your team will receive a one-time touch penalty of ten points.

Benefit of the Doubt

Teams will receive the benefit of the doubt when it comes to mission objective points if there is any doubt to scoring regarding the Robot Game.

Robot Game Missions

Your robot will complete missions to earn points during the Robot Game match. The goal is to earn as many points as possible. Each Robot Game match should last two minutes and thirty seconds. Missions do not need to be completed in any particular order. They are numbered here for ease of understanding.

1. Mail Call
2. Confidential Documents
3. Roll Out Gauze
4. Harvard Mark I Operations
5. LORAN Pulse
6. Parachute Rigging
7. Test Flight
8. Aircraft Mechanic
9. Signal Light

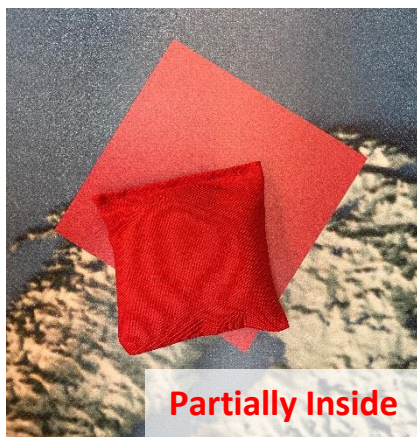
Mail Call

Robot Game Mission #1

During World War II, the 6888th Central Postal Battalion, took on a crucial mission to clear a two-plus year backlog of mail for U.S. troops in Europe. The 6888 were a predominately Black unit of the Women's Army Auxiliary Corps. Despite facing discrimination and segregation, they worked tirelessly to sort millions of letters and packages. Stationed in England and later in France, they provided an extremely important service. By sorting and ensuring the mail reached its destination, they did a great deal for the morale of the soldiers in the European Theater. Unfortunately, they had their own challenges to overcome. As women of color, they faced discrimination on multiple fronts. While in England, they were not allowed to eat, sleep, or shower with the White servicewomen, and they had to operate many of their own facilities out of necessity.

While serving, 3 of the 855 members of the battalion lost their lives in a Jeep accident. They were laid to rest in France, accounting for three of the four women buried in the Normandy American Cemetery. The remaining battalion members returned home unceremoniously, where their hard work would not be recognized for some time. Their hard work not only contributed to the smooth operation of the postal system, but also paved the way for greater opportunities for African American women in the armed forces. The impact of the 6888th Central Postal Battalion extends beyond their wartime duties, serving as a symbol of resilience and breaking down barriers for future generations.

For this mission, your robot will move the three bean bags from their starting locations on the mat to the rectangles that match their color. For example, the red bean bag should be moved to the corresponding red rectangle. Each bean bag must be completely inside of the correct rectangle at the end of the match to earn points. 10 points will be awarded for each bean bag that is delivered correctly, so your team can earn 10, 20, or 30 points with this mission.



Confidential Documents

Robot Game Mission #2

A large portion of the women who volunteered for service during World War II were tasked with administrative or secretarial work. The work of these servicewomen kept many of the military's operations functioning. Some even brought their skills overseas to directly support the war effort. In 1942, six Women's Army Auxiliary Corps (WAAC) officers arrived in the North African Theater of Operations. These servicewomen were experienced secretaries, and they were there to provide administrative services. The first enlisted WAACs arrived a month later. Though they faced skepticism and bitterness from some male counterparts, many of the WAACs were excited at the opportunity to take on new experiences and see new places. Their clerical skills made them valuable to the effort, and opened doors for them to do things they might not have imagined possible.

For this mission, your robot will collect the miniature envelope from its starting location on the mat and return it to Headquarters. The envelope will be upright in a cardholder on the mat at the beginning of each match. The cardholder will be secured to the mat with Velcro tape. If the envelope is removed from the cardholder and returned to Headquarters by the end of the match, your team will receive 25 points. If it is completely removed from the cardholder (not touching it) but left somewhere else on the mat, your team will receive 5 points.

No points will be awarded if the cardholder is detached from the mat. No points will be awarded if the envelope is removed from the cardholder and brought to the free space if it is not brought to Headquarters first.



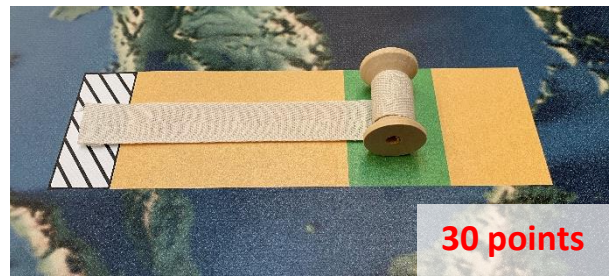
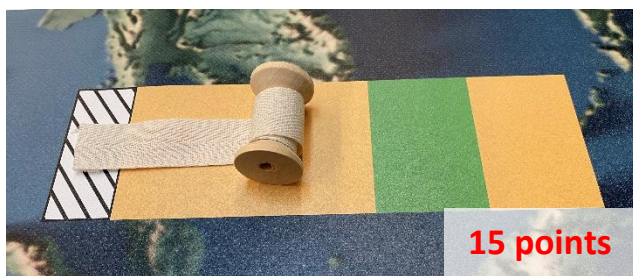
Roll Out Gauze

Robot Game Mission #3

During World War II, over 59,000 nurses served in the Army Nurse Corps, with nearly 11,000 in the Navy Nurse Corps. This type of service was one of the select options for women to serve overseas during the War. Many nurses served under fire, working close to the front lines to provide medical care to sick and injured soldiers. The aid they provided was invaluable, but the work was incredibly dangerous.

In 1942, 77 U.S. military nurses stationed in the Philippines were captured by Japanese forces and taken as Prisoner of War (POWs). Despite the harsh conditions, the nurses organized to provide professional medical care for their fellow Allied POWs throughout their three-year imprisonment. Amazingly, all 77 nurses survived until their rescue in 1945. Their bravery and resilience earned them the name "The Angels of Bataan and Corregidor," after the places where they were held.

For this mission, your robot will unroll the wooden spool and fabric so that it lands in the designated section on the mat. One end of the fabric will be attached at the starting location using velcro tape. Points will be awarded depending on where the wooden spool is located at the end of the match. If the spool is completely inside of the green section, your team will receive 30 points. If the spool is completely inside of the yellow section, you will receive 15 points. If the spool is partially inside either the yellow or green section of the rolling area, you will receive 5 points. This includes if part of the spool is touching the mat outside of the side of the rolling area, or if part of it is still touching the lined rectangle. No points will be awarded if the fabric is detached from the mat.



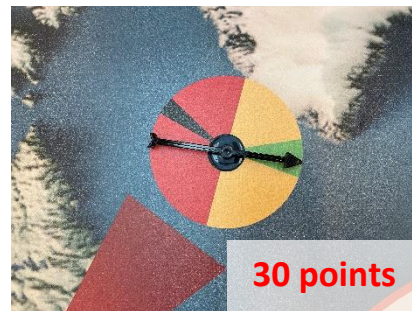
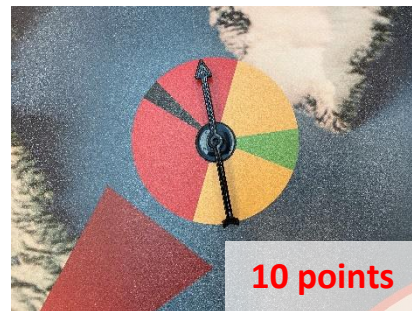
Harvard Mark I Operation

Robot Game Mission #4

Navy Rear Admiral Grace Hopper worked under Howard H. Aiken as one of the first programmers of the Harvard Mark I computer, and went on to become one of the pioneers of computer coding. The Mark I was used to process calculations in the development of the Atomic Bomb. It was also known as the Automatic Sequence Controlled Calculator, which means it could process mathematical equations automatically according to the instructions it was fed. Grace Hopper served as one of the Women Accepted for Voluntary Emergency Service (WAVES). Her work not only contributed to the future of computer science; it inspired countless women to pursue careers in STEM. Hopper's dedication to education and discovery changed the face of science and technology, and we still see the impacts of her work today.

The Mark I received instructions through a paper tape feed. It was operated through a network of switches, buttons, and rotary dials. It was important to give the Mark I the right instructions, but it was also important to make sure that all of the switches were in the right position to operate.

For this mission, your robot will rotate a game spinner attached to the mat. The game spinner's pointer will be positioned over the black section of the circle at the beginning of the match. Your team will receive points based on where the spinner's pointer is located at the end of the match. If the pointer is positioned over the green section, your team will receive 30 points. If the pointer is positioned over one of the yellow sections, your team will receive 20 points. If the pointer is positioned over a red section, your team will receive 10 points. No points will be awarded if the base of the spinner is detached from the mat.



LORAN Pulse

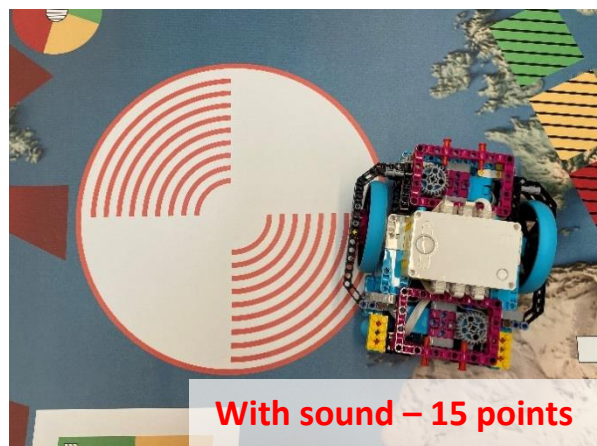
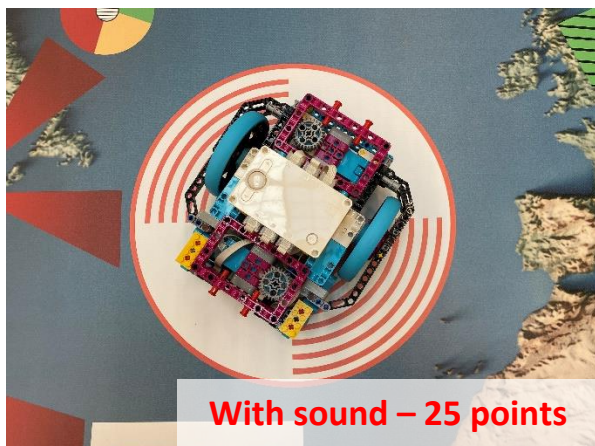
Robot Game Mission #5

The U.S. Coast Guard introduced the Women's reserve during World War II, and their servicewomen came to be known as SPARs. The acronym stands for the Coast Guard's motto: *Semper Paratus-Always Ready*. SPARs served throughout the United States, taking on roles as supply officers, recruitment officers, and more. As SPARs continued to perform well in their duties, and as more requests for their service were issued, their numbers increased in many male dominated spaces. They would, at times, be faced with negative reactions from male colleagues who discounted the experience and expertise servicewomen brought to their roles.

In the summer of 1944, it was decided that SPARs should operate the LORAN stations within the continental United States. LORAN, which stands for Long Range Aid to Navigation, was a method of using radio signals to pinpoint the location of military aircraft and ships. The first SPAR LORAN in Chatham, Massachusetts was run by a group of 12 servicewomen. Their work was confidential, so they were not allowed to discuss their training or assignment with any other service members. After the men who manned the station were dismissed to serve overseas, the SPARs were responsible for every aspect of operating the LORAN station, 24 hours a day. In addition to the obvious new skills, they had to become skilled at everything from maintenance to plumbing in order to complete their assigned duties.

For this mission, your robot will go to the white and orange circle at the center of the mat and make a sound. It does not have to be a specific sound, but if your team is competing at an event it will need to be a sound that is easy to hear. If your robot is completely inside of the white and orange circle when making a sound, your team will receive 25 points. If your robot is partially inside of the circle when making a sound, your team will receive 15 points.

To be considered "completely inside" of the circle, all of the robot's wheels must be inside of the circle and all of its attachments must fit inside of the perimeter. To be considered partially inside of the circle, at least some part of the robot must be touching the mat inside of the circle. Teams can only receive 15 or 25 points for this mission. If your team makes multiple attempts to complete this mission, you will be awarded the points that correspond with your best attempt.



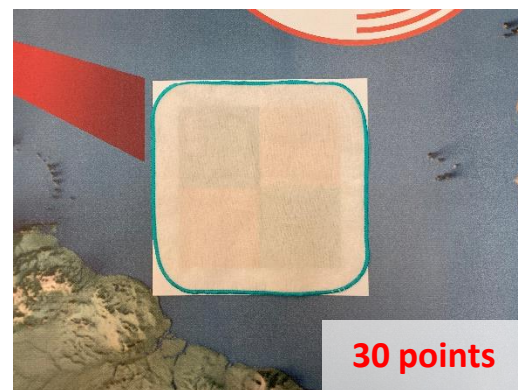
Parachute Rigging

Robot Game Mission #6

Parachute riggers were essential to making sure equipment was safe and effective. They were responsible for inspecting, repairing, and packing parachutes. Due to gendered stereotypes, many assumed that women would be naturally inclined to working with fabrics. In reality, this was not necessarily the case. Many women who enlisted to be trained as parachute riggers had little experience with a sewing machine, and had to be trained just as any other recruits. With some training, women parachute riggers became successful and efficient components of naval aviation.

When WAVES started to serve as parachute riggers, a previously standing requirement was waived. Other parachute riggers were required to jump from a plane using a parachute that they had packed themselves. Women were originally barred from this activity, but it later became an optional experience for women parachute riggers. This was only one of many new experiences servicewomen were exposed to.

For this mission, your robot will unfold a handkerchief to cover the yellow and green areas below it. The handkerchief will be attached to the mat on one corner. The goal is to unfold the handkerchief so that it lays as flat as possible and covered the colored areas below it. If both the yellow and green areas are completely covered at the end of the match, your team will receive 30 points. If the green areas are not completely covered, but both yellow areas are completely covered, your team will receive 20 points. If one or both of the yellow areas are partially covered by the handkerchief, your team will receive 5 points. No points will be awarded if the handkerchief is detached from the mat.



Test Flight

Robot Game Mission #7

Some of the most famous female contributors to the war effort were the Women Airforce Service Pilots (WASP). Although they flew military aircraft, WASPs were employed as civilian pilots. They were not allowed to fly in combat, so the primary duty of WASPs was ferrying planes across the United States. This meant that they were responsible for moving American aircraft to get them in place for military operations. The WASPs were essential to the success of the United States military because their service enabled more male pilots to join combat overseas. However, even though their training was almost identical to male pilot training and their jobs put them in consistent danger, WASPs were not considered service members until 1977. After years of fighting for recognition, WASPs were granted military status. Over 30 years later in 2009, President Obama signed a bill awarding the WASP the Congressional Gold Medal.

For this mission, your robot will bring a toy airplane from Headquarters to the white square on the mat. Your team will receive points based on where the airplane is located at the end of the match. If the plane is completely inside of the white square, your team will be awarded 25 points. If the plane is partially inside of the square, your team will receive 10 points.

The plane must be upright at the end of the match to receive points. If all four of the plane's wheels are not touching the mat at the end of the match, no points will be awarded. To be considered completely inside of the square, all four of the planes wheels must be touching the inside of the white square. To be considered partially inside of the square, at least one of the wheels must be touching the inside of the white square.



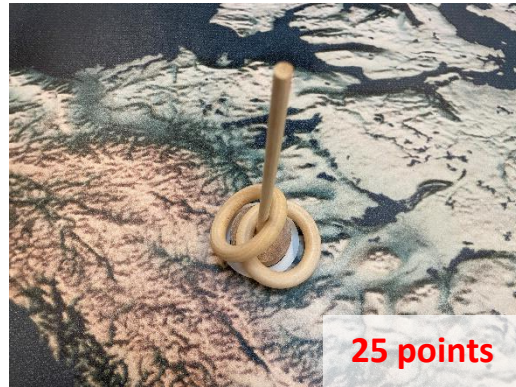
Aircraft Mechanic

Robot Game Mission #8

Many women took on traditionally male roles during World War II. The famous character of Rosie the Riveter represented a large number of these women. Rosies entered the workforce in large numbers, working in civilian positions as machinist, mechanics, technicians, and more. A large number of servicewomen served in similar roles, where they maintained military aircraft and equipment. Because so many men were needed for the war effort, civilian and military roles needed to be filled. Women stepped up to support the effort in every way they could.

In military positions, women served as aircraft mechanics, aviation metalsmiths, and machinist's mates. The work may not have been as flashy as some of the events overseas, but the proper function of military equipment was essential to the Allies' success.

For this mission, your robot will put wooden rings around the dowel attached to the mat. Points will be awarded depending on the number of rings placed on the wooden dowel at the end of the match. There are two large rings and one small ring for this mission, but they all earn points in the same way. If there are three rings on the dowel at the end of the match, your team will receive 40 points. If there are two rings on the dowel at the end of the match, your team will receive 25 points. If one ring is on the dowel at the end of the match, your team will receive 15 points. No points will be awarded if the dowel is detached from the mat during the match.



Signal Light

Robot Game Mission #9

During World War II, some WAVES served in U.S. naval bases as Control Tower Operators. Control Tower Operators monitored and controlled the aircraft entering and exiting the base. They used signal lamps to communicate with aircraft pilots, typically using Morse code. This was important communication, especially when technology was much more limited than what is available today.

WAVES were initially not allowed to serve overseas or on ships. In 1944, Congress passed legislation that allowed WAVES to volunteer for service in Alaska and Hawaii. Over 100,000 women served as WAVES during the War. Roughly 23,000 of them served in the aviation field. In addition to control tower operators, WAVES served as photographers, pigeon trainers, gunnery instructors, and more. Though they were not permitted to serve outside of the United States, WAVES played a major role in ensuring the Allies' success. They helped to keep numerous operations running smoothly, serving in traditional male and female positions.

For this mission, your robot will push the button on a push light to turn it on. If the push light is lit up at the end of the match, your team will receive 25 points. No points will be awarded for this mission if the push light is detached or moved from its starting location.



Engineering Project: Women in WWII

The American women who served in the military during World War II contributed to the war effort in many ways. Their unique skills and perspectives proved invaluable to the Allies' victory, and their stories continue to have an impact today.

Your Team's Project

Your team will design a simple website using Google sites to tell the story of a woman (or group of women) who contributed to the Allies' war effort during World War II. The website should answer the following questions about your subject:

- Who is the subject of your project?
- What did they do to support the war effort during World War II?
- Where did your subject serve? If they were not in the military, where did they live during the War?
- What lasting impact did your subject's achievements have?*

*You might not be able to find concrete information about the impact your subject has had. Use the information you find about their story to make an argument about why their achievements were important. For example, a number of women scientists served during World War II. Did they open doors for more women to work in the sciences? Did they open doors for more women to serve in the military? It is most important to include **why** you think their achievements had a lasting impact.

Building Your Website

For competing teams, it is recommended that you use [Google Sites](#) to build your website. Other website building platforms are permitted, as long as a link can be generated for judges to view when judging your project.

Your website should have at least two sub pages in addition to the Home Page. There should not be more than 5 pages on your website. The pages do not need to be organized in a specific way, but the recommended organizational structure is listed below. Teams are welcome to organize their website in a different way if they believe it will tell the subject's story more effectively. Competing teams will be judged according to the overall organization of their website and its content.

Recommended structure:

- Home Page: Overview of subject, including general background information
- Sub page 1: The subject's contribution to the war effort
- Sub page 2: The lasting impacts of the subject's achievements; the subject's legacy

Important Dates

If you are participating in a Robotics event, please be prepared to submit the link to your team's website no later than **Monday, April 22nd**. The website **DOES NOT** need to be completed on this date. Your team can continue working on their website until the day of their competition. We need the links in advance in order to prepare for the judging sessions.

Sources & Citations

Your website should have content from at least three sources. Somewhere on the website, include a list of sources for your team's research. Any source that you get information, images, or any other content from should be cited. We recommend that sources are cited in MLA format.