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A Dark Endeavour

Although this week's launch of the Endeavour will mark the final voyage of NASA's shuttle program, the result of the mission may open up an entire universe that we've never seen before. Scheduled to launch on Friday, April 29 at 3:47 p.m., Endeavour will deliver the Alpha Magnetic Spectrometer (AMS) to the International Space Station (ISS) in order to measure invisible cosmic rays and decipher the hidden secrets amongst them.

SPACE ROCK

A wakeup song for the astronauts has been a part of the space program since the days of the Apollo missions, and NASA is giving the public a chance to choose the songs for the final mission!

Vote for your favorite song at: https://songcontest.nasa.gov/homeaspx

The AMS is the brainchild of MIT professor Samuel Ting, a Nobel laureate, who designed the instrument with dark matter and antimatter in mind. The hypothesis of dark matter involves the existence of invisible mass that results from the gravitational effects on visible matter; however, little is actually known about this substance. Although Ting is hesitant to make predictions about what the instrument will uncover, he hopes it will shed some light upon the mystery surrounding dark matter, which makes up an estimated 90% of the universe's mass.

During Endeavor's 14-day trip, the crew of six will deliver the AMS to the ISS, where it will be used to measure the invisible cosmic rays found in space. The AMS, which is basically a 2-ton ring of powerful magnets and ultrasensitive detectors, is going to be used to track, but not capture, these cosmic rays. Once the instrument is installed outside of the space station, it will be operated remotely from Earth and won't need any attention from the astronauts in orbit. Joe Delai, the mission manager for NASA's 134th and final shuttle launch, says that "This is probably the most exciting one I've been on."

Space Exploration

This year marks the 30th anniversary of the shuttle program as well as its retirement. The first shuttle launch occurred on April 12, 1981 with the Columbia, or STS-1. Manned by a crew of two, this was the only U.S.-manned maiden test flight of a new shuttle system. During the 54-hour mission, the Columbia orbited Earth 37 times. This ambitious beginning paved the way for advancements in space exploration and improved shuttle technology. Since that time, space shuttles have been used to launch, repair, and recover satellites, conduct ground-breaking research, and participate in communication and war efforts.

Long before the shuttle program began, however, astronomers and scientists were trying to understand how we fit into the universe. Thousands of civil servants and contractors have worked in NASA field centers across the country to promote space exploration and help solve one of our oldest mysteries: the

universe itself. According to Jack Nolan, a TTS employee of 5 years, one of the first attempts to understand Earth's relationship to the universe was through the Orbiting Geophysical Observatory (OGO), which consisted of six satellites that were launched from 1964 to 1972. As an employee of the TRW aerospace division (now Northrop Grumman), Nolan participated in the assembly and testing of the OGO, which was designed to study Earth's magnetosphere and the Van Allen radiation belt. This invisible belt is made up of charged particles, or plasma, and held in place by Earth's magnetic field. Like dark matter, however, there are still a lot of questions surrounding this phenomenon. A NASA mission scheduled for 2012 will further explore the belt and how it affects our universe.

During his long career, Nolan has worked on the Apollo missions as an assembler, tester, and procedure writer. Nolan has also met the original Mercury Seven astronauts, including working personally with Walter Marty (Wally) Schirra Jr., and was involved in the initial development of the Defense Support Program (DSP), which is still active today. The DSP is a U.S. Air Force program that operates reconnaissance satellites and serves as an early warning system in the detection of missile and spacecraft launches as well as nuclear explosions.

Political Climate

Politics has played a role in space exploration since NASA's inception on July 29, 1958. After the Soviet Union launched Sputnik, the world's first artificial satellite, in October of 1957, the U.S. entered the space race. During this time, NASA began garnering public support and government funding for its own mission on the grounds of national security as well as the necessity of technological leadership. As a result, the U.S. launched its first satellite, Explorer 1, in 1958, three months after Sputnik.

Continued advancements in the aerospace industry during the 1960s brought a feeling of romanticism toward space exploration among the American public, culminating with the moon landing in 1969. During this time, astronauts were looked upon as heroes, which led to increased public support and funding for the space program. In the 1970s, the political climate shifted to issues of security and economic gains with the use of satellites for communication and television.

Questions and criticism, however, began to cloud NASA's reputation after the explosion of the Challenger in 1986. After only 73 seconds of its 10^{th} mission, the Challenger exploded, resulting in the deaths of all seven crew members. Controversy and funding issues surrounding NASA continued into the 1990s when the public began considering the space program a waste of money, particularly involving the SETI program (Search for Extra-Terrestrial Intelligence). People didn't believe that the low probability of finding extraterrestrial life warranted the large amount of funding the program was receiving. As a result, the program was detached from NASA and has been privately funded since 1991.

In recent years, our economic climate, advanced technological capabilities, and private shuttle programs have contributed to the impending conclusion of NASA's shuttle program. Both the competition for funding among different government agencies as well as the technological ability to explore space without the need of manned shuttles have directly led to the retirement of the space program, with Endeavour's final launch on Friday. The 14-day mission will include four space walks and the delivery of

the AMS to the space station. The result of this final mission, however, will create an entirely new opportunity to uncover the mysteries of our universe and dark matter with the AMS.

The Future of Space Exploration

Although NASA's shuttle program has reached its retirement, the future of space exploration and discovery is still limitless. To replace its program, NASA is turning to private aerospace companies in order to taxi astronauts back and forth to the space station. As part of an Obama Administration plan, this new effort will save the government money while allowing NASA to focus on more ambitious missions farther into space. While many may feel a bit sad or nostalgic about the end of NASA's shuttle program, new commercial shuttle development and advanced technology, such as the AMS, will only serve to further our understanding of the universe and help unravel the mysteries and unanswered questions we still have.

If you're interested in watching the final shuttle launch in person, visit http://www.nasa.gov/centers/kennedy/about/view/view_shuttle.html for a list of the most popular off-site viewing locations.

Endeavor mission: http://www.nasa.gov/mission_pages/shuttle/shuttlemissions/sts134/index.html

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