Southern Maine Astronomers
Club Meeting Minutes
September 4, 2025July10, 2025 7:00 p.m.

Attending were members Michael Green, Russell Pinizzotto, Bob Dodge, Greg Thorup, Greg Shanos, Howie Marshall, Al DiSabatino, Ron Thompson, Anne Dobriko, David Feindel, Bill Denig, Paul Howell, George Bokinsky, Craig Snapp, Andrew Farm, Dean Ostergaard, Gil Fraser, Dwight Burkard, Brad Irish, Marc Stowbridge, Steve Tondreau, Scott Lovejoy, David Crocker, John Saucier, Mike Simmons, Kevin Berry, Doug Lund-Yates, guests Todd, Melinde and Herb Bubert from NHAS and Rob Burgess.

Russ Pinizzotto opened the meeting by immediately introducing our speaker, Ron Thompson, a member of the club since 2005, and someone who has followed the Voyager missions since their inceptions in 1977. The missions were conceived as far back as 1965 when it was realized that in the outer planets would be in a favorable alignment in the 1980's, an alignment that would not repeat for 175 years. A launch of space exploration vehicles by 1977 was necessary to take advantage of this alignment.

Voyager 2 was actually launched first on August 20, 1977 followed by Voyager 1 on September 5, 1977. Voyager 1 would do fly-bys of Jupiter and Saturn. Voyager 2's different trajectory would take it on a path allowing it to explore Jupiter, Saturn, Uranus and Neptune. Today, Voyager 2 remains the sole mission to visit the outer ice giant planets. The Voyagers remain NASA's longest operating space exploration missions, both reaching 48 years of scientific discovery.

Seen from today, the computer systems on board both spacecraft was extremely primitive. The computers had a memory capacity of only 69kb and also utilized an 8-track recording system. Both spacecraft contained the same equipment, including narrow and wide-field cameras, magnetometers, plasma and dust detectors, and several instruments dedicated to planetary measurements. These latter instruments were turned off once the planetary fly-bys occurred to save power. Both spacecraft utilized radioactive thermoelectric generators containing plutonium 238 that transformed the heat from radioactive decay into electricity. The half life of plutonium is 88 years. At present, each spacecraft is generating only about 4 watts of power. At some point in the not-too-distant future the spacecraft will have insufficient power to communicate with Earth and the missions will end. Both spacecraft will then silently continue their journey in interstellar space forever. Voyager 1 is travelling at 38,000 mph and it 15.6 billion miles from Earth, while Voyager 2 is proceeding aat 34,400 mph, and now at a distance of 13.1 billion miles. Voyager 1 has traveled 0.0024 of a light year.

Among a multitude of discoveries from the Voyagers were the detection of rings around all four outer planets, the active vulcanism of Jupiter's moon Io, and the giant storm in the atmosphere of Neptune. We gained our closest look at moons such as Saturn's Titan and Neptune's Miranda and Triton that had widely differing surface features indicating different geologies. In one of the most iconic of space pictures was that of "The Pale Blue Dot" from beyond Neptune, showing several of the inner planets including Earth a sunbeam of interplanetary dust illuminated by sunlight.

Astronomer Carl Sagan was a driving force behind the missions including the "golden records" carried by each spacecraft. Each record contained greetings in 55 languages and sounds from Earth, including a crying baby, a thunderstorm, rain, wind and waves. They also contained a map showing from where the craft emanated, by reference to quasars, and an outline of male and female humans scaled in relation to the spacecraft, all in the extremely rare hope that one of these craft might be intercepted by another intelligent life form. They represent our message in a bottle thrown into the cosmic ocean.

Both craft are now in interstellar space, with Voyager 1 crossing the heliopause in August 2012 (not confirmed until April 2013), and Voyager 2 doing so in May 2018. Their respective passages were different indicating

that the heliosheath was not of uniform proportions but something with differing density and size. The spacecraft demonstrated their crossing into interstellar space with the decrease is helio-generated particles and an increases in plasma density and cosmic rays.

Both spacecraft communicated through the Deep Space Network with three antennae located in Goldstone, CA, Madrid, Spain and Canberra Australia. One-way communication takes almost 24 hours. The spacecraft have each had problems that required an amazing amount of ingenuity to address. Engineers and scientists from the missions' inception have had to be pulled out of retirement to help modern computer programmers write new code that could be uploaded into the primitive onboard computers to keep the spacecraft gathering data and transmitting them to Earth.

Ron's involvement with the missions goes back to their earliest days as a member of JPL Radio Club, allowing HAM operators to receive signals from the spacecraft as they flew by the outer planets.

Ron's presentation, showing side-by side comparisons of the two missions including excellent slides gathered from the archives of the missions over the decades, was enthusiastically recognized by the Club audience. Many members said Ron's presentation was the clearest and most helpful exposition of both missions they had ever seen and he received a hearty applause at the conclusion of his talk.

Announcements:

Russ reminded members of the schedule of events for the remainder of the year:

- Solar viewing on the Brunswick Mall on Saturday, 9/13, from 11 to 2
- Star party at Bug Light State Park in South Portland on 9/20
- Private Star Party in Newcastle on 9/25
- Star Party at Mitchell Field in Harpswell on 10/24
- Star Party at Kettle Cove in Cape Elizabeth on 11/15

Night Sky Tour - Russ Pinizzotto

Russ highlighted items from the NASA Observing Challenge for September showcasing the following: TCrB (still waiting for the nova event); M15 Globular Cluster in Pegasus; M27 Planeatry Nebula (Dumbbell) in Vulpecula; M55 and M75 Globular Clusters in Sagittarius; C20 North American Nebula in Cygnus; C27 Crescent Nebula in Cygnus; C55 Planetary Nebula (Saturn Nebula) in Aquarius; C57 Galaxy (Barnard's Galaxy) in Sagittarius; M71 Open Cluster (Angelfish Cluster) in Sagitta; C15 Planetary Nebula (Blinking Planetary) in Cygnus. Russ also highlighted 3I Atlas, an interstellar comet "visible" (Mag 14) in Libra on Sept 4. It is believed this comet may be 7 billion years old, much older than our Solar System.

Rob Burgess
Secretary, SMA