



## General Meeting Saturday, February 14, 2004

President Wayne French opened the meeting at 7:30

Minutes accepted. Treasurer's report: \$1961.92

### Old Business:

**1. Public Star Party:** Mark K. report about 15 hardy souls ran from their cars to the scopes on the 31 January open house. An operator of the Baltimore City Community College asked Mark if anyone could help with their new Meade LX200, especially with the workings of the electronic drive. Their new observatory (which we learned they purchased from Lucy A.!) is at the Dundalk campus. If you'd like to help them and need some information please contact Mark K.: <mailto:mark@warhorse6.com>

**2. Observatory Operations:** Members who would like to go through the training to certify safe operation of the observatory should contact Steve Channel to schedule a class. The extremely cold weather prevents us from holding training currently, but as soon as temperatures moderate a bit, we can start back up. Three members are signed up so far, and we're aiming for the end of this month to hold another class. The scope points and tracks well. Final drift alignment would be necessary for exacting astrophotography work...especially film, however Steve has made some digital shots through the eyepiece with good result. The club does have a new CCD camera and the only thing keeping us from hooking that up is identifying folks that would be interested in working in that area. Please let us know if you'd be interested in trying your hand at digital astrophotography and we'll work to install the camera and associated computer support.

**3. Blue and Gold Banquet:** Tom Rusek reminded all that about the Blue and Gold Banquet to be held at the Fallston united Methodist Church, starting at 6:00PM, Saturday, 21 February. Tom's remarks:  
THERE WILL BE A BLUE AND GOLD BANQUET FOR THE SCOUTS (PACK-899) ON SATURDAY, FEB. 21ST AT THE FALLSTON UNITED METHODIST CHURCH ON RT. 152 IN FALLSTON. I WILL BE GIVING A PRESENTATION FROM 5 TO 6 PM INSIDE THE BANQUET HALL. THERE WILL BE APPROXIMATELY 230 PEOPLE INCLUDING 70 SCOUTS. I WILL NEED HELP FROM ANY MEMBER WHO IS INTERESTED IN BRINGING HIS OR HER TELESCOPE FOR THE OUTDOOR ACTIVITY FROM 6 TO 7 P.M. THIS IS SOMEWHAT EARLY BUT I HAVE NO CONTROL OF THE TIMES SET.

WE WILL BE LOOKING AT PLANETS, CONSTELLATIONS, ETC. WE WILL MAINLY ACCOMODATE THE 70 SCOUTS BUT I AM SURE THAT THE PARENTS WILL ALSO BE INTERESTED. WHILE OUTDOORS WE CAN EXPLAIN HOW OUR SCOPES WORK. PLEASE HELP IF YOU ARE ABLE. THIS WILL BE GREAT PUBLICITY FOR THE CLUB.

#### **New Business:**

**1. Warren Hoover Memorial:** Lucy is heading up the organization of Warren's memorial service to be held in April, POSSIBLY in conjunction with our general meeting the 3rd of April. We're planning a potluck dinner to start at the observatory, attended by HCAS members and Warren's daughter and family, Ms. Brenda Newby. We've obtained permission to affix a brass plaque to the main scope pillar naming the scope in honor of Warren. Lucy needs ANY PHOTOS you may have of Warren so she can put together a slide show for that evening's remembrance. **PLEASE HELP LUCY AND THE HCAS MAKE THIS A CLASS ACT TO HONOR ONE OF OUR OWN! Lucy can be reached at: 410-679-7055, virgoastronomics@comcast.net**

**2. Susquehanna State Park Request:** George Jones brought us great news of an opportunity to provide a "star party" during one of the adult/family camps to be held in April/May. By providing some observing to the campers, some of whom will certainly be members of the HCAS, we'll receive official designation as State Park Volunteers. A key to the camping area parking lot will be provided...an excellent dark sky site for our use throughout the year. George was asked to officially represent us in the negotiations...stay tuned!

**3. Earth Day:** Grace W. brought the information for the 17 April Earth Day at Swan Harbor Farm. The HCAS has been represented at this great spring outing for several years now. We've generally set up for solar observing, if the weather permitted. A beautiful location with good attendance has been the rule. President Wayne French has all the information and may be calling on members to help support this activity...which by the way is at no cost to the club!

**4. Lucy Alpert's Class:** Lucy will be teaching "Learning the Night Sky" class at the observatory from 23 March-27 April. Held Tuesday evenings as part of the HCC continuing education series, the classes run from 7-9 PM. Interested persons can contact HCC for information.

**5. HUBBLE TELESCOPE:** An impassioned discussion of the fate of the Hubble Space Telescope ensued. Lucy provided the following Frequently Asked Questions (FAQs) from the Space Science Telescope Institute:

### Hubble's Future

Servicing Mission 4, the last scheduled flight of the space shuttle to the Hubble Space Telescope, has been cancelled. On Jan. 16, NASA Administrator Sean O'Keefe announced his decision to call off the mission, which would have performed Hubble maintenance work and installed new instruments. O'Keefe cited the new safety guidelines set out following the Columbia tragedy as the primary basis for his decision, which is currently under review.

Hubble was designed to be visited periodically by astronauts who would perform repairs and install new equipment. Astronauts made several servicing visits to the telescope in the years after Hubble's launch in 1990. This final servicing mission would have taken place in 2006.

### **Is Hubble being shut down?**

No. Hubble is operating normally and will continue to function until age and natural wear take their inevitable toll on its components.

### **Is the decision to cancel the last servicing mission final?**

At NASA Administrator Sean O'Keefe's request, Admiral Harold W. Gehman Jr. will review the safety concerns associated with sending astronauts by space shuttle to service Hubble. Adm. Gehman is chairman of the Columbia Accident Investigation Board, responsible for analyzing the tragic demise of the Columbia shuttle, and will offer his advice regarding the possibility of a future flight to Hubble.

### **What was Servicing Mission 4 supposed to do?**

Servicing Mission 4 had a series of jobs to perform. Astronauts would have boosted Hubble into a higher orbit, a standard task that helps keep Hubble from spiraling too close to the Earth and re-entering the atmosphere. They would have replaced a fine guidance sensor, which helps point the telescope; placed protective "blankets" on top of torn insulation; and installed new instruments: Wide Field Camera 3 (WF3): This camera, which sees in both infrared and ultraviolet wavelengths, would have replaced the Wide Field Planetary Camera 2. It is two to three times more sensitive in the infrared than Hubble's Near Infrared Camera and Multi-Object Spectrometer (NICMOS).

Cosmic Origins Spectrograph (COS): This high-resolution spectrograph, a prism-like instrument capable of studying the chemical composition of far-distant interstellar gas, would have replaced the Corrective Optics Space Telescope Axial Replacement (COSTAR).

Astronauts' last visit to Hubble, Servicing Mission 3B, was in 2002. During that mission, astronauts put Hubble in shape for the future by installing new solar panels, the powerful Advanced Camera for Surveys and a new cooling system for NICMOS. They also replaced a wheel reaction assembly that helps point the telescope and re-boosted Hubble's orbit. Learn more about Servicing Mission 3B.

### **How long will Hubble live?**

Making an estimate about the life of a spacecraft like Hubble is like trying to figure out the lifespan of a new car when no previous models exist. It's difficult to predict because we have little history to base our predictions upon.

Hubble was launched in 1990. Its original mission was supposed to last 15 years. Eventually that was extended to 20 years, with a projected end date of 2010. With the cancellation of Servicing Mission 4, Hubble will probably not last that long. Scientists and engineers are looking at ways to stretch Hubble's life out as long as possible.

The telescope's gyroscopes and batteries are the two main areas of concern.

### **What could cause Hubble's failure?**

#### Gyroscopes:

Hubble depends on gyroscopes to point the telescope and keep it stable. If too many gyroscopes fail, Hubble becomes unusable.

Hubble has six gyroscopes. Two are broken and would have been replaced on Servicing Mission 4. Three are working and used every day. One is on standby as a backup gyroscope. Right now it takes three gyroscopes to point the telescope, but scientists are developing software and techniques, to be tested this fall, that would allow Hubble to operate using just two gyroscopes.

Gyroscopes have been replaced repeatedly throughout Hubble's life. Based on previous history, Hubble will probably be down to two gyroscopes around 2006, and one gyroscope in 2007. We are currently unaware of a method that would allow Hubble to operate with only one gyroscope, but that possibility will be carefully studied.

Engineering improvements that were made to Hubble's current gyroscopes may extend their lives, but there's no way to tell in advance.

#### Batteries:

Hubble is powered by a set of rechargeable nickel-hydrogen batteries. Hubble's solar panels collect the energy that recharges the batteries 14 to 15 times a day, whenever Hubble's orbit carries it into the daylight. If the batteries die, Hubble will have no power during the nighttime, and the telescope won't stay pointed

The batteries Hubble uses are not unlike the rechargeable batteries around your own home. As they age, their charge runs down more quickly. Once the batteries are unable to hold a charge, the telescope becomes inoperable.

Hubble has its original batteries, which means they date back to 1990. We don't know how long they will last, but their performance is starting to deteriorate.

Engineers have been continuously monitoring the charging of Hubble's batteries and developing techniques to minimize the effects of aging. The focus was on keeping them healthy until Servicing Mission 4; now the emphasis will be on getting the most life out of them.

#### Other failures:

Hubble has many parts, and random failures could pose a problem. Transistors and resistors can break down, for instance. Fortunately, Hubble also has a number of redundant systems to keep the telescope working in the event of such a failure.

But since there will be no servicing mission to replace failed components, the backup systems that eventually kick in will themselves have no standby waiting in the wings to take over.

Slow degradation will also take its toll on the telescope. For instance, electronics last longer when they stay cool. The material shielding the outside of the telescope has been slowly aging, resulting in a gradual rise in the temperature of some of Hubble's components.

### **What will happen when Hubble stops working?**

Hubble will continue to orbit the Earth until a method is devised to safely de-orbit the telescope. The current plan is to build and launch an unmanned robotic device that will rendezvous with Hubble and attach a rocket to it. The rocket will fire in a controlled manner and alter Hubble's orbit. Hubble will fall to Earth and crash into the ocean, safely away from populated areas and shipping lanes.

Plans are still underway for the James Webb Space Telescope, Hubble's successor, which would be launched in 2011. JWST will be designed to view objects in visible light and infrared, and its mirror will have six times the area of Hubble's mirror. Its goal is to study the first stars and galaxies that formed in the early universe. JWST will operate 1 million miles (1.5 million km) away from the Earth, and will not be serviceable from orbit.

### **Can we expect more observations from Hubble?**

Absolutely. Hubble is functioning normally, and new images, press releases and science are forthcoming. Astronomers continue to submit proposals for research time on the telescope, and Hubble will continue to conduct observations until a major systems failure makes that impossible.

### **What plans are underway to maximize Hubble's lifespan?**

Planning is only in the earliest stages, but Hubble scientists and engineers will study every option to prolong Hubble's life. Software and techniques that will allow Hubble to operate using two gyroscopes, instead of the usual three, will be tested in the fall. Adjustments to the batteries may help lengthen their life.

Teams of scientists are looking at every possibility, from servicing Hubble without the space shuttle, perhaps robotically, to examining technical methods that could conserve the usefulness of key components.

### **Can Hubble be moved to the International Space Station for servicing? Can it be attached to the station?**

It would take a large amount of energy to change Hubble's orbit to match the orbit of the International Space Station. Not even the space shuttle would be able to perform this maneuver. In addition, there may be safety concerns about having Hubble and the ISS in the same orbit.

The ISS orbits at a lower altitude, where there's more atmosphere, than Hubble. Even if we could move Hubble permanently to the station's orbit, the friction of passing through the atmosphere would create a drag on the telescope that would make it difficult to point.

### Can Hubble be placed on the Moon?

Hubble was designed to operate in the weightless environment of space, and its technology would not be compatible with placement on the Moon.

### Can Hubble be moved to a higher orbit for safekeeping, until it can be repaired?

The problem isn't that Hubble will crash to Earth anytime soon. Hubble's orbit will not decay that extensively until well into the next decade. But once Hubble's equipment shuts down, it cannot easily be restored, due to the temperatures it faces as it floats through space.

### Can someone else service Hubble?

When Hubble is being serviced, it actually docks with the space shuttle. Hubble was built to be compatible with the space shuttle's design and components. It would be difficult to simply substitute in another spacecraft. There are no plans at this time to have another agency service Hubble.

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MEETING ADJORNED AND MEMBERS WATCHED THE NOVA PROGRAM ON THE SUPER NOVA!

IN ADDITION, THE SKY CLEARED UP AND WE OPENED UP THE DOME AND DID SOME GROUP OBSERVING. M42 WAS OUTSTANDING! TRIED BOTH "NAKED" AND FILTERED VIEWING. IN ADDITION, WE HAD SOME SUPER VIEWS OF JUPITER. THERE IS STILL A PROBLEM WITH THE TREES, BUT SAL r. IS WORKING THAT WITH HCC. WHAT A FUN WAY TO END A GENERAL MEETING...LOOKING AT THE SKY!

#### FEBRUARY EVENTS

**21st** - Blue/Gold Banquet, 7:00PM, Fallston U.Meth.Church

**28th** - Open house Public Viewing;Tech H.S. next to observatory

#### MARCH EVENTS

**6th** - General Meeting, 7:30, Observatory, OFFICER NOMINATIONS!

**13th and 20th** - Star Party, Steppingstone, MEMBERS ONLY.

**27th** - Open house Public Viewing;Tech H.S. next to observatory

**REMEMBER, NOMINATIONS FOR NEW OFFICERS WILL BE HELD  
A T THE MARCH MEETING. COME AND PARTICIPATE!!**

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