

IO - April 2011

Issue 2011-04
Eugene Astronomical Society

Eugene Astronomical Society
Annual Club Dues \$25
President: Sam Pitts - 688-7330
Secretary: Jerry Oltion - 343-4758
Additional Board members:
Jacob Strandlien, Tony Dandurand,
John Loper.

www.eugeneastro.org

EAS is a proud member of:

The Astronomical League
The World's Largest Federation of Amateur Astronomers



Next Meeting: Thursday, April 28th

Star Hopping by Jerry Oltion

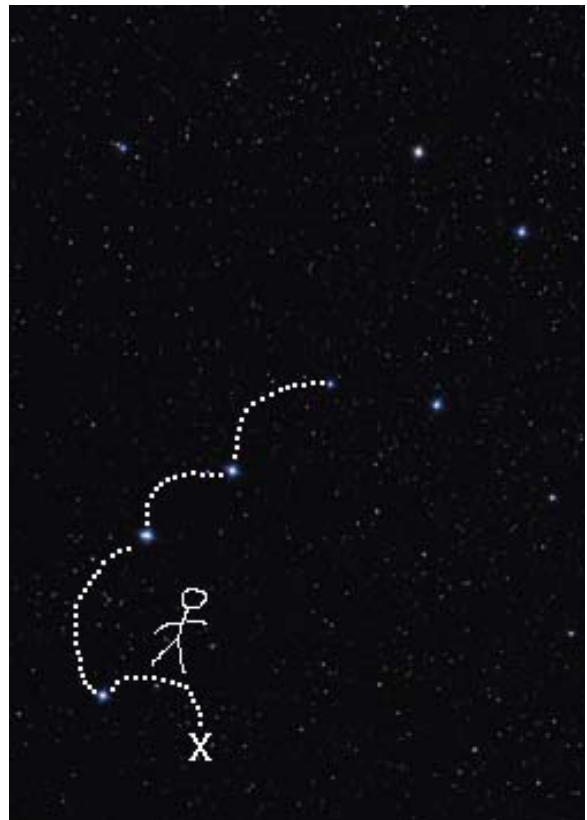
New astronomers often find the night sky bewildering in its multitude of stars. Maps show the constellations with neat lines drawn between bright stars, but the real sky has no such aid to navigation. In town the major constellations like the Big Dipper and Orion are fairly easy to pick out because the dimmer stars are lost in the skyglow, but the dimmer constellations disappear along with the dimmer stars. Drive just a few miles out into the country and you have the opposite problem: even the most obvious constellation can be hard to spot amid the thousands of other stars that pepper the unpolluted sky.

Finding the major constellations is hard enough, but finding a particular object within them can be even more challenging, in town or out. Which of those myriad dots is Gamma Andromedae? And which direction from there is NGC 891?

So how do you find your way around this crowded field of glowing dots? You can buy a go-to scope that does it for you, or you can learn how to star-hop.

Many people think star-hopping is a skill only useful to obsessive pursuers of deep sky objects too dim to find any other way (Hi, Jim!), but that's not its only use. Star hopping can help you locate something as large and bright as Hercules in a truly dark sky; a feat that many find quite difficult even when they're looking right at its signature keystone, because of all the stars of similar brightness complicating the picture. You probably already do star hop to find Polaris. Most of the major landmarks in the sky can be found by star-hopping from other landmarks, and nearly all the minor objects can be found the same way. At our April 28th meeting Jerry will show you the major hops and teach you the skills necessary to find anything you want inbetween — even those deep sky objects too dim to find any other way.

In addition to Jerry's talk, Jacob Strandlien will present the astronomical news of the month. We also encourage people to bring any new gear or projects they would like to show the rest of the club. The meeting is at 7:00 on April 28th at EWEB's Community Room, 500 E. 4th in Eugene.



March Meeting Report

At our March 24th meeting Rick Kang gave a presentation on the American Astronomical Society's annual conference in Seattle last January. Rick attended several talks at the conference and gave us an overview of what he learned from them, including some neat information on Saturn, the Kepler mission that's searching for Earth-like exoplanets orbiting Sun-like stars, and more information on recently discovered exoplanets themselves.

Also at the meeting Jerry Oltion showed off a homemade 2" eyepiece that he built with lenses from Surplus Shed, which compares favorably to an Explore Scientific eyepiece that he bought online.

Kathy Oltion displayed a shawl that she knitted in the shape and with the colors of the Orion Nebula.

Our next meeting will be on Thursday, April 28th, at 7:00 PM in the EWEB north building's Community Room. This is the first room in the semicircular building to the north of the fountain at EWEB's main campus on the east end of 4th Avenue.

Meeting dates for 2011: (All meetings are at 7:00 in the Community Room)

April 28	June 23	August 25	October 27
May 26	July 28	September 22	November 10
			December 22

Next First Quarter Friday: April 8th

Our March star party was just like the previous two: cloudy but not quite cloudy enough to stay home. The Moon was visible through gaps, so we knew there would be people waiting for a look at it, so Gordon and Jerry and Kathy went to the reservoir with telescopes and set up for the dozen or so people who showed up. We got a few good looks at the Moon and a couple of bright stars, but that was pretty much it. This makes four cloudy ones in a row. One of these months we're bound to have a clear night, aren't we? Let's hope April starts a new trend.

First Quarter Fridays are laid-back opportunities to do some observing and promote astronomy at the same time. Mark your calendar and bring your scope to the College Hill Reservoir (24th and Lawrence in Eugene) and share the view with whoever shows up.

Here are the dates for First Quarter Fridays through December of 2011:

April 8	July 8	October 7	December 30
May 13	August 5	November 4	
June 10	September 2	December 2	



Thank You Castle Storage

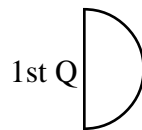
For the last three years, Castle Storage has generously provided EAS a place to store its telescopes and equipment. EAS would like to thank Castle Storage for their generosity and support for our group. Please give them a call if you need a storage space, and tell your friends. They are great people and offer secure and quality storage units.



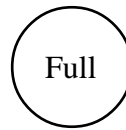
Observing in April



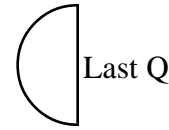
New



1st Q



Full



Last Q

April 3	April 11	April 17	April 24
Mercury Set: 8:36 PM	Mercury Behind Sun	Mercury Rise: 5:57 AM	Mercury Rise: 5:35 AM
Venus Rise: 5:42 AM	Venus Rise: 5:33 AM	Venus Rise: 5:26 AM	Venus Rise: 5:17 AM
Mars Rise: 6:30 AM	Mars Rise: 6:12 AM	Mars Rise: 5:58 AM	Mars Rise: 5:42 AM
Jupiter Behind Sun	Jupiter Behind Sun	Jupiter Rise: 6:15 AM	Jupiter Rise: 5:51 AM
Saturn Set: 7:13 AM	Saturn Set: 6:40 AM	Saturn Set: 6:16 AM	Saturn Set: 5:47 AM
Uranus Rise: 6:29 AM	Uranus Rise: 5:59 AM	Uranus Rise: 5:36 AM	Uranus Rise: 5:09 AM
Neptune Rise: 5:19 AM	Neptune Rise: 4:48 AM	Neptune Rise: 4:25 AM	Neptune Rise: 3:58 AM
Pluto Rise: 2:12 AM	Pluto Rise: 1:40 AM	Pluto Rise: 1:16 AM	Pluto Rise: 12:49 AM

All times: Pacific Standard Time (Nov 6, 2011-March 10, 2012) = UT -8 hours or U.S. Pacific Daylight Time (March 13-November 5, 2011) = UT -7 hours.

Date	Moonrise	Moonset	Sunrise	Sunset	Twilight Begin	Twilight End
4/1/2011	05:45	18:16	06:54	19:39	05:14	21:19
4/2/2011	06:07	19:16	06:52	19:41	05:12	21:21
4/3/2011	06:30	20:17	06:50	19:42	05:10	21:22
4/4/2011	06:54	21:19	06:49	19:43	05:08	21:24
4/5/2011	07:22	22:20	06:47	19:44	05:06	21:26
4/6/2011	07:55	23:21	06:45	19:45	05:05	21:27
4/7/2011	08:34		06:43	19:47	05:02	21:29
4/8/2011	09:21	00:19	06:42	19:48	04:59	21:30
4/9/2011	10:16	01:12	06:40	19:49	04:57	21:32
4/10/2011	11:18	02:00	06:38	19:50	04:55	21:34
4/11/2011	12:26	02:41	06:36	19:51	04:53	21:35
4/12/2011	13:38	03:17	06:35	19:53	04:51	21:37
4/13/2011	14:52	03:49	06:33	19:54	04:49	21:39
4/14/2011	16:09	04:18	06:31	19:55	04:47	21:40
4/15/2011	17:27	04:47	06:29	19:56	04:44	21:42
4/16/2011	18:46	05:15	06:28	19:58	04:42	21:44
4/17/2011	20:06	05:47	06:26	19:59	04:40	21:45
4/18/2011	21:26	06:22	06:24	20:00	04:38	21:47
4/19/2011	22:41	07:03	06:23	20:01	04:36	21:49
4/20/2011	23:48	07:52	06:21	20:02	04:34	21:50
4/21/2011		08:48	06:19	20:04	04:31	21:52
4/22/2011	00:44	09:51	06:18	20:05	04:29	21:54
4/23/2011	01:30	10:56	06:16	20:06	04:27	21:56
4/24/2011	02:08	12:01	06:15	20:07	04:25	21:58
4/25/2011	02:38	13:05	06:13	20:08	04:23	21:59
4/26/2011	03:05	14:07	06:12	20:10	04:21	22:01
4/27/2011	03:28	15:08	06:10	20:11	04:19	22:03
4/28/2011	03:50	16:08	06:09	20:12	04:16	22:05
4/29/2011	04:12	17:08	06:07	20:13	04:14	22:07
4/30/2011	04:34	18:09	06:06	20:14	04:12	22:08

Items of Interest This Month

4/3 Saturn at opposition

4/8 First Quarter Friday Star Party

4/9 Moon near M35 in Gemini

4/22 Peak of Lyrid meteor shower

4/30 & 5/1 Moon near Mars, Jupiter, Venus, and Mercury just before dawn.



For Current Occultation Information

Visit Derek C. Breit's web site

"BREIT IDEAS Observatory"

<http://www.poyntsource.com/New/Regions/EAS.htm>

Go to Regional Events and click on the Eugene, Oregon section. This will take you to a current list of Lunar & asteroid events for the Eugene area. Breit continues to update and add to his site weekly if not daily. This is a site to place in your favorites list and visit often.

All times are for Eugene, Oregon, Latitude 44° 3' Longitude 123° 06' for listed date

Making an Eyepiece

by Jerry Oltion

In the course of my latest telescope project, I needed to find an eyepiece that looked like a 2" version of an Edmund Scientific RKE. After considerable hunting around online, I came to the conclusion that the closest contenders were either too expensive or too heavy (or both). This is going on a ball scope — a scaled-up replica of the Edmund Astroscan — so balance is tricky. A 2-pound hand grenade would require an extra 6 pounds of counterweight inside the ball, and if I did that the scope wouldn't balance properly with any other eyepiece.



28mm and 15mm Edmund RKE eyepieces

So I decided to make my own. Surplus Shed sells eyepiece lens sets for very little money. Thinking that I would scale up the 28mm RKE, I bought a set for a 26mm “modified plossl” for only \$8.50. That got me three lenses: two double-convex singlets 35.5mm in diameter with a 55mm focal length, and a 33mm diameter concave-convex doublet with a 360mm focal length. All three lenses were anti-reflective coated.

Next I needed to figure out how to mount them in a stack. The instructions that came with the lenses told me which order to put them in (the doublet on the bottom, concave side down, the other two stacked as close to it as possible above). It turned out that a “Clear Care” contact lens solution bottle was fairly close to the right diameter. I had to cut a half-inch strip out of the side and close it up again with masking tape. Four cardboard rings held that in place inside a bigger contact lens solution bottle (an Aosept bottle). Four more small plastic rings served to hold the lenses apart so they were close but not touching, and keep them from falling out of the tube. The top of the Aosept bottle was even tapered like a real eyepiece, so I could cut the right size hole in it for the eye lens and have a fairly nice looking body. A section of wrapping-paper tube turned out to be just the right diameter for the 2" barrel.

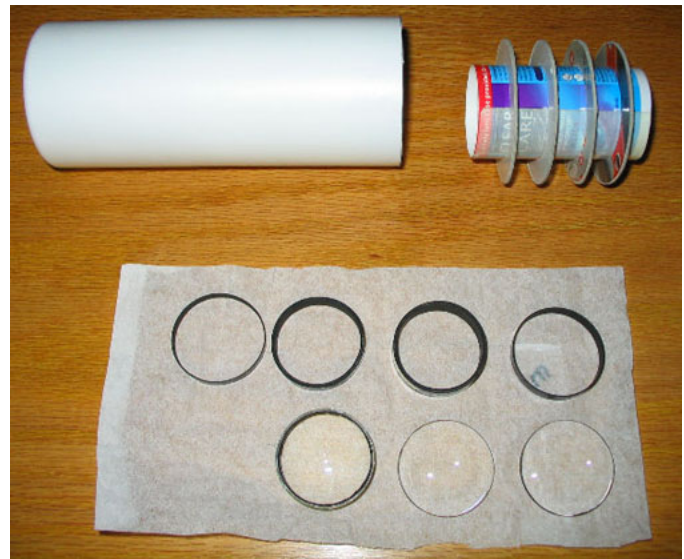
The Edmund RKE has a distinctive red grip band around the body. I considered several options, often looking longingly at the grip band for my 22mm Nagler. If only.... Finally I called Televue and asked what a grip band would cost. \$4. Got to be the cheapest anything you can buy from Televue.

So I had all the parts. Best of all, when I piled them all on a postage scale they only weighed 3 ounces. That's the same weight as the original 28mm RKE.

Unfortunately, I hadn't considered that a short stack of 3 lenses would make a short-bodied eyepiece. You can't space out the lenses, because the image becomes distorted when you do. I had to put the bottom of the lowest lens at the telescope's focal point (typically where the eyepiece body meets the barrel), and I

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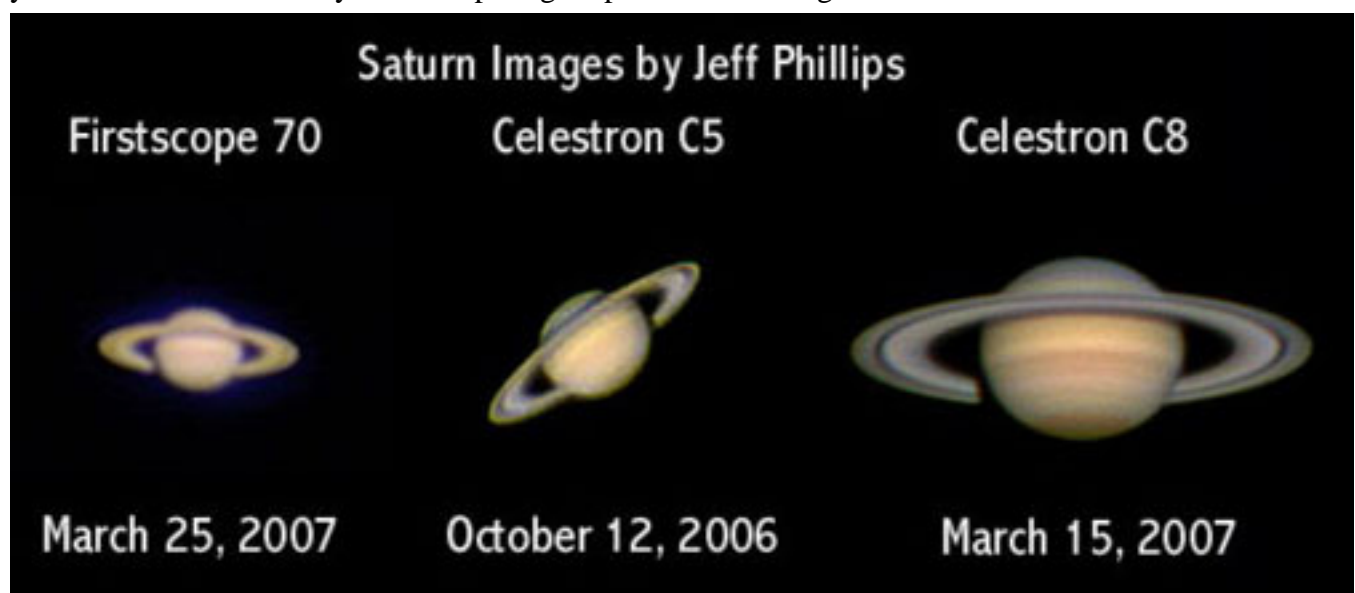
The finished (almost) eyepiece

didn't have enough eye relief to recess the top lens very far into the body, so the body is about half as tall as I'd hoped. It looks like a scaled-up 15mm RKE rather than a 28.

How do the optics compare with a store-bought eyepiece? Well, there's an old saying: "Everyone wants a good, cheap, wide-field eyepiece. You can have any two out of the three." Without a field stop, my homemade eyepiece gives me about a 70-degree apparent field of view. The image in the middle 40 degrees or so is very sharp and clean. There's hardly any pincushion or barrel distortion when you swing an object from side to side. But there is some chromatic aberration on bright objects like the Moon, and there's some spherical aberration out near the edges as well. It's not so bad as to be useless, but I wasn't happy enough with it to make it my showpiece eyepiece in a showpiece scope. So I haven't painted the grip ring red yet, and I'm exploring other options for the Astroscan, but even so I do have a pretty cool homemade eyepiece out of the deal. It's every bit as good as some of the wide-field eyepieces I've seen selling for \$70-100. I'll definitely keep it and use it. For \$12.50, it's a steal. And I learned a lot about eyepiece design while playing with the lenses.

The Effect of Aperture on What You Can See

Recently on our email list someone asked about the difference in resolving power between telescopes of various aperture. Jeff Phillips prepared a great photo montage to illustrate the effect of aperture on what you can see. This certainly sums it up: larger aperture means higher resolution.



The Club's "New" Hardin 8" Dob

by Tony Dandurand

"What telescope should I get? I'd like to get good views of the moon, planets, star clusters, maybe some galaxies, whatever's up there. Oh, and I don't want to spend too much money." This question, from someone wanting to get their first (or first decent - or sizable) telescope can generate *lots* of discussion and different opinions. But the qualifier "I don't want to spend too much money," for most people, points the discussion to the common 6, 8, or 10-inch dobsonian telescope.

All these telescopes are about the same length, but increase in weight, bulk, and cost as mirror size increases. The 10" size is tempting; it gathers almost 3 times the light of a 6", more than half again as much as an eight. This makes quite a difference on galaxies and other deep sky objects. But it costs and weighs quite a bit more than the others, and its low F-ratio (typically F 4.5 – 5.0) requires more precise collimation, and more costly eyepieces (and maybe a Paracorr) to get near perfect images all the way to edge of a low power, wide field view (if that matters to you).

A generation or two ago a 6-inch reflector was a *big* scope and it is capable of showing a lot. Indeed, the *Herschel 400* observing list was designed to be a doable challenge for someone with a 6-inch scope under good but less than ideal conditions. Most 6-inch dobs give fine images. Their long focal length (usually F8) mirrors are easier for machines (or persons) to figure accurately, and any collimation error effects are less in longer F-ratio scopes. The 6-inch dob is the lightest and cheapest.

But not by much. There's a saying: "The best 6-inch F8 is an 8-inch F6." Eight-inch dobs are typically only 6-8 pounds heavier than a 6-inch and often only \$50 - \$60 more in cost (and usually have a 2" focuser, allowing a lower power, wider field of view). An 8-inch gathers over 80% more light than a 6-inch. For many people, for general use, for not much money, this is the 'Goldilocks' size. The EAS Lending Library has two.

Part of low cost of commercial dobs is the plastic coated particleboard of their bases. It's not pretty,



Hardin OTA cradle and bearings

but it's cheap, and serves its purpose. One flaw of particleboard is that getting damp too often (in storage or use) will swell it enough to lose its flatness and make the base unusable. That happened to the Club Hardin 8" dob, so as a rainy day (month, winter) project, I made a new, better base for it.

Dob construction is nice and simple, basically a box rotating within a box, turning (like a turntable) on a ground board. The larger altitude bearings give the scope nice proportions, and the scope seems to move quite well. I will bring this "new" Hardin dob to the April Club meeting for "show & tell" and



8" Hardin dob OTA

discuss and show details about it. Somebody (you) should check it out and take it home. An 8-inch commercial dob may be the most telescope per dollar ever made, but EAS members have an even better deal – they may borrow it (or any of *your* Club scopes) for free.

(The 6" scope at right is for sale. Contact Tony at tdandurand at comcast.net)



6" and 8" size comparisons.

The Original Hubble Telescope



Hubble's personal telescope, from before he entered graduate school.

Adapted from a post on Boing-Boing.net.
Used with permission.

We've all heard of the Hubble Space Telescope. Named after astronomer Edwin Hubble, this orbiting observatory is responsible for some of our most iconic photographs in the history of astronomy. But before Hubble became famous enough to have a telescope named after him, he was a law and Spanish student with an interest in the stars. A photo of his personal telescope from that era has surfaced and made the rounds on the internet last month. Maggie Koerth-Baker posted this about it on Boing-Boing.net:

"Yesterday, I spoke at the University of Wisconsin-Milwaukee, as part of a Physics Department speaker series. Dawn Erb, one of my hosts in the department, was kind enough to send me this awesome photo of Edwin Hubble's personal telescope, from before he finished his Ph.D. The photo came from Todd Bensenhaver, a friend of a friend of Dawn's, who lives in Louisville, Kentucky, and owns the telescope today. How did he end up with it?

"Edwin Hubble grew up in Louisville, and later worked there for a year as a high-school

Spanish teacher and basketball coach. When he left for graduate school at the University of Chicago, he gave his telescope to a fellow teacher, and it has been passed down through his family.”

A little more digging online revealed the photo at right of Hubble actually using the scope. (One hopes that he was looking through a suitable solar filter at the time.)

In later life, Hubble went on to use the 40-inch refractor at the Yerkes observatory, the 100-inch Hooker telescope on Mount Wilson, and the 200-inch Hale telescope on Mount Palomar. With these telescopes he discovered that “spiral nebulae” were not part of the Milky Way but were in fact galaxies themselves, and that the universe was expanding, a finding that lent credence to the Big Bang theory of the universe’s origin.

A pretty good showing for a guy who started with what looks like a 3-inch refractor.



Earliest photo on record of Hubble with a scope, taken in New Albany, Indiana pre-1914.

NASA’s *Stardust* Officially Ends Operations

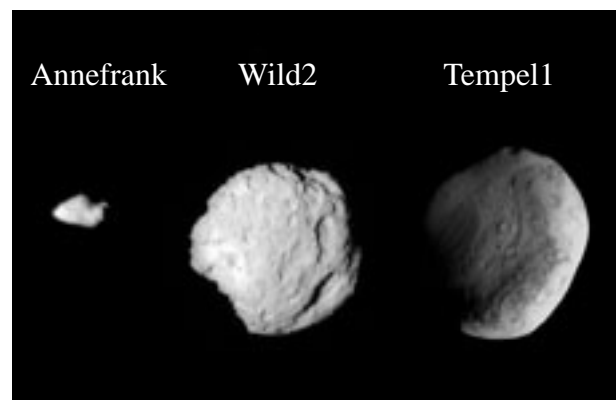
Courtesy NASA

PASADENA, Calif. — NASA’s Stardust spacecraft sent its last transmission to Earth at 4:33 p.m. PDT (7:33 p.m. EDT) Thursday, March 24, shortly after depleting fuel and ceasing operations. During a 12-year period, the venerable spacecraft collected and returned comet material to Earth and was reused after the end of its prime mission in 2006 to observe and study another comet during February 2011.

The Stardust team performed the burn to depletion because the comet hunter was literally running on fumes. The depletion maneuver command was sent from the Stardust-NExT mission control area at Lockheed Martin Space Systems in Denver. The operation was designed to fire Stardust’s rockets until no fuel remained in the tank or fuel lines. The spacecraft sent acknowledgment of its last command from approximately 312 million kilometers (194 million miles) away in space.

“This is the end of the spacecraft’s operations, but really just the beginnings of what this spacecraft’s accomplishments will give to planetary science,” said Lindley Johnson, Stardust-NExT and Discovery program executive at NASA Headquarters in Washington. “The treasure-trove of science data and engineering information collected and returned by Stardust is invaluable for planning future deep space planetary missions.”

After completion of the burn, mission personnel began comparing the computed amount of fuel consumed during the engine firing with the anticipated amount based on consumption models. The models are required to track fuel levels, because there are no fully reliable fuel gauges for spacecraft in the weightless environment of space.



This composite image shows the three worlds NASA’s Stardust spacecraft encountered during its 12 year mission. The flyby of asteroid Annefrank came on Nov. 2, 2002. Comet Wild 2 was visited on Jan. 2, 2004. The comet Tempel 1 encounter occurred on Feb. 14, 2011. Image credit: NASA/JPL-Caltech/UW/Cornell

Mission planners use approximate fuel usage by reviewing the history of the vehicle's flight, how many times and how long its rocket motors fired.

“Stardust's motors burned for 146 seconds,” said Allan Chevront, Lockheed Martin Space Systems Company program manager for Stardust-NExT in Denver. “We'll crunch the numbers and see how close the reality matches up with our projections. That will be a great data set to have in our back pocket when we plan for future missions.”

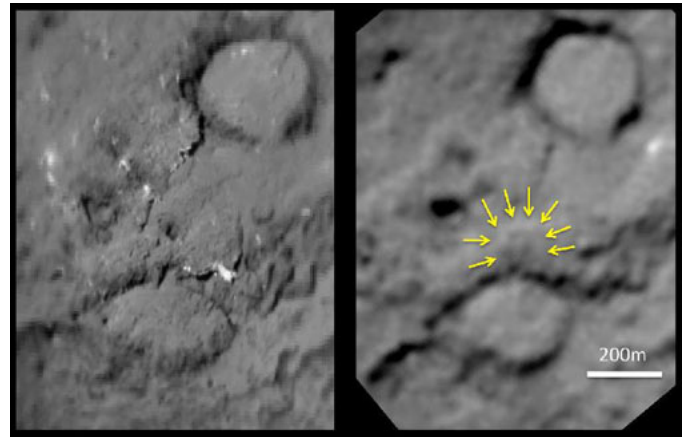
Launched Feb. 7, 1999, Stardust flew past the asteroid named Anfrank and traveled halfway to Jupiter to collect the particle samples from the comet Wild 2. The spacecraft returned to Earth's vicinity to drop off a sample return capsule eagerly awaited by comet scientists.

NASA re-tasked the spacecraft as Stardust-NExT to perform a bonus mission and fly past comet Tempel 1, which was struck by the Deep Impact mission in 2005. The mission collected images and other scientific data to compare with images of that comet collected by the Deep Impact mission in 2005. Stardust traveled approximately 21 million kilometers (13 million miles) around the sun in the weeks after the successful Tempel 1 flyby. The Stardust-NExT mission met all mission goals, and the spacecraft was extremely successful during both missions. From launch until final rocket engine burn, Stardust travelled approximately 5.69 billion kilometers (3.54 billion miles).

After the mileage logged in space, the Stardust team knew the end was near for the spacecraft. With its fuel tank empty and final radio transmission concluded, history's most traveled comet hunter will move from NASA's active mission roster to retired.

“This kind of feels like the end of one of those old western movies where you watch the hero ride his horse towards the distant setting sun — and then the credits begin to roll,” said Stardust-NExT project manager Tim Larson from NASA's Jet Propulsion Laboratory in Pasadena, Calif. “Only there's no setting sun in space.”

For more information about Stardust and Stardust-NExT, visit: <http://www.nasa.gov/stardust/>



Composite image of comet Tempel 1 taken in 2005 before impact (left), and in 2011 after impact (right). The impact site is barely evident.



Some Observing Resources

Bill Murray sent in these links to websites that can be useful in planning an observing session (if we ever get any...)

This page will provide you with a list of objects that will transit the meridian during the date and time you specify: <http://njstargazer.org/TonightSkyNEW.asp>

Cal Sky's Celestial Observer: <http://www.calsky.com/cs.cgi?%B7=en>

Deep Sky Objects Browser: <http://dso-browser.com/>