



# Monthly Notices of the Everglades Astronomical Society



Naples, FL  
January 2012

**Officers: President:** Michael Usher; **Vice President/ Secretary:** Todd Strackbein; **Treasurer:** Bob Gurnitz

**Newsletter Editor** Michael Usher [usher34105@earthlink.net](mailto:usher34105@earthlink.net)

(Newsletter publisher address 1689 Northgate Drive, Naples, FL 34105)

**Home Page:** <http://gator.naples.net/clubs/eas> **Webmaster:** Martin Zombeck [mvz@alum.mit.edu](mailto:mvz@alum.mit.edu)

**Fack Coordinator** & information on viewing Charlie Paul [cpaul651@earthlink.net](mailto:cpaul651@earthlink.net) 410-8192

## President's Message

Now that winter has finally arrived, the best viewing of the season is finally here! The best viewing is when the humidity is low right after a cold front - which happens about once every two weeks during our winters - but the skies are pretty good anytime. If you have not made it out there, now is the time.

I'd like to have quite a few people in this year's telescope making class; last year's substitute for Ebony Star Formica was not entirely successful and we need a large class so it is economical to purchase another type of substitute.

Clear Skies!  
Mike Usher

## Dates for the "Fack"

Usually the best times to go out to the Fakahatchee Strand viewing site are moonless nights. Below is a list of upcoming Saturday nights that you will often find fellow club members out there enjoying the skies with you (weather permitting).

Date	Moonrise	Moonset
Jan 14	11:32PM	
Jan 21		4:39 PM

## Sky Events

Jan 3,4 - Quadrantids Meteor Shower  
Jan 9 - Full Moon  
Jan 16 - 3rd Quarter Moon  
Jan 23 - New Moon  
Jan 31 - 1st Quarter Moon

## Next Meeting

January 10, 2012  
Time 7:00 – 9 pm  
At the Norris Center

## Astronomical Trivia Question of the Month

How many exoplanets have been identified as of December 22, 2011?

- a. 137
- b. 422
- c. 716
- d. 1024

*Answer on next page.*



## Dawn Takes a Closer Look

By Dr. Marc Rayman

Dawn is the first space mission with an itinerary that includes orbiting two separate solar system destinations. It is also the only spacecraft ever to orbit an object in the main asteroid belt between Mars and Jupiter. The spacecraft accomplishes this feat using ion propulsion, a technology first proven in space on the highly successful Deep Space 1 mission, part of NASA's New Millennium program.

Launched in September 2007, Dawn arrived at protoplanet Vesta in July 2011. It will orbit and study Vesta until July 2012, when it will leave orbit for dwarf planet Ceres, also in the asteroid belt.

Dawn can maneuver to the orbit best suited for conducting each of its scientific observations. After months mapping this alien world from higher altitudes, Dawn spiraled closer to Vesta to attain a low altitude orbit, the better to study Vesta's composition and map its complicated gravity field.

Changing and refining Dawn's orbit of this massive, irregular, heterogeneous body is one of the most complicated parts of the mission. In addition, to meet all the scientific objectives, the orientation of this orbit needs to change.

These differing orientations are a crucial element of the strategy for gathering the most scientifically valuable data on Vesta. It generally requires a great deal of maneuvering to change the plane of a spacecraft's orbit. The ion propulsion system allows the probe to fly from one orbit to another without the penalty of carrying a massive supply of propellant. Indeed, one of the reasons that traveling from Earth to Vesta (and later Ceres) requires ion propulsion is the challenge of tilting the orbit around the sun.

Although the ion propulsion system accomplishes the majority of the orbit change, Dawn's navigators are enlisting Vesta itself. Some of the ion thrusting was designed in part to put the spacecraft in certain locations from which Vesta would twist its orbit toward the target angle for the low-altitude orbit. As Dawn rotates and the world underneath it revolves, the spacecraft feels a changing pull. There is always a tug downward, but because of Vesta's heterogeneous interior structure, sometimes there is also a slight force to one side or another. With their knowledge of the gravity field, the mission team plotted a course that took advantage of these variations to get a free ride.

The flight plan is a complex affair of carefully timed thrusting and coasting. Very far from home, the spacecraft is making excellent progress in its expedition at a fascinating world that, until a few months ago, had never seen a probe from Earth.

Keep up with Dawn's progress by following the Chief Engineer's (yours truly's) journal at <http://dawn.jpl.nasa.gov/mission/journal.asp>. And check out the illustrated story in verse of "Professor Starr's Dream Trip: Or, how a little technology goes a long way," at <http://spaceplace.nasa.gov/story-prof-starr>.

*This article was provided courtesy of the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.*

*This full view of the giant asteroid Vesta was taken by NASA's Dawn spacecraft, as part of a rotation characterization sequence on July 24, 2011, at a distance of 5,200 kilometers (3,200 miles).*

*Credit: NASA/JPL-Caltech/UCLA/MPS/DLR/IDA*

### **Answer to Trivia Question**

The answer to the question is c) 716. It is now thought that a significant percentage of stars have planets, therefore it is likely that there are tens of billions of exoplanets in our galaxy.



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## 2012 DUES

For the bargain price of only \$20.00, all this can be yours for the coming year:

- Meet with your fellow astronomy enthusiasts at least 10 times a year
- Many opportunities to freeze/sweat/get bitten by mosquitoes in the Fakahatchee Strand
- View planets, nebulae and many other celestial objects
- Reduced price for *Sky & Telescope* and *Astronomy* subscriptions

Don't miss out! Fill out this form (please print plainly) and send it with your \$20 check, payable to *Everglades Astronomical Society*, to P.O. Box 1868 Marco Island, Florida 34146

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