

NASA



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May-Jun 2004

Incorporating Late-Breaking News Through 30 Sep 04



The Official Newsletter of the
INTERNATIONAL ASSOCIATION OF ASTRONOMICAL ARTISTS

In the Next Issue of PULSAR:

Jul-Oct 2004: Special Catch-up combo issue!
Exotic Objects: Neutron stars, black holes, supernovae, Big Bang, anything weird and energetic. Plus **Comets:** Seen from a distance with long flowing tails, seen up close as dirty snowballs, landing missions, impacts, comets around other stars.

In Future Issues:

We're always looking for theme images for our upcoming issues, so send your digital files or slides or prints:

Nov-Dec 2004: The Moon. Early lunar formation, cratering, lava, human exploration, the moon's future.

Jan-Feb 2005: Workshops. Art created from studies out in the field, from Death Valley to Iceland and elsewhere.

Mar-Apr 2005: Vehicles. Getting there is half the fun, as we look at spaceships over the years, both historical and speculative.

PULSAR is published at least four times per year as part of the membership benefits from dues paid. All contents are ©2004 International Association of Astronomical Artists (IAAA) except where noted. Individual artists and writers retain copyright to works contributed to this publication.



"Jovian Cloudscape" by Don Davis ©2004

From the Editor –

Worlds of Howling Vapor, Freezing Liquids, Hurtling Snowballs, and Smog

The Cassini spacecraft has finally settled into long, looping orbits around Saturn and its family of 31 satellites after seven years of travel around the sun, with gravity slingshots past Earth and Venus. Astounding images are arriving at Earth in record numbers, revealing density waves in the ring particles, evolving storm systems in Saturn's atmosphere, and tantalizing clues about what lie beneath the thick cloud cover of Titan, the system's largest moon.

Astronomers and artists have drawn and painted Saturn since Galileo first glimpsed the rings as two elongated "handles" flanking the body of the gas giant. Christiaan Huygens, for whom the Titan entry probe is named, discovered Titan in 1655 and the true nature of the rings in 1656, and what has followed in the nearly 350 years since that time has been a fascination with the science and the visual drama of Saturn. To be fair, however, Jupiter, Uranus, and Neptune are also deserving of our attention and have already been studied by the Voyager 1 & 2 spacecraft. The Galileo spacecraft, seared into molten bits of metal at the close of its orbital mission to Jupiter, recorded the Jovian clouds and moons in exquisite detail. Orbital missions to Uranus and Neptune will have to wait, but the Voyager glimpses of those gas giants and their moons, particularly Miranda and Triton, have inspired us to place ourselves exactly *there* in paint and pixels. And with the likelihood of gas giants even bigger than Jupiter around other stars, the artistic possibilities are endless. I'm sure you'll find that our art selections this time around will let you visit all these places.

PULSAR Improbability Factor Now Three to One and Falling

Your editor is catching up to normality; the Jul-Aug and Sep-Oct issues will be combined into one, followed in December by the Nov-Dec issue, so we'll start 2005 fresh and in sync with the calendar. We're still catching up on some lengthy email list discussions here and in the next few issues; the list activity spikes now and again and a great deal can be boiled down for folks not online. The rants against and praises for CGI, which were to have been included last issue, begin in the next one. I'm entertaining suggestions for special topics for 2005, so email or write me; I have a few ideas but would rather hear from you folks — it's **your** newsletter.

Rick Sternbach

Cover: "Jovian Cloudscape" by Don Davis © 2004

Don writes: "This is painting made during my 'Cosmos' work in my spare time at the Artists' Apartment. It is india ink and acrylic and airbrush colors on a big scratchboard panel. It represents an early effort to paint the clouds of Jupiter, partly inspired by Adolf Schaller's efforts of the time but with an effort made to independently visualize what the clouds might look like at the edge of a belt-zone boundary. The 'whiter' higher clouds tower well above the brownish layers."

Artist Profile: Julie Jones

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often combining the two media. Julie had a love of astronomical imagery and admired space artists such as Dave Archer but hadn't considered pursuing space art until one day when she saw a fantasy image drawn by her son, Ross, of a planet overlaid with an elaborate sword. That was the catalyst.

Julie now exhibits throughout the United States. She has received several awards and honors for both her astronomical art and her flowers. In addition to her work being shown in galleries, Julie's art can also be seen nationally as she has created corporate art for businesses and non-profit organizations from corporate art and logos to internationally distributed posters.

After a thirty-three year career, Julie left the Lab April 2003 to pursue her art full time. She and her old loves are now inseparable.

In 2004, Julie moved from San Pablo in the San Francisco Bay Area to Nevada with her family and is looking forward to dark skies with fewer city lights and having remote locations for star gazing close at hand.

Recent kudos have been being included in the "Women of Space: Cool Careers on the Final Frontier" book, showing her work on the inside cover of an internationally distributed magazine and having her astronomical greeting cards shown in Astronomy Magazine. Fleischmann Planetarium will soon be showing her art and selling her prints, space greeting cards and planetarium logoed items with her space images.

Julie's website is www.ArtFromTheSoul.com



Edwin Faughn writes: "The image titled "Ringed Gas Giant Planet As Seen From One Of Its Moons" depicts a hypothetical ringed gas giant planet as seen from one of its orbiting moons. The moon in the foreground is extremely cold with a very thin atmosphere and methane geysers erupting on its surface. The Milky Way can also be seen draped across the background sky. The piece was created using Photoshop and Terragen." This piece has recently been published on the back cover of **The Planetary Report**. Way to go, Edwin. ©2004 Edwin Faughn

CASSINI TO SATURN

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about that — ESPECIALLY given the results we had with our distant flyby on July 2nd, and the degree to which we're now certain that we'll be able to see through Titan's clouds. Also exciting is the Huygens entry into Titan's atmosphere next January 14th. Timelines for events can be found at <http://saturn.jpl.nasa.gov>. All of the close satellite flybys should whet the appetite of space artists, but of particular interest should be the Iapetus close flyby on 10 September 2007. Stay tuned — it's going to be a wild ride! [Check Kevin's bio at 64.78.10.206/journey/network_profiles/vr_profiles/kevin_grazier.pdf] —Ed.

is happy. What? No questions about my role on "Battlestar Galactica"? Just kidding. :)

RS: A lot of the raw images coming back show the various satellites as fuzzy crescents with not a lot of pixels. I'm assuming, for example, that a soft blob showing Tethys today will resolve into a much more detailed set of flyby pictures later on. Are you itching to see these moons close up? How much latitude do you have in retargeting if you see something amazingly interesting?

KG: First off, many of the "raw" images you see on the Cassini web site are never intended to be aesthetically pleasing. Some are what we call OPNAV (optical navigation) images. All they require is a satellite in the same frame as some known stars. Further, some of those raw images are what we call "support" images. The FOV's (fields of view) of the four ORS instruments are co-aligned, and sometimes one of the other instruments will request a high resolution image from ISS just so they know exactly at what they are pointed. As for whether or not we're itching to see the moons up close and personal? ARE YOU KIDDING? Of COURSE we are!!! We have 45 flybys of Titan and 38 of Saturn's icy satellites. In particular there are 9 extremely close flybys (< 10,000 km) of the icy satellites that should be quite spectacular. The Imaging Team builds "retargetable" observations into the sequence timelines — observations with the target to be determined close to the time the sequence is to be uplinked. That allows some latitude for target selection.

RS: It's been said we've already gotten the closest view of the rings that we're ever going to get with Cassini. Will the SC continue to image and scan the rings throughout the mission?

KG: While the closest we ever get to the rings was during SOI (Saturn Orbit Insertion), from a data volume standpoint we've barely even scratched the surface. Since the rings are so thin that we get practically zero science viewing them edge-on, ring scientists are interested in orbits with higher inclinations. We have two extended periods in the mission where we are at higher inclinations, but those don't come until 2006 and 2007. Do we have ring observations before then? Certainly. The times when we will be returning truckloads of ring data will be during these periods.

RS: Will Cassini give us any hope that humans might someday walk on the surfaces of the moons, or is the environment hostile enough to prevent that with the anti-rad technology we understand today?

KG: Saturn does not a radiation environment that's as harsh as Jupiter's. Therefore, the space environment won't be what deters humankind from walking on these moons. I can think of about 30 other things that WOULD, but radiation is not one of them.

RS: What major events can we look forward to, like the Titan flybys and Huygens probe entry, in the coming months, and where online can we find updated timelines? Which close approaches will really jazz the space artists?

KG: This October 26th is our first close Titan flyby. You'd better believe we're excited

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WORKSHOP NEWS

• **February 6-13, 2005 — Death Valley.** **Contact:** Rick Sternbach (rsternbach@earthlink.net). As far as can be determined, the **DV Workshop is on.** We have a satisfying number of "good to go" members and another list of "maybes" who might convert at any minute. We have met and exceeded our 10-room hotel minimum. Unless you've been hiding under a piece of vesicular basalt, you'll know to check in periodically with the DV Workshop website: <http://www.ricksternbach.com/dvw.html>. The latest news is that road work to repair major flood damage continues and that most sites that we will want to visit should be open. We're still hoping to coordinate schedules with NASA scientist Chris McKay and former NASA educator Don Scott (also a former park ranger and devotee of Lewis & Clark).

The deadline for making reservations is still January 6, 2005. IAAA is not making reservations for you; you have to do that yourself by contacting the Furnace Creek Ranch at (760) 786-2345 and ask for booking number 6415. If by some very small chance you are an IAAA member who wants to attend the Workshop **but are not online**, please write to me as soon as possible and I will send you an application:

Rick Sternbach
IAAA/Death Valley Workshop
12417 Hesby St.
Valley Village, CA 91607 USA

The following members are Good to Go:

Jackie Burns	David A. Hardy	Bob Parkinson
Mike Carroll	Robin Hart	Betsy Smith
Don Davis	Frank Hettick	Aldo Spadoni
Dan Durda	Paul Hoffman	Rick Sternbach
April Faires	Julie Jones	Kara Szathmary
Gus Frederick	Bob Kline	Dirk Terrell
Joel Hagen	Ron Miller	

The following members are considering attending:

Joe Bergeron	Bettina Forget	Gavin Mundy
Richard Bizley	Bill Hartmann	Jim Plaxco
Malcolm J. Currie	B.E. Johnson	Kees Veenenbos
Joy Day	Charley Kohlhasse	Arthur Woods
Don Dixon	Pam Lee	

Thanks to all who have responded to this call for a major gathering of space artists, in a place that holds so much wonder and inspiration for us. Let's keep our fingers crossed that nature doesn't knock out our plans.

• **May 2005 or 2006 — Columbia Ice Fields.** **Contact:** Paul Hoffman (paul@digitalspacart.com)

MEMBERSHIP OPS

Walt Barrows, U.S. Membership Secretary, has temporarily stepped down from his post to attend to pressing personal matters in Florida, where many are still recovering from the recent pounding hurricanes. Good luck to you, Walt, and thanks for the effort in maintaining the Excel membership list. Your editor will take over, with the able assistance of Board member B.E. Johnson. BJ is reworking the list into a new database format, and we'll have more news on that soon.

In the meantime, you are urged to **check your status and make sure that you are not in default for 2004**, even at this late date. We know the new system has been a bit confusing, and some members have come close to being dropped from the list because of this confusion or simply due to forgetting to pay their dues. We'll repeat the gist of the new system (the language is clarified a bit from the Jan-Feb 2004 issue article):

All membership dues are payable on **January 1st** of each year following the initial join-up date. The amount changes **only for the second year**. For those **first-time members only** who join mid-year, the following percentages are applied to your particular membership level:

Date Joined First Time	Percentage of Dues Applied First Year
January 1st to March 31st	100%
April 1st to June 30th	75%
July 1st to September 30th	50%
October 1st to December 31	25%

Example of how this works now: Let's say you join in May at the Artist level. **You pay the full \$45.00 dues on joining.** Seventy-five percent of your \$45.00 (\$33.75) is applied to your first year's membership. That carries you through to January 1 of the next year. At your **first renewal (Year 2)**, you pay \$33.75, because \$11.25 (25%) of your initial join-up dues already covered the first quarter of the second year. On January 1 of the **third year** (second renewal), you pay the normal \$45.00, and each year after that. See? Simple.

Second example: You join up as an Associate in September. **You pay the full \$40.00 dues on joining.** Fifty percent of that initial dues (\$20.00) gets you to the next January 1; you then renew for \$20.00 because the other \$20.00 covered the first half of the second year, and on January 1 of the **third year** you send the full \$40.00. **You pay full dues (Year 1), then a piece to sync up (Jan. 1 of Year 2), and then full dues from then on (Jan. 1 of Year 3-on).**

EXHIBITION & GALLERY NEWS

From Joy Day, Director of Exhibitions: "Thank you to everyone who submitted pieces for the new slots in the Artists' Universe show. The submitted works were extremely beautiful, thought-provoking and had a surprisingly wonderful professional quality to each and every one of them. New members works are from:

Joe Bergeron	Mark Garlick	Lynn Perkins
Edwin Faughn	Frank Hettick	Jon Ramer
Bettina Forget	Julie Jones	Bill Stolpin

Congratulations to these members. Their works are wonderful and will add more to an already great collection of works."

KG: I seem to be the dissenter here, but I wasn't particularly nervous. In the weeks prior to SOI (Saturn Orbit Insertion), we performed the same set of maneuvers—just up to the point of the burn—and the spacecraft performed nearly flawlessly. During the burn, although the main dish was off Earth-point, the omnidirectional low gain antenna was transmitting a signal. So it wasn't like we ever lost communications.

RS: How do Cassini mission control activities differ from those on, say, MER, with the Sols timekeeping? And how does the greater distance affect scheduling of uploads, data return, etc.?

KG: Our operations are dramatically different than that of, say, MER. The MER teams upload sequences on a daily basis. When the data downloaded, images are analyzed, and the next sequence is created with the sense of "Oooh! Let's go THERE!". So sequencing is done on a daily basis. In contrast, our sequences are anywhere from weeks to months long. We already know what trajectory Cassini will take through the Saturnian system. We already know where Saturn, the moons, and the rings are and we plan observations accordingly. So, combining a few of my previous answers, the whole science planning/sequencing process goes something like this (dramatically simplified): Navigation or the mission designers create, or modify, Cassini's tour trajectory. I, and folks on various instrument teams, run software to analyze the potential science return, and determine observation opportunities. The TWT's and OST's determine conflict-free timelines of observations for given periods. Teams generate command files for their instruments to perform their observations. These command files are merged with downlink, navigation, and engineering housekeeping activity files in the sequence development process. The sequences are tested again and again and again and again. Errors are removed. The sequence is radiated to the spacecraft, it becomes active, observations are made, data and images are sent to Earth, everybody

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PULSAR Submission Guidelines

We're always looking for news and images for PULSAR. Feature articles generally run 500-1500 words; news bits can be as short as a few lines. Even in this age of internet email lists, if you have anything of interest to the space artist, you can share it here.

Hard copy, mailed: Text should be typewritten, double-spaced. Images can be photographic prints, sketches, or photocopies suitable for scanning, either black & white or color. Mailing address: Rick Sternbach, IAAA/PULSAR, 12417 Hesby Street, Valley Village, CA 91607 USA.

Email and Other Web Options: email all text to rsternbach@earthlink.net. Text files can be saved in any format which can be opened by Microsoft Word. Text files can also be placed on a website for downloading; please furnish the proper URL. Images should be roughly 1800 pixels wide or better. Images can be PSDs, JPGs, GIFs, or PNGs. Other formats, like QuickTime, are also acceptable; please check with your editor first. If emailed, please keep file size to 2MB or zip-compress larger files. Large images can also be placed on websites for download; again, please furnish a URL. Please provide credit and copyright information for articles and images. If no copyright information is provided, a © notice will be placed with the artist's name and current year. For images, please provide a **real title and a sentence or two about the subject**; a file name like "jup345.jpg" won't tell us what we need to know.

RS: Did Cassini actually have the retractable thruster cover dome installed? I've seen conflicting info about that. If it's still there, did it work as advertised? (I assume so)

KG: Yes, the MEA (Main Engine Assembly) cover is installed on the spacecraft, and yes it functions properly (knock on wood).

RS: Why go with moving the SC instead of moving the instruments (body mounted vs. scan platform)? Doesn't that inject a lot of risk in communications?

KG: Many deep space probes—like Galileo and the Voyagers—have their ORS (optical remote sensing) instruments mounted on a scan platform. The scan platform articulates, allowing the ORS instruments to track bodies as the spacecraft flies past. With Cassini all the ORS instruments are body-mounted, so we must physically turn the entire spacecraft to point to an object, and to track an object. I am unclear of ALL the details here, but it seems that the omission of the scan platform was a cost-saving measure, one which I understand may have saved the mission. In the early days of designing the Cassini spacecraft, the costs were starting to look prohibitive. The scan platform was eliminated to save a million dollars or so, and this likely was a decision that saved the mission....

...but one for which we are paying now. Turning the spacecraft does not so much harm communications as it does create other difficulties.

The spacecraft can be turned in two ways: thrusters and reaction wheels. Thrusters turn the spacecraft more quickly, but for most spacecraft observation pointing, particularly when pointing for an ISS observation, the thrusters will not give us the kind of accuracy we require so we use the reaction wheels. Reaction wheels are, like they sound: heavy wheels—akin to Hubble's gyros—that, when spun up, turn the spacecraft. When on wheels, Cassini turns glacially slowly. Therefore, all instrument teams have to add what is usually a fairly nontrivial turn time to all their observation durations. Further, some instruments like our Composite Infrared Spectrometer (CIRS) like to be as cold as possible. Therefore, these instruments have radiators, not unlike heat sinks, that radiate their heat to space. Our flight rules dictate that these radiators can't point near bright bodies (like the Sun, Saturn, etc.). Further, the borsights of most of these instruments also cannot point too near the sun. The implication here is that many of our turns, which already take a while, can take even longer. It's often the case that the spacecraft simply can't turn from point A to point B without violating flight rules, so it turns from A to C then to B. It can get very complex at times.

So was eliminating the scan platform the right call? Since it seems to have saved the mission from cancellation then I would argue yes. There is still a price to be paid for that, though: increased mission complexity.

RS: Related to the above—the SC had to point away from Earth during the ring plane crossing and then point toward (but still off-axis) Earth during the SOI burn. How scary was that?

CASSINI TO SATURN: MAKING IT WORK FROM JPL AN INTERVIEW WITH DR. KEVIN GRAZIER

Your editor recently interviewed Dr. Kevin Grazier of JPL, who has already distinguished himself as something of a TV personality during Cassini's Saturn Orbit Insertion maneuver, clearly explaining things along the way. Without further ado:

Rick: Could you tell us a little about your role in the Cassini mission, and what's different (spacecraft, operations, types of experiments, whatever) from the last time a major SC visited Saturn (Voyager 2)?

Kevin: I have the dual roles of Investigation Scientist, (IS), for the Imaging Science Subsystem, as well as Science Planning Engineer (SPE).

As an SPE I maintain a huge database of geometrical information called the Tour Atlas. This is used by all the Cassini instrument teams to plan observations throughout the mission. Also I periodically lead, or co-lead, sequence development teams. The computer program that runs on the spacecraft at any time is called a sequence. There are 41 sequences during Cassini's prime mission. The timeline of observations are already largely determined. During a sequence development phase, the Science Planning Lead accepts spacecraft command files from all the different instrument teams, makes sure they play well together, don't violate flight rules, don't overfill the solid state recorder, have enough downlink time, etc. That's half of my job.

As the IS for the ISS instrument, I write software to help our instrument team plan their observations. Also, different parts of the mission, different orbit orientations, are good for different types of scientific observations. To schedule observations, and to create conflict-free timelines, different orbits are relegated to one of four different Target Working Teams—TWTs or, yes, "Twits". I am the ISS representative for the Rings TWT and co-rep for the Magnetospheres TWT. In other words, I get to argue with 12 other scientists why OUR science is more important than theirs when there are conflicts in the timelines. As an aside, we also have two other teams which perform similar tasks for satellite flybys: the Titan Orbiter Science Team (TOST), and the Satellite Orbiter Science Team (SOST). On Cassini we have WAY too much fun with acronyms. As for what I do, though, that's about all.

RS: With Cassini delayed by its circuitous route past Earth and Venus, did a lot change on the flight plan, maintaining the SC systems, maneuvering fuel use, power concerns, hardware MTFB issues, etc.?

KG: The word "delayed" implies there was a change to our trajectory. Unlike Galileo, which *DID* have a cruise trajectory change, Cassini was always scheduled to have a rather circuitous route to Saturn—called a VVEJGA trajectory (Venus-Venus-Earth-Jupiter Gravity Assist). This country currently doesn't build a booster big enough to send the six-ton (in Earth's gravity) Cassini spacecraft directly to Saturn. We planned on those gravity assists all along. Given that, hardware designs, power, etc. were all planned with a nearly seven-year cruise in mind.

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Artist Profile:

Julie Jones



“Moonbow” by Julie Jones ©2003

Julie’s interest in art and astronomy started at an early age. As a young child, coloring was a passion. This combined with hearing about Sputnik in 1957 from her mother (a vivid memory from age 4) and together locating constellations, her interests bloomed. A 1959 children’s book, “You Will Go to the Moon” illustrated by Lee J. Ames, was a favorite and fostered a belief that space travel for kids was in our future! She also followed the US space program from its inception. As a youth she built a large telescope by hand, grinding the mirror herself. (She says the telescope still works and is in good use!) In high school Julie discovered she had a real love of art but did not pursue it due to commitments to science and her first career at the Lawrence Berkeley National Lab (LBNL) which she began as a research technician during high school.

Julie drew casually throughout college, during her career at LBNL and while raising a family. Her work at the Lab turned to the business aspects of the institution, writing contracts for LBNL’s collaborative research and development with other research institutions and universities. Though interesting, Julie missed the creativity she had discovered in art and in 1998 began to draw again. She was encouraged by inquiries made at a local framing shop when a customer came in to have some of her art framed in. She discovered digital imagery through an associate at Berkeley Lab and was fascinated by its flexibility but began her renewed interest by first studying traditional media at the Berkeley School of the Arts. Later she acquired digital skills,

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BOOK REVIEW: FUTURES

REVIEWED BY RON MILLER

David Hardy’s “Futures” (Harper Collins, NY: 2004) is probably the best solo space art book to come out since . . . well, since David Hardy’s last solo space art book. It is both an updating of his earlier “Challenge of the Stars” and a retrospective of the first two editions of that book. The strong points are many: a typically splendid text by the inimitable Patrick Moore, scores of brand-new paintings by Hardy and brilliant reproduction. With the passing of Ludek Pesek, Hardy has now assumed the mantle of the Grand Old Master of space art. And rightly so.

Of particular interest are Hardy’s digital renderings. Not just for their own sake—and they are wonderful in and of themselves—but for the way he has managed to blur the line between his traditionally painted artwork and his digitally painted art. By (apparently) combining painted elements with digital elements or running his digital art through various filters in order to make them more “painterly”, he has succeeded in erasing any visual distinctions between the two. I was very much interested to see his extensive use of Terragen, which he uses very imaginatively and creatively, which is just how it should be used. Occasionally, the Terragen elements of a painting appear to have been rendered over to large extent, leaving only small areas of the Terragen landscape untouched.

While all of the illustrations are excellent—indeed, they are some of the best space art ever published—a number stand out even amongst such an extraordinary crowd. Some of my favorites include remarkable views of a fog-filled Martian canyon, a crew of astronauts with their rover exploring the floor of a valley and an illustration of a lander touching down on the surface of a comet is literally compelling as is his Plutonian landscape and a view of Eta Carinae. I was particularly interested to see Hardy’s take on the ice spires on Ganymede since I’ve done an illustration of the same subjects (in fact, I think we are the only two to have illustrated these features).

The only weak point of “Futures”—though it is really a small one—is its retrospective side. Much too much of the book is devoted to comparing what we know now to what was known when the first edition of “Challenge of the Stars” was published in 1974—or, more specifically, between 1954, when Moore and Hardy first collaborated, and the present, which accounts for the subtitle of the book: “50 Years In Space”. The point that things have indeed changed in the past half century is well made in Moore’s introductory chapter, “Overview 1954-2004”. That and a handful of examples of before-and-after Hardy art would have been sufficient. Unfortunately, the book can’t quite make up its mind what it is—an updated “Challenge of the Stars” or nostalgic semi-biographical reminiscence—so far too much of the book is devoted to comparing present-day Hardy renderings of astronomical subjects to his renderings of the same or similar subjects decades earlier (a great deal of which depends on the reader’s familiarity with the earlier books). A great deal of the text as well is spent in explanations of what was known half a century ago—space that I think might have been better devoted to explaining what we know now. A little of this would have gone a very long way—a lot gets a bit redundant and, frankly, pointless.

A quibble, really, when set against everything “Futures” has to offer. It certainly deserves a place on the same shelf as “Conquest of Space”, “Sur les Autres Mondes” and “The Moon and Planets” as one of the classics of space art.

NEWS BITS — SOLAR VOYAGER CLOSING

From David Jones: “Solar Voyager has existed now for almost 4 years, serving as a display gallery for some of the best space art on the internet today. Unfortunately, due to reasons which I will not share here, I can no longer maintain the site. Therefore, pending any changes, the website will close permanently on Saturday, October 9th.” Jones is open to offers to reactivate the site; contact webservice@solarvoyager.com.

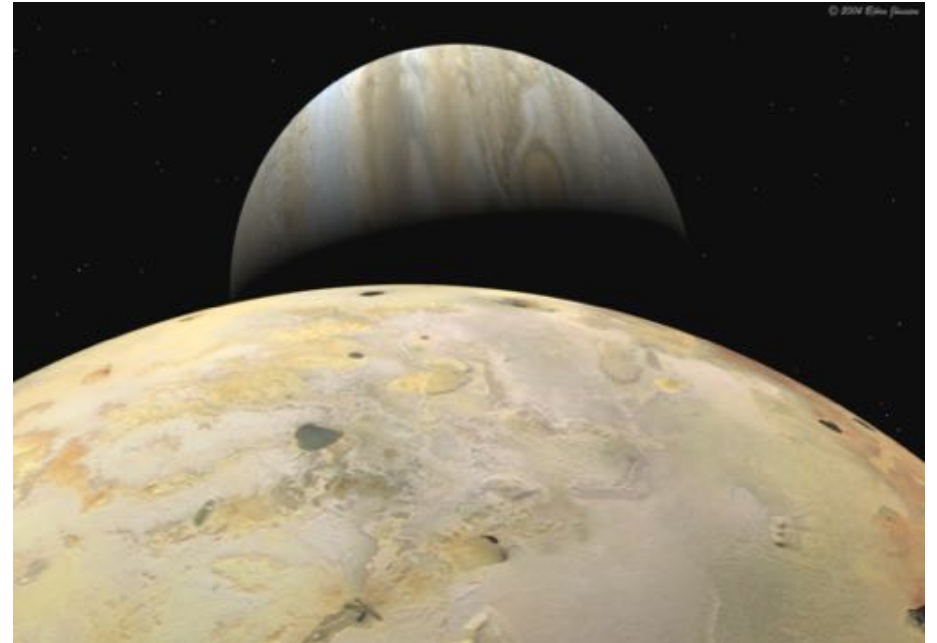
GAS GIANTS



“Ring Particles” by Garry L. Harwood ©2004

GAS GIANTS

A PULSAR Special Feature



“Giant’s Crescent” by Bjorn Jonsson ©2004



“Star Cluster World” by Samuel Deitz ©2004

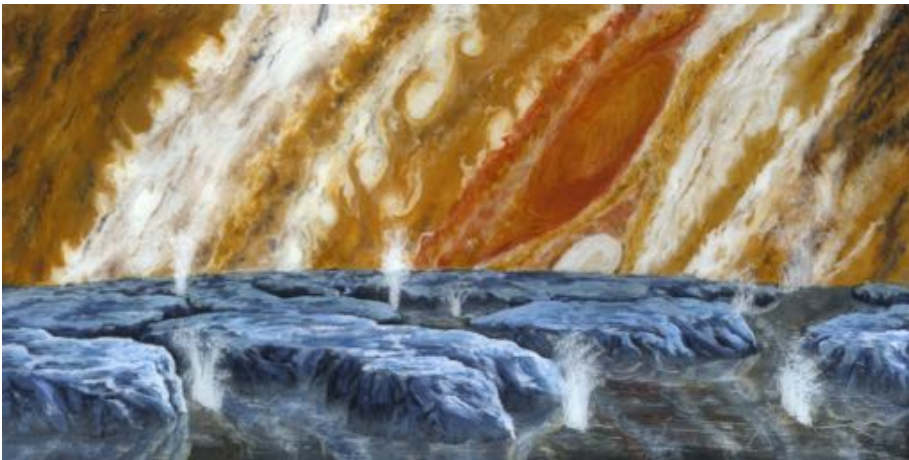
GAS GIANTS



“Catching the Ring” by Norm Siegel ©2004



“Io” by Lionel Bret ©2004

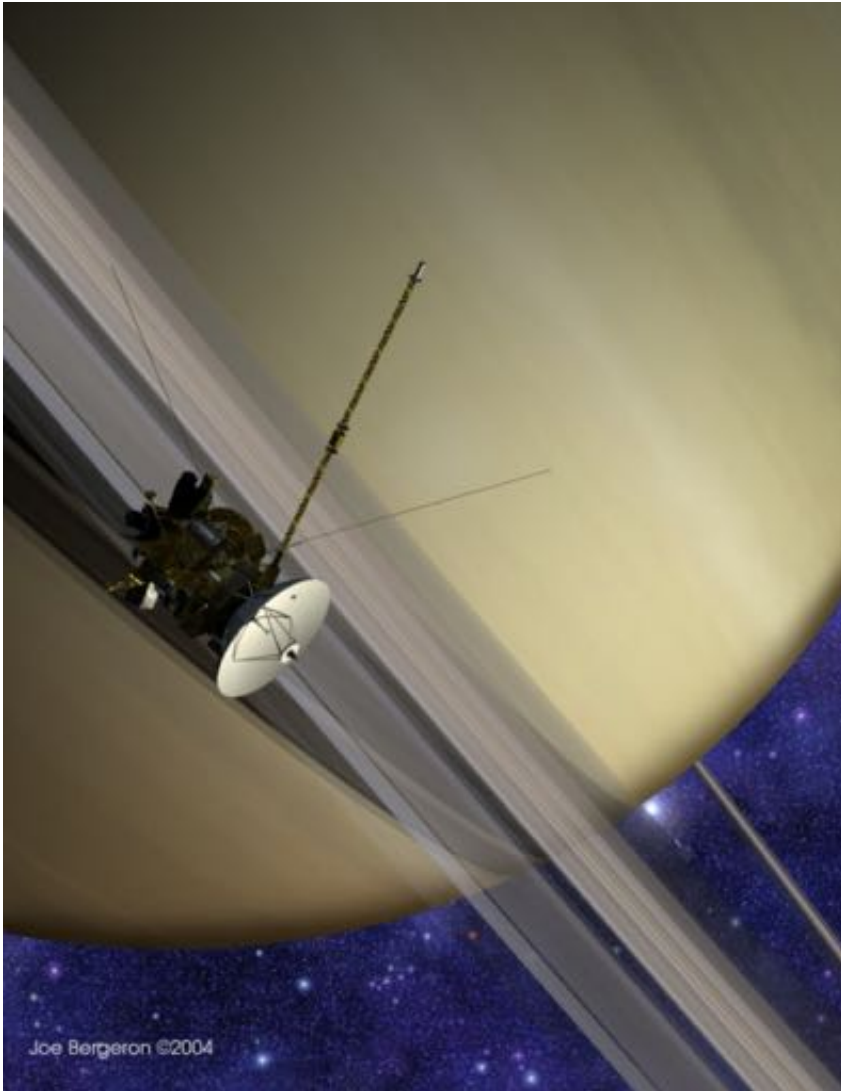


“Up Close” by Joy Day ©2004

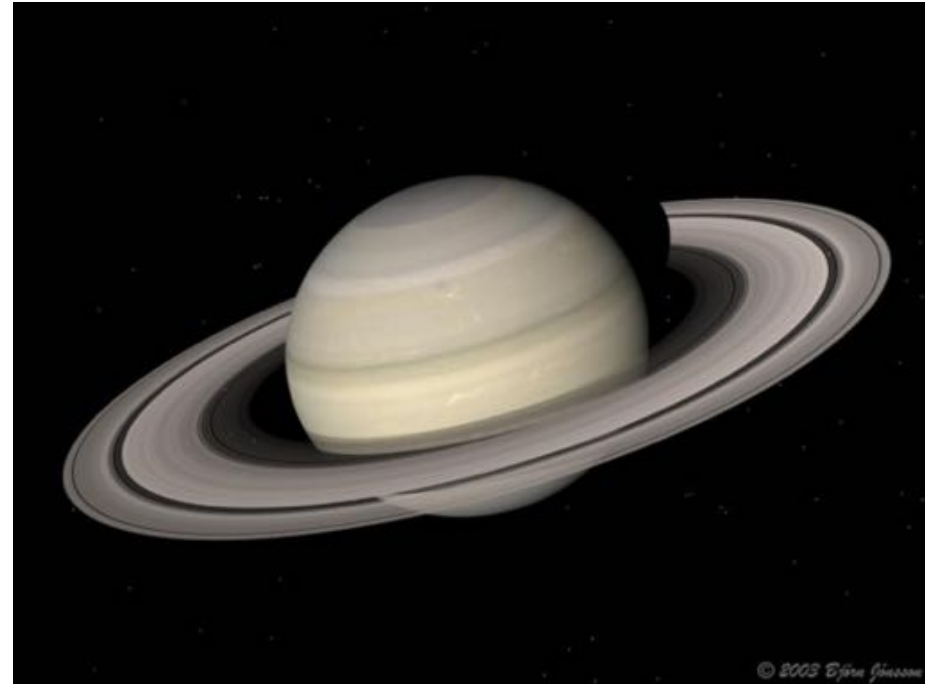


“Binary Star and Ringed Planet” by Richard Bizley ©2004

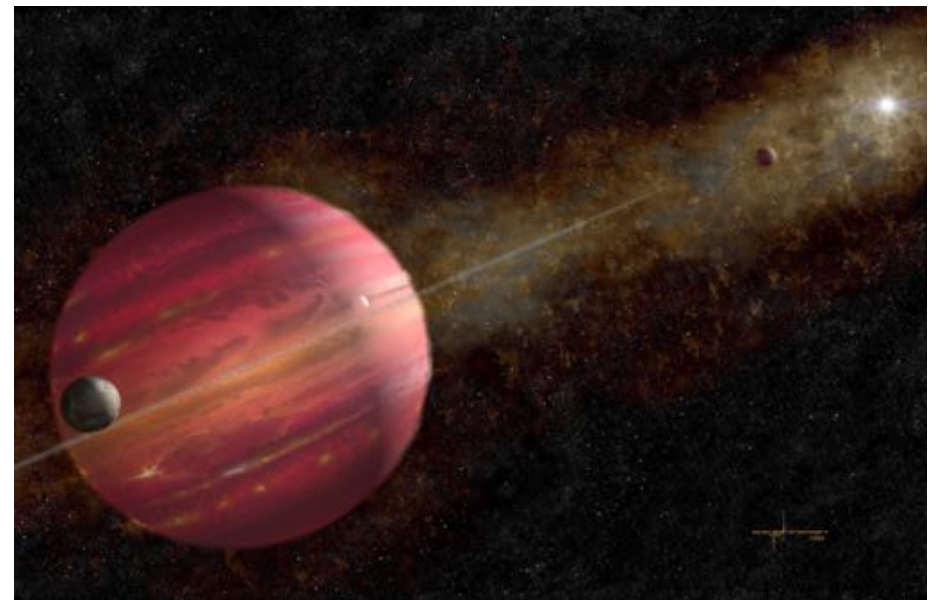
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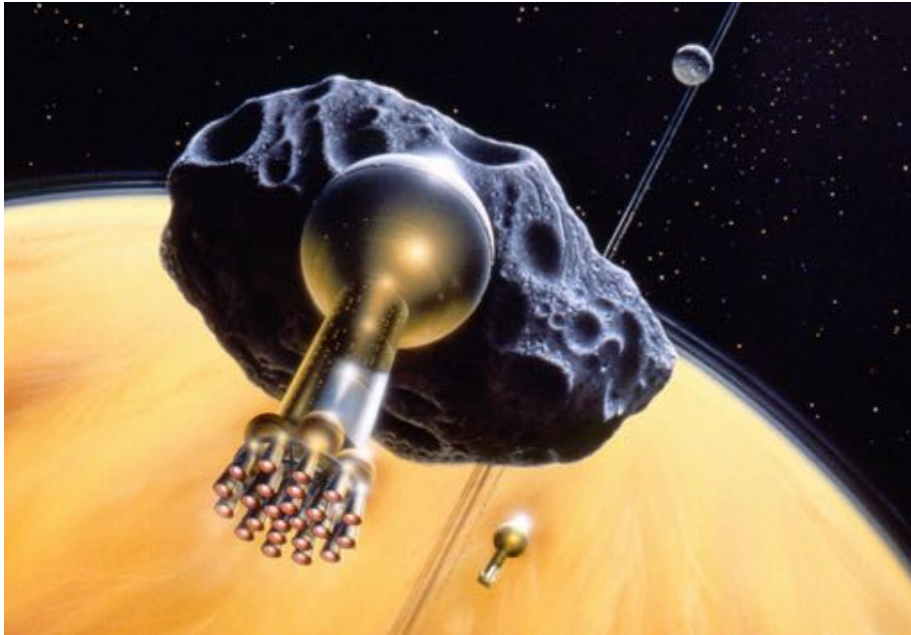
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