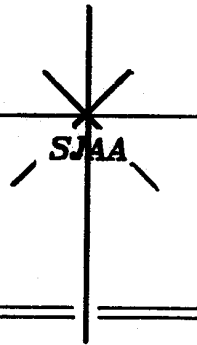


# THE SAN JOSE ASTRONOMICAL ASSOCIATION

## EPHEMERIS



### MARCH 1985

\*\*\*\*\*  
\* MARCH 30TH GENERAL MEETING \*  
\* NASA PROJECT MANAGER NICK VOJVODICH WILL \*  
\* PRESENT A PROGRAM ON THE GALILEO/JUPITER \*  
\* ORBITING PLANETARY MISSION \*  
\*\*\*\*\*

- MARCH 2 Los Gatos Red Cross Building.  
Indoor star party. Doors  
open at 8 pm. Don Machholz  
will be giving an informal  
talk on the up coming Messier  
Marathon's, March 15, 16 and  
the 23rd.
- MARCH 9 Board meeting 8 pm at Robert  
Fingerhut's home. If you want  
to attend, please give Bob  
a call for directions to his  
house.
- MARCH 15/16 Messier Marathon Part I at  
Loma Prieta observing site.  
For additional information  
please call Don Machholz at:  
(408) 448-7077
- MARCH 23 Messier Marathon Part II at  
Grant Ranch county park.
- MARCH 30 General meeting 8 p.m. at the  
University of Santa Clara  
Alumni Science building. Nick  
Vojvodich, NASA's project  
manager for the Galileo space  
probe, will be our guest  
speaker. This should be a  
most informative talk about  
one of NASA's last planetary  
probes to Jupiter this century.
- APRIL 6 Los Gatos Red Cross build.  
Indoor star party. Doors open  
at 8 p.m.
- APRIL 12 Board meeting at Chris Pratt's  
house. 7 p.m. "POT LUCK"
- APRIL 13 Fremont Peak Field Expedition  
for astronomical observation.  
Dusk till Dawn.
- APRIL 20 Second Annual star party at  
Henry Coe State Park. Dusk till  
Dawn.
- APRIL 27 ASTRONOMY DAY!

#### ASTRO ADS

New, never used Celestron 5.5" f/1.65 Schmidt  
Camera. With standard and filter film  
holders. Adaptors for mounting to C8, C11,  
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for strength and rigidity. Great for comet  
Halley! Celestron list price: \$364 Selling  
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#### TUCSON 85'

BY: DAVID LEVEY

Go west, stargazer, the clarion calls as  
Tucson prepares to host the 1985 Astronomical  
League convention that promises something  
truly special. Beginning on the new moon  
which is Tuesday, June 18 and continuing  
through Saturday the 22nd, the five day  
convention will consist of tours, paper  
sessions, outings, dinners, parties and  
contests.

#### TOUR OF KITT PEAK.

We all know this observatory as one of  
the largest and most important in the world, a  
place where galaxy-breaking research is done  
on state-of-the-art equipment. We'll get a  
chance to look at some of that during the  
convention.

#### MMT

The Multiple Mirror Telescope, the  
forerunner of what will likely be a whole  
series of specially designed and productive  
telescopes, will also be on our tour list.  
But because the facility and its access road  
can't handle large numbers of visitors, this  
tour is limited to those who register early.

#### OBSERVING SESSIONS

June is traditionally one of Tucson's  
driest months, and the warm, dry, mosquito-  
free evenings offer phenomenally clear skies.  
We're planning observing sessions at a number  
of sites, both outside and inside the city.  
Visitors will also be able to see some of the  
unique telescopes belonging to the collections  
of some of our local astronomers.

#### CONTESTS

This year we are planning but one  
contest. You can bring telescopes,  
astrophotographs, observing projects, writing  
material, or anything else you wish. If your  
entry meets the standards that will be set by  
our panel of judges than you may win a prize!

For further information about Tucson 85',  
contact: David H. Levey, Chairman, Tucson  
Convention Committee, Rt 7, Box 414, Tucson,  
AZ. 85747

#### UNIVERSE MAGAZINE

Man has always looked to the heavens with  
curiosity. We know more about outer space  
today than when Galileo first focused his  
telescope on the Milky Way, but there is still  
so much to learn. Now, you can explore our  
world and beyond on the KCBS Universe  
Magazine.

The Universe Magazine is an  
interview/call-in program that seeks to  
provide listeners ready access to scientists  
and their discoveries. In the nineteen months  
that it has been in existence, a wide range of  
topics from dinosaurs to the search for  
extraterrestrial intelligence have been  
discussed.

You can hear it on Saturday evenings from  
6:00 PM to 8:00 PM. on KCBS AM radio.

DEEP SKY NOTES - MARCH  
BY: STEVE GOTTLIEB

Sandwiched between the prominent constellations of Gemini and Leo is the inconspicuous grouping of Cancer. Though containing no stars brighter than mag. 4, Cancer is nevertheless an attention-grabber in dark skies because located near its center is the bright, large, naked-eye cluster M44. Besides splashy M44 and the rich, ancient cluster M67 found 9 deg. south, Cancer contains numerous lesser known galaxies, many appearing in pairs and groups. These multiple galaxy groupings were recently explored using my 13.1" on December 22, 1984 in the Sierra foothills near Fiddletown and at Fremont Peak on the weekend of January 18-19, 1985.

NGC 2535: The brighter member (Mp 13.5) of an interacting pair, NGC 2535 can be found by locating mag. 6, 14 Cancr and offsetting 22' SSE. I recorded this face-on Sc galaxy as faint, fairly small, round and diffuse. I probably only observed the brighter central region.

NGC 2536: Just 2' SE of NGC 2535 I found a small and very faint companion (Mp 14.8) nearly in contact. An excellent photo of this system appears in Timothy Ferris' GALAXIES on page 146. In this shot, NGC 2536 appears to be located at the tip of one of the spiral arms of NGC 2535.

NGC 2608: Plotted on the Tiron SKY STLAS 2000 in northern Cancer, this barred spiral was elongated ENE=WSW, moderately large, and fairly diffuse (Mp 13.2) but contained a condensed core. Photographs reveal a double nucleus or a centrally located superimposed star.

NGC 2619: Located 33' ENE in the same low power field, this spiral appeared as a slightly fainter (Mp 13.6) twin of NGC 2608. Though the size of NGC 2619 was similar to NGC 2608, the elongation was NE=SW and the surface brightness was smoother.

NGC 2672: This small elliptical galaxy is plotted on the Tiron Atlas 2 deg. SE of M44, just 1/2deg. NW of a mag. 6 star. At 166x, it appeared small, roundish, moderately bright (Mp 13.4) with a small condensed nucleus. Switching to 220X, a companion was visible close to the east edge of NGC 2672. Appearance on the Palomar Observatory Sky Survey is very compact.

NGC 2752: The last member of the NGC 2749 group which I located was another marginal object (Mp 14.8) found 5.4' ENE of NGC 2749. Though I recorded no details due to a distracting close, bright double star just NE of NGC 2752, it appears as a small edge-on spiral on the POSS print.



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Include postage and insurance for return mail.	12 1/2"	\$24.00
Mirror will be shipped in container received	14"	\$26.00
	16"	\$50.00

FROM THE EDITORS DESK  
BY: JOHN GLEASON

A special thanks to those of you who responded to my call last month for telephone numbers. In this issue you will find the 1985 Membership Roster. Additional copies are available for new members. Extras will be available from Jim Van Nuland and Bob Fingerhut.

I understand that there are a number of members who get their Ephemeris nearly 2 weeks after the mailing. And, then there are those members who get the Ephemeris a day after I mail it. All of this has to do with the 3rd class bulk rate zip code presort. Many members do not fall into an identical 5 digit sort, nor a 3 digit sort. These members get an all state bundle which is probably the reason for the delay. But....you're getting this months Ephemeris a little later than usual due to a major computer crash which locked up my March Ephemeris files for 7 days! So much for modern technology.

The 5th ANNUAL ASTRONOMICAL AUCTION will be held on Saturday May 4th at the Los Gatos Red Cross Building. Doors will be open at 2 p.m. This is one of the biggest astronomical events in the bay area. Plan now to attend. Pre-registration information is in this months Ephemeris.

Your editor is still looking for star party reports. I have heard that the last two star parties were well attended and that the weather was excellent for this time of year.

107 EVENTS OBSERVED ON GRAZE EXPEDITION  
BY A SINGLE OBSERVER  
BY: SHIELA MACDOUGAL, SJAA

On the evening of 30 February (29 February UT) the star Gamma Globulin was scheduled to be occulted by the local Moon. Gathering the pieces of my trusty Alfred Clork refractor together, I headed out to the graze site using the map drawn by the expedition leader who has no sense of direction and cannot make a straight line even with a ruler. When I finally arrived, the graze team members were busily hunting for station markers buried earlier by the expedition leader. I assembled the Clork, noting for the first time by the inscription that the lens blanks appeared to have been cast by the Coca Cola Corporation. As the graze moment approached, most of the fighting over choice sites had subsided and we started gazing into the sky looking for the Moon (the expedition leader had not provided us with finder charts as previously promised). It was all rather academic anyway due to the heavy cloud layers building up, causing an estimated 6 magnitudes of visual extinction (on top of 1 magnitude of extinction due to local mosquitos).

Undaunted, I searched with the Clork until I could just barely make out the full Moon. I tried calling out to the other nearby stations that I had discovered the Moon but the melodious tones of WWV masked my screeching. A few accurately tossed rocks got their attention. Finally we all settled down to watching the Moon but I never did see the 21st magnitude star. I could hear the cries of "OUT", "IN", "BLINK", "MISS" and "FLASH" all up and down the observing line as we recorded the passage of clouds over the Moon. In all, it was an exciting time and it was over all too soon. It would have been a much better graze, if that bright Moon hadn't been so close to the star.

I look eagerly to the next graze expedition and have been pestering the expedition leader for more details on when it is and where my observing station will be. Finally he relented and said, "Why don't you just go out beyond Yuma someplace in July, about Noon some day"! I have it marked on my calendar.

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Rose	Phyllis	620 N. 10th St.	San Jose, CA. 95112	(408)	293-6611
Rosing	Wayne&Jo-Anne	18716 Favre Ridge Rd.	Los Gatos, CA. 95030	(408)	354-2507
Roth	James P.	5964 Garces Ave.	San Jose, CA. 95123	(408)	578-4768
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Schneer	David & Joy	1352 Kingfisher Way #31	Sunnyvale, CA. 94087		
Sanford	John	2215 Martha Ave.	Orange, CA. 92667		

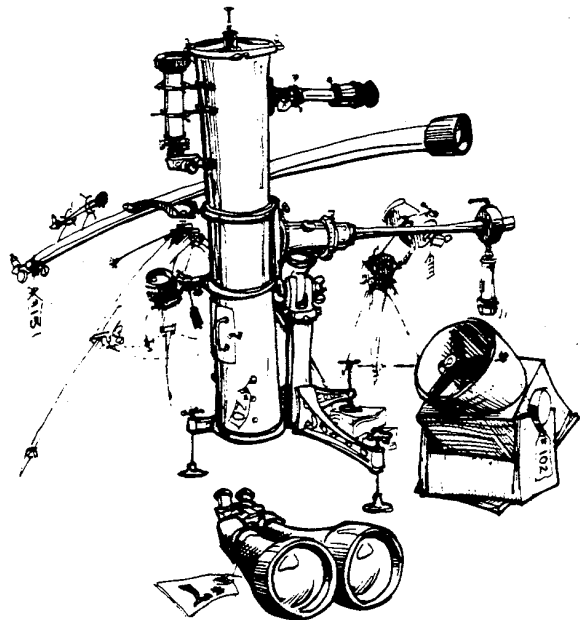
Schell	Ed	P.O. Box 1345	Los Gatos, CA. 95030	(408)	356-7498
Schiffmann	Mary	22449 Cupertino Rd.	Cupertino, CA. 95015	(408)	446-4265
Schoendorf	Walt	Apt c-125 344 Westline Dr.	Alameda, CA. 94501	(415)	523-8431
Schumacher	Fred	14327 Corvallis St.	San Leandro, CA. 94579	(415)	352-2327
Seefred	Helene	P.O. Box 6	Los Altos, CA. 94022	(415)	967-6049
Seefred	Ronald	Star RT.2 Box 408	La Honda, CA. 94020	(415)	851-3493
Spierling	Norm	5248 Lawton Ave.	Oakland, CA. 94618	(415)	547-6523
Spoecker	Robert R.	2201 Monroe St. #404	Santa Clara, CA. 95050	(408)	251-3808
Stavolone	Thomas	392 Ann Darling Dr.	San Jose, CA. 95133	(408)	257-0947
Steps	Steven&Diana	4949 Englewood Dr.	San Jose, CA. 95129	(415)	376-3007
Stone	Donald	731 Camino Ricardo	Moraga, CA. 94556	(408)	244-8693
Sunseri	Joseph	E-206 3915 Seven Trees Blvd.	San Jose, CA. 95111	(408)	238-5530
Sutorius	Michael	3883 Balcom Rd.	San Jose, CA. 95148	(415)	235-9513
Takahashi	Allen	5916 Orchard Ave.	Richmond, CA. 94804	(408)	252-8016
Tanner	Eve	1037 Harlan Dr.	San Jose, CA. 95129	(408)	241-2125
Thometz	Alan	2492 Karen Dr. #23	Santa Clara, CA. 95050	(408)	371-1307
Trejo	Paul	21250 Stevens Creek Blvd.	Cupertino, CA. 95014	(415)	327-3158
Van Nuland	James	3509 Calico Ave.	San Jose, CA. 95124	(415)	574-1621
Vann	Marvin	885 Laverne Wy.	Los Altos, CA. 94022	(415)	325-4166
Vanzandt	Donald E.	168 Waverly #7	Palo Alto, CA. 94301	(415)	278-3335
Waldee	Stephen R.	3914 Leigh Ave.	San Jose, CA. 95124	(415)	786-2967
Wallace	Donald G.	387 Hedge Rd.	Menlo Park, 94025	(408)	267-4133
Walton	Ron	1671 Via Rancho	San Lorenzo, 94580	(408)	629-8712
Watts	Earl	26638 Jamaica Lane	Hayward, CA. 94545	(408)	244-7610
Webster	Larry	5291 Elrose Ave.	San Jose, CA. 95124	(408)	252-5301
Weinberg	Edward	365 Madison Dr.	San Jose, CA. 95123	(408)	252-8966
Weisenstein	Daniel L.	609 N. Genevieve LN.	San Jose, CA. 95128	(415)	471-4852
Welch	Mike & Jeani	P.O. Box 1528	Campbell, CA. 95009	(408)	947-7573
Wells	J.D.	Box 9651	San Jose, CA. 95157	(408)	246-6189
Wild	Norman	7557 Orange Blossom Dr.	Cupertino, CA. 95014	(408)	867-1770
Williams	Dale W.	33050 LK. Wawasee St.	Fremont, CA. 94536	(408)	
Witkowski	Jim	2193 Hogan Dr.	Santa Clara, CA. 95050	(408)	
York	David O.	800 Richmond Ave.	San Jose, CA. 95128	(408)	
Zeiders	Jack	2961 #3 Magliocco Dr.	San Jose, CA. 95128	(408)	
Zimmer	Jerry W.	21260 Glenmont Dr.	Saratogn, CA. 95070	(408)	

#### New Members and Late Renewals

Belleville	Logan M.	13201 NE. Salmon Creek Ave.	Vancouver WA. 98665	(408)	997-2657
Damisch	Peter W.	1045 Mazzone Dr.	San Jose, CA. 95124	(408)	292-8977
Pura	Dave	494 Irving Ave.	San Jose, CA. 95128	(408)	629-8146
Rappaport	Fred	236 Manley Ct.	San Jose, CA. 95139	(408)	

THE  
SAN JOSE ASTRONOMICAL ASSOCIATION'S

5<sup>TH</sup>  
ANNUAL



# ASTRONOMICAL AUCTION

SATURDAY MAY 4

6:00 PM

DOORS WILL OPEN AT 2:00 PM

THE LOS GATOS RED CROSS BUILDING  
16011 Los Gatos Saratoga Road

TELESCOPES, EYEPIECES, MOUNTINGS, MIRRORS, LENSES, CLOCK DRIVES, BOOKS, CAMERA EQUIPMENT, STAR CHARTS, FINDERS, TUBES, DIAGONALS, PHOTOGRAPHS, SPACE ART - everything you need to make your hobby more enjoyable. You name it - it's likely to be there. Check your garage and closets for anything astronomical you would like to sell. Complete the pre-registration information form on back and save time and trouble. Anyone can buy and sell! It's fun and it's easy!

SEE YOU AT ONE OF THE BIGGEST AND MOST FUN ASTRONOMICAL EVENTS IN THE BAY AREA!



## PRE-REGISTRATION INFORMATION

The 5th Annual Bay Area Astronomical Auction is approaching so now is the time to start looking around for those items not earning their space, or brought back from Riverside, or whatever is astronomical or telescope-making related that you would like to earn some \$\$ from.

Pre-registration by mail makes it easy. Fill out the form or a copy of it. List each different item you have. If you have several identical items, use a single line and put in the quantity. Give a minimum price, even if you are willing to let it go really cheap. Indicate the percentage of the selling price to go to the SJAA (minimum 10%). If you didn't pay much for it anyway you may wish to make it an outright donation. Thank you. All proceeds from the auction go to further public education in astronomy.

Next, and MOST important, mail the form, with a SASE, to Jim van Nuland, 3509 Calico Ave, San Jose, CA. 95124. You might keep a copy of it, too. Jim will assign your bidder/seller and item numbers, and will get the form back to you quickly. That's a promise.

You will then have the numbers to label everything before the day of the auction. Use stickers given to indicate the item number, at least. If you have large stickers sent back, include the minimum bid, too. It helps the auctioneer work smoother.

If you find another box of things, just send in another form. Include the bidder number from the first one. If you find more of something you'd already registered, give the number of the first, indicate the number to be added, and give the same description.

If you don't include the SASE, Jim will assign the numbers and hold the form. You can pick it up when you arrive at the auction and then get busy labeling your goodies then.

In any case, Jim will have all the stuff hammered into the computer before auction day, so there will be no backlog and, for those who pre-register, no delays. Priority on auction day will be given to assigning bidder numbers, ---item registration will be done as time permits. So get the forms to Jim.

Directions to the auction:

Take Hwy 17 south towards Santa Cruz. Take the Highway 9 (Los Gatos-Saratoga Rd) exit and continue onto Los Gatos-Saratoga Rd. Travel about a mile to Rose Avenue and turn right. Turn right immediately into the Red Cross buildings parking lot. (16011 Los Gatos-Saratoga Rd). Plenty of parking and easy loading and unloading access!

Doors open at 2 PM for registration of items and bidders. There will be no item registration past 5:45 PM. Auction starts promptly at 6 PM. Items may be paid by cash or check. There will be a \$1 bidder/seller registration fee at the door. Refreshments will be available!

[illegible]

## COMET COMMENTS

BY: DON MACHHOLZ

No new comets have been discovered, nor returning comets recovered during the past month. Two comets are visible, though: Comet Levy-Rudenko is now in the evening northern sky and Comet Shoemaker (1984f), discovered nine months ago, is finally brightening in the morning sky.

Two fainter comets are visible too: Periodic Comets Tsuchinshan (1984p) and Schaumasse (1984m). They are growing dimmer at roughly magnitude 11, call me if you want positions for them.

As I mentioned in December 1984 of this column, the "Past Discoveries" installments of 1983 and 1984 were being updated (five comets added) and (tripled in size), and would appear in booklet form soon. This is now available from me, the cost is \$8.00, ppd. (without postage it's \$7.00). It runs 115 pages and covers comets discovered by amateur astronomers between 1975 and 1984.

DATE R. A. (1950) DEC. ELONG. MAG.

Comet Levy-Rudenko (1984t)

02-24	09h 03.9m	+59°16'	128°	9.8
03-01	08h 40.9m	+51°43'	129°	10.1
03-06	08h 28.1m	+45°03'	128°	10.5
03-11	08h 20.9m	+39°22'	126°	10.9
03-16	08h 17.0m	+34°36'	123°	11.3
03-21	08h 15.3m	+30°36'	119°	11.6
03-26	08h 15.0m	+27°15'	115°	12.0
03-31	08h 15.9m	+24°23'	111°	12.3
04-05	08h 17.5m	+21°56'	107°	12.7

This comet is pulling away from the sun (1.6 to 2.0 AU this month) and from the earth (0.8 to 1.4 AU). It may be slightly brighter than indicated. This will be our last chance to see this comet.

Comet Shoemaker (1984f)

02-24	16h 08.8m	-24°05'	90°	11.8
04-06	16h 03.1m	-26°08'	101°	11.5
03-16	15h 53.4m	-28°24'	112°	11.3
03-26	15h 38.8m	-30°50'	124°	11.0
04-05	15h 18.2m	-33°18'	137°	10.8

This comet is 3.2 AU from the sun and 2.7 AU from the earth at mid-month. It moves from near M 80 through S. Libra. It should brighten to mag 10.3 in May as it moves further south.

## WHAT GOES AROUND COMES AROUND

This month we'll cover several aspects of Halley's comet. It is slowly brightening in the evening sky as it continues to move towards the sun while the earth moves away from it. These distances are listed below in millions of miles. The comet will be equidistant from the earth and sun on March 11.

The comet remains near the border of Orion and Taurus, and, since the 11th until late July. It will move only about 2 degrees all month.

DATE R. A. (1950) DEC. DIS. TO SUN AND EARTH

02-24	04h 58.2m	+13°24.2'	443.9	418.9
03-01	04h 56.0m	+13°35.4'	439.4	422.7
03-06	04h 54.2m	+13°47.0'	434.9	426.6
03-11	04h 52.9m	+13°59.0'	430.4	430.5
03-16	04h 51.9m	+14°11.3'	425.8	434.3
03-21	04h 51.3m	+14°23.8'	422.0	438.0
03-26	04h 51.1m	+14°36.6'	416.6	441.5
03-31	04h 51.2m	+14°49.4'	412.0	444.6
04-05	04h 51.6m	+15°02.4'	407.3	447.4

As for its brightness, some sources state that it should be 16th magnitude by mid-month. This implies a fully-active coma, or head, of the comet. Latest observations, however show the comet to be quite small, about 25 seconds of arc across, with the coma reflecting more light than it is emitting. Estimates in early Feb. place it at roughly magnitude 20, but this varies by about 2 magnitudes over a period of roughly a day. This variability may be due to rotation, possibly also it's due to comet behavior we don't yet understand. As the comet warms the coma will brighten tremendously, becoming mag. 13 by this August. By then Halley's Comet will be in our morning sky and visible in amateurs' scopes.

For those of you with computer programs for comet ephemerides, here are the orbital elements for Halley's comet from IAU Cir. 3767, determined by D. Yeomans.

Peri date: 1986 Feb. 09.44394  
Arg. of Peri: 111.84804 deg.  
Inclination: 162.23930 deg.  
Aphelion (a): 17.94104 AU.  
Peri. Dis. (q): 0.5871045 AU.  
Ascending node: 58.14538 deg.  
Eccen.: 0.9672759

For magnitude, Norris and Bortle suggest:

Abosl. Mag. 3.1, "n"=3.1

It is not too late to become involved in gathering data on Halley's Comet for use in a world-wide study. International Halley Watch can be reached at:

Steve Edberg  
Jet Propulsion Laboratory  
Calif. Institute of Technology  
4800 Oak Grove Drive  
T1166 B4  
Pasadena, CA. 91109

Some additional sources of information are available for those interested in comets. Each serve a different purpose, all are quite useful.

The INTERNATIONAL COMET QUARTERLY is published four times a year and contains comet observations, articles and ephemerides. It is yours for \$8.00 a year (payable to INTERNATIONAL COMET QUARTERLY) from:

Daniel Green  
Smithsonian Observatory  
60 Garden St.  
Cambridge, Mass. 02138

The International Astronomical Union issues about 80 circulars each year, these transmit data on comets, asteroids, novae, and deep space astronomy. They cost \$39.00/100 issues (payable to "Central Bureau for Astronomical Telegrams") and you can get them from:

Central Bureau for Astronomical Telegrams  
Smithsonian Astrophysical Observatory  
Cambridge, Mass. 02138

Then there's the "Comet News Service", quarterly newsletters with interesting reports about new comets and articles on comets in general. you can get this for \$5.00/yr. (Payable to "Comet News Service") from:

Comet News Service  
P.O. Box TDR, No. 92  
Truckee, Calif. 95734

## SPACE PROGRAM UPDATE

BY: BOB FINGERHUT

### SHUTTLE MISSION 51-C COMPLETED

After a one day delay, due to an ice build up caused by the weather, Discovery was launched on Jan 23. After launch of its Department of Defense payload, it returned to land at the Kennedy Space Center on Jan 27. The IUS, which was used to boost the payload, was said to have performed well.

### SHUTTLE MISSION 51-E DELAYED TO MARCH 3

The mission has been delayed to allow additional time for replacement of thermal insulation tiles. The tiles were removed for repair of the screeed, which is used to smooth the surface of the orbiter. When Challenger flies, United States Senator Jake Garn will be aboard. He has been added as a payload specialist and will participate in studies of space sickness and the shuttle toys, physics education demonstration. Also aboard will be the second Tracking and Data Relay satellite and the Telesat-I communications satellite.

### SHUTTLE ORBITER FLEET TO GROW

The orbiter, Atlantis, is scheduled for delivery to Kennedy Space Center in April. The orbiter Columbia is being updated and will be returned in early July.

### DISCOVERY SCHEDULED FOR ANOTHER LAUNCH MARCH 19

The mission, 51-D, is to deploy the Syscom iv-3 communications satellite and retrieval of the Long Duration Exposure Facility.

### JAPANESE HALLEY MISSION LAUNCHED

MS-T5 was launched toward Halley's comet on Jan 8th. Its purpose was to test the new Nissan Motors MU-35-2 launch vehicle. It will also provide solar wind data when near Halley's comet. The primary Japanese Halley spacecraft, Planet-A, will be launched on the same type of booster on August 14, 1985.

### EUROPEAN NATIONS APPROVE A 10 YEAR SPACE PROGRAM

The program includes development of a heavy lift Ariane launcher and participation in the U.S. space station. The heavy lift booster, Ariane 5, will use the HM60, large cryogenic engine which ESA is developing. ESA's contribution to the U.S. space station project will be the Spacelab that will orbit with but separate from the station. The Hermes mini-shuttle was not approved, but the French were told to keep ESA informed of progress so that it could be approved as soon as it is feasible.

### EXTREME ULTRAVIOLET EXPLORER SATELLITE INITIATED

NASA began this project last August. Its objective is to develop the first all-sky map in the extreme ultraviolet band of the electromagnetic spectrum.

### NASA BUDGET SENT TO CONGRESS

The budget request includes money for development of a Mars Geoscience/ Climatology Orbiter and a new start for an Orbital transfer Vehicle. The Mars mission would be launched in 1990.

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