

# Saguaro Astronomy Club

Metro Phoenix, Arizona

**SACNEWS**



January, 1990 — Issue #168

## Robby Roves Arroyo as Prelude to Mars

*From the "JPL Universe" October 26, 1990*

JPL scientists and engineers have for the first time programmed a computer-driven planetary vehicle to traverse 100 meters of rugged natural terrain without human guidance. The test in September was considered a significant milestone in development of a semi-autonomous navigation system for a planet-roving vehicle.

A mission using a computerized rover is expected to precede any manned mission to another planet. The rover, called "Robby" by the Section 347 experimenters, covered the 100 meters in about 4 hours and 20 minutes, moving cautiously about two meters at a time, then stopping to survey ahead another two meters.

The test was in the rugged Arroyo Seco between the east lot and Oak Grove Park. The course was not pre-programmed in that the end of the course was not in the vehicle's stereo vision. It was obscured by foliage and rocks and no information about the specific terrain was provided in the testbed computer.

By using the stereo television cameras, Robby surveyed the area and made its own map, two meters at a time. When it encountered a flat plane, it proceeded directly toward the goal, when it encountered an obstacle, it made a new map and modified its path to go around it, rather than over it.

The unprecedented accomplishment was that the vehicle's stereo ranging perceived the terrain in three dimensions, and its artificial intelligence planned, without human help, a safe path to its goal. It was all done within a power and volume compatible with the onboard resources of a Mars surface vehicle. To complete the 100-meter semi-autonomous navigation milestone, the engineers had to integrate sensing, perception, planning and control into the self-contained vehicle.

The long-range technology development goal is to go 20 kilometers, about 13 miles, in one day. The overall program goals are to develop the technology to enable planetary surface transportation with unmanned science and exploration rovers, along with mining and construction vehicles.

## Check your Mailing Label

This will be the last newsletter sent to those who have not renewed for 1991. Also check that you are paid through December 1991. The dues were increased to \$20 per year and some may still need to pay the difference from last year's amount.

Vehicles such as Robby, but space-qualified and even smarter, would cross the red, rocky wastes of Mars to find safe paths for future visits by space-traveling men and women.

JPL's work is performed in cooperation with NASA's Office of Aeronautics, Exploration and Technology.

## Directions to SAC Events

**SAC General Meetings** 7:30 PM at Grand Canyon University, Fleming Building, Room 103 — 1 mile west of Interstate 17 on Camelback Rd., north on 33rd Ave., second building on the right.

**SAC Star Parties** at Buckeye Hills Recreation Area — Interstate 10 west to Exit 112 (30 miles west of Interstate 17), then south for 10.5 miles, right at entrance to recreation area, one-half mile, on the right. No water and only pit toilets. Please arrive before sunset; allow one hour from central Phoenix.

**SAC Deep Sky Subgroup Meeting** at John & Tom McGrath's, 11239 N. 75th St., Scottsdale, 998-4661 — Scottsdale Rd. north, Cholla St. east to 75th St., southeast corner.

## Preliminary Survey

Remember to send your survey questions that you have about what the club is doing as a whole to the SAC Newsletter Editor — the address is on the last page of this newsletter. You do not have to include your name with your submission, but if you do and there is some question about what you wrote we will at least be able to get back to you. Please try get your entry in by the February meeting. —*Paul Dickson, SAC Newsletter Editor*

# Comet Comments

by Don Machholz

Two comets have been recovered and one faint one discovered. Still visible are Comets Wild 2, Tsuchiya-Kiuchi, and Levy.

Periodic	Comet		Wild 2		(1989t)	
Date	RA-1950-Dec		RA-2000-Dec		Elong	Sky Mag
12-25	14h10.1m	-11°00'	14h12.8m	-11°14'	58°	M 10.8
12-30	14h24.0m	-12°02'	14h26.7m	-12°16'	60°	M 10.8
01-04	14h37.8m	-13°01'	14h40.6m	-13°14'	61°	M 10.8
01-09	14h51.6m	-13°55'	14h54.3m	-14°08'	63°	M 10.8
01-14	15h05.1m	-14°45'	15h07.9m	-14°57'	65°	M 10.8
01-19	15h18.4m	-15°31'	15h21.2m	-15°42'	67°	M 10.8
01-24	15h31.5m	-16°11'	15h34.3m	-16°22'	68°	M 10.8
01-29	15h44.3m	-16°47'	15h47.2m	-16°57'	70°	M 10.8
02-03	15h56.8m	-17°19'	15h59.6m	-17°27'	72°	M 10.9
02-08	16h08.9m	-17°45'	16h11.8m	-17°53'	75°	M 10.9

Comet	Tsuchiya-Kiuchi		(1990i)		
Date	RA-1950-Dec		RA-2000-Dec		Elong Sky Mag
12-25	04h21.6m	-41°22'	04h23.2m	-41°15'	111° E 8.7
12-30	03h50.4m	-38°46'	03h52.2m	-38°37'	107° E 9.1
01-04	03h27.0m	-36°02'	03h29.0m	-35°51'	103° E 9.4
01-09	03h09.8m	-33°24'	03h11.8m	-33°13'	99° E 9.7
01-14	02h57.1m	-30°58'	02h59.2m	-30°59'	95° E 10.0
01-19	02h47.7m	-28°46'	02h49.9m	-30°05'	90° E 10.3
01-24	02h40.9m	-26°46'	02h43.1m	-26°29'	86° E 10.6
01-29	02h36.0m	-24°59'	02h38.2m	-24°22'	81° E 10.9
02-03	02h32.6m	-23°23'	02h34.8m	-23°16'	77° E 11.2
02-08	02h30.3m	-21°56'	02h32.6m	-21°21'	73° E 11.4

Comet	Levy		(1990c)		
Date	RA-1950-Dec		RA-2000-Dec		Elong Sky Mag
12-25	13h33.1m	-40°28'	13h36.0m	-40°44'	60° M 7.1
12-30	13h22.0m	-40°18'	13h24.9m	-40°34'	66° M 7.2
01-04	13h09.1m	-40°00'	13h12.0m	-40°16'	73° M 7.2
01-09	12h54.1m	-39°31'	12h57.0m	-39°47'	80° M 7.3
01-14	12h36.8m	-38°44'	12h39.5m	-39°01'	88° M 7.3
01-19	12h17.2m	-37°35'	12h19.8m	-37°52'	96° M 7.3
01-24	11h55.3m	-35°56'	11h57.8m	-36°13'	105° M 7.3
01-29	11h31.5m	-33°41'	11h34.0m	-33°57'	114° M 7.4
02-15	11h06.7m	-30°46'	11h09.1m	-31°02'	124° M 7.4
02-20	10h41.8m	-27°12'	10h44.1m	-27°28'	133° M 7.5

**Periodic Comet Harrington-Abell (1990m):** Jim Scotti at Kitt Peak and H. Rickman of Pic du Midi recovered this comet at magnitude 21. It will not get much brighter.

**Periodic Comet Taylor (1990n):** Jim Scotti recovered this comet on Nov. 11. It will remain fainter than mag. 15.

**Comet Shoemaker-Levy (1990o):** This 13th magnitude comet was discovered by Carolyn and Eugene Shoemaker and David Levy on plates taken with the 18" Schmidt at Palomar on Nov. 15. It was closest the Sun

(1.6 AU) in mid-September, when it was probably about magnitude 11. It is now getting fainter as it recedes from both the Sun and Earth.

## Bits and Pieces

### Minutes of the December Meeting

There was no meeting this month, just the Christmas party on December 29.

1991 SAC Meetings	1991 SAC Star Parties
January 4	January 12
February 1	February 9
March 1	March 9
April 26	April 6
May 24	May 4
June 21	June 8
July 26	July 6
August 23	August 3
September 20	September 7
October 25	October 5
November 22	November 9
December 14 Party	December 28

### Deep Sky Meeting

The Deep Sky meeting will take place on Thursday, January 10 at 7:30pm. See the directions on the first page.

## Such-A-Deal

**SUCH-A-DEAL** is a place to advertise equipment, supplies, and services related to amateur astronomy. This is a free service for SAC members and friends. SAC is not responsible for the quality of advertised items or services.

**Telescope**—2080 \$1200. 6" reflector (spectrum) \$150. Jim Sexton 942-2231.

**Telescope**—10" Dobsonian *f*/5.6, 8x finderscope 8x50 with diagonal, 25mm orthoscopic, variable barlow 2-3x, \$450 or trade for refractor. John Vames 946-3658.

**Telescope**—Celestron C8 with Starbright coating, Byers drive, off-axis guider, 4 eyepieces, barlow, dew cap, 8x50 finder, piggyback camera mount. \$1100. Noel DeLange 937-3805.

**For sale**—IBM software: Right Writer 3.1 (grammar); Quicken 3.0 (personal accounting); The Magician (presentation graphics); First Choice (integrated); Hotline (phone management); \$15 or \$50 for all. Pete Burggraaf 995-1964.