

‡ Polar platform with useful payload on single Shuttle launch. Platform will have maximum equipment commonality with the Space Station such as solar arrays and nickel-hydrogen batteries.

‡ Co-orbiting platform with systems common to polar platform and manned base which can be used to support astrophysics and materials processing.

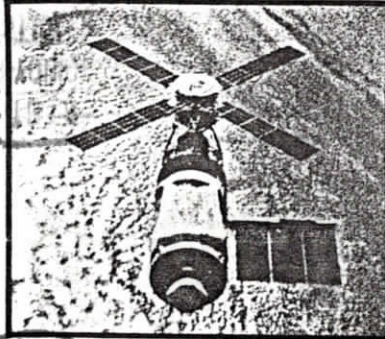
‡ Gaseous hydrogen/oxygen propulsion system for altitude boost with four modules located on the four quadrants of the Space Station. Thrusters on the propulsion modules will be in the 11.3-to-56.3-pound thrust range.

‡ Assembly altitude of 220 nautical miles. Operational altitude will be 250 nautical mi. minimum. Frequency of periodic reboost of station to operational altitude will be determined by solar activity.

‡ Metric as standard unit of measurement. Deviations permitted only where costs of implementing metric are unreasonable.

‡ Inclusion of international elements into the overall design, including the Canadian Mobile Servicing Center (MSC) and hardware provided by Japan and the European Space Agency. The MSC will include the Space Station remote manipulator system, end effectors, servicing tools, control stations and special purpose dextrous manipulators.

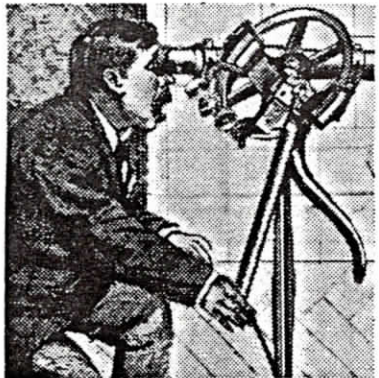
NASA will provide the mobile capability for the MSC's base structure. Japan is conducting preliminary design on a pressurized laboratory module with a local manipulator arm, attached work deck for mounting payloads requiring direct exposure to space, and an experiment logistics module. Discussions with ESA will continue to focus on a permanently attached pressurized laboratory for life sciences and materials experiments, a polar platform and a co-orbiting platform.



THE PRAIRIE ASTRONOMER
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FIRST CLASS Calico Scallop



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NEXT MEETING
MAY 27TH 7:30PM

THE *Prairie* Astronomer

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NASA ANNOUNCES BASELINE CONFIGURATION FOR SPACE STATION

NASA Administrator Dr. James C. Fletcher announced the selection of a baseline configuration for the permanently manned Space Station. This configuration will be used to guide preliminary design activities for the remaining 8 months of the Phase B (definition and preliminary design) studies.

The announcement came after more than a year of study by NASA centers and contractor teams during which the overall architecture of the station was defined and specific subsystems for operating the Space Station were chosen.

Acting Associate Administrator for the Office of Space Station John D. Hodge described the baseline Space Station configuration at a news conference on May 14th in Washington, D.C.

President Reagan directed NASA in January 1984 to develop a permanently manned Space Station within a decade. Definition of Space Station architecture and subsystems began in April 1985 with the selection of eight U.S. aerospace companies to perform the detailed definition and preliminary design studies under contract to four NASA centers. The Space Station reference configuration used as a starting point for conducting the definition studies included unmanned free-flying platforms and a manned base called the "power tower."

Important changes in the reference configuration of the Space Station have been made in response to user requirements. The "dual keel" Space Station provides for a better microgravity environment (10-56s for all modules), increases useable area on the structure for attaching external payloads, allows better pointing accuracy due to the stiffer structure and reduces traffic through the laboratory modules.

As part of their definition activities, NASA and the contractors also studied the approach of initially man-tending the Space Station by phasing in the permanently manned aspects of the program over a 3-to-5-year period. The current planning scenario for the baseline configuration can incorporate this man-tended approach, enabling a future decision on phasing in the permanently manned feature of the station. A report on this man-tended approach has been submitted to Congress.

A total of 14 Space Shuttle flights are required for assembly of the baseline Space Station configuration. Attached payloads and the laboratory module are scheduled to be carried up early in the assembly sequence to provide a useful capability for conducting early scientific operations prior to the addition of the habitation module. Two additional flights from the West Coast will be required to place the two planned polar platforms into orbit.

The current schedule calls for NASA to begin development of the Space Station in October 1986 with the contracts for actual hardware development slated for negotiation and signature in the spring of 1987. First element launch would occur in 1993, with a useful, permanently habitable station in place in 1994. The remaining elements required to complete assembly of the Space Station would be launched over the next 2 years.

Major features of the baseline configuration are:

§ Dual keel configuration consisting of two vertical keels 361 feet long, connected by upper and lower horizontal booms 146 ft. long. The former reference configuration consisted of a single keel 400 ft. long. The Space Station now measures 503 ft. at its widest point from tip to tip of the transverse boom on which the power modules are mounted. The truss building block selected is a 16.4-ft. cube and is erectable by astronauts during extravehicular activity (EVA) and assisting fixtures. Struts will be made up of individual 2.12-inch outer diameter, .060-inch thick tubes of a graphite/epoxy composite material.

§ Two 44.5-ft. long, 13.8-ft. interior diameter U.S. supplied modules with external interconnects. The reference configuration was four 35-ft. long modules with internal interconnects. Useable volume provided by two baseline-size modules is approximately the same as four reference-size modules. One U.S. module will provide laboratory functions and the other will be used for crew quarters.

Baseline configuration also includes two smaller logistics modules 24.1 ft. long. One logistics module will be attached to the station for on-orbit use while the other is being replenished on the ground. Flights to exchange logistics modules will occur on

approximately 90-day cycles. Module structures will be formed from aluminum waffle panels formed into four cylindrical and two conical segments. The habitation module will include a capacity to maintain up to eight crewmembers.

§ Location of modules near the station's center of gravity to provide the best possible microgravity environment for experiments. The reference configuration had modules clustered at the bottom of the single keel.

§ Raft module pattern with four nodes and two tunnels to serve as module interconnects. The new configuration frees up the maximum useable volume inside the modules.

The reference was racetrack configuration where modules were directly connected to each other. Nodes and tunnels will be made of aluminum. Nodes will be 12 ft. in diameter and have six 6.7-ft. diameter berthing ports. Tunnels will be 12 ft. long and 6.7 ft. in diameter.

§ Internal module pressure of 14.7 per square inch and 80/20 nitrogen/oxygen mixture ratio to approximate sea level Earth atmospheric conditions. This atmosphere is compatible with the existing data base for life sciences experiments and due to its normal oxygen content will minimize flammability problems and ease constraints on materials that can be used inside the modules.

§ Closed-loop environmental control and life support system. Oxygen and water (including wash water and urine, but excluding fecal water) will be recycled. Potable water will be distilled and nitrogen and food will be resupplied.

§ Hybrid solar power system with 75 kilowatts of power at completion of station assembly period. Reference configuration used only photovoltaic system. The hybrid system will be designed so that 25 kilowatts are provided by the photovoltaic system and 50 kilowatts are supplied by the solar dynamics system. Nickel-hydrogen

batteries will provide storage for the photovoltaic system to handle eclipse periods. The primary power distribution system is still under review.

§ Five locations on the structure for placing attached payloads and a facility for servicing free flying spacecraft and platforms. Payload attach equipment could support four or more individual payloads. Possible locations include three on upper boom, one on left keel and one on lower boom. Two coarse pointing systems designed for accuracy of 1 arc minute also will be provided.

§ Telerobotic servicer as a part of the baseline configuration. The servicer will be compatible with astronauts on EVAs or with mobile remote manipulator system for servicing attached payloads and free-flying spacecraft. Future application of the robotic servicer as a "smart" front end for an Orbital Maneuvering Vehicle is planned. cont. p6

OBSERVING CHAIRMAN'S REPORT

This month's star party will be held on June 6th at Earl Moser's house near Hickman. Globular clusters dominate deep sky viewing this month. A good starting point is the bright globular M5, located just north of the 6th magnitude star 5 Serpentis. It can be seen easily in binoculars but it is compact so at least a four inch is required to see any of its stars. Larger instruments will show a bright central region composed of thousands of faint stars with a brighter spot of light near the center.

Another good globular is M3 in Canes Venatici. It can be found by looking about six degrees east and a bit north of Beta Comae Berenices and resolves nicely in six or eight inch telescopes. Not too far away is a faint pair of globular clusters M53 and NGC 5053, both about a degree west and a bit north of Alpha Comae. M53 can just be glimpsed in binoculars but it doesn't resolve too well unless an eight inch or larger aperture is used. NGC 5053 is slightly smaller and much fainter than M53 with my 10 inch showing only a faint diffuse glow with 15 or 20 very faint stars in it.

Up in Draco is an interesting pair of galaxies, M102 and NGC 5907. M102 is about three degrees south and 2.5 degrees west of Iota Draconis and looks like a faint fuzzy oval when viewed with small instruments. An eight inch at high power will show the narrow

by
David Knisley



spikes of light on the ends of the galaxy and under good conditions the very narrow dark lane can be glimpsed with a 10 inch. NGC 5907 can be found about 2.5 degrees south and 1.5 degrees west of Iota. It is a nearly edge-on spiral that appears as a small hazy streak of light with a brighter center when viewed with a six inch. Larger instruments will show the egg shaped nucleus and hints of mottling.

As a final challenge for those of you with large telescopes, try NGC 6027, a small interacting group of five or six galaxies located 1.5 degrees east and 1/2 degree south of Rho Serpentis. I have glimpsed the group in my eight inch and my ten shows some of the individual galaxies as very faint fuzzy blobs of light almost in contact with each other.

PRESIDENT'S MESSAGE

On April 26th, 1986 at Gateway Mall in Lincoln the Prairie Astronomy Club celebrated National Amateur Astronomy Day. We had tables set up in the mall with many displays. They included: Computer Astronomy Quizes, Computer graphics displays of Astronomical objects, VCR shows, and a home-made comet. The home-made comet was definitely the big attraction getter. Jack Dunn and Bev Hetzel used dry ice, water, dirt, rocks, ammonia, and molasses to make a comet right there in the mall! Crowds poured all around as clouds of evaporated dry ice rose to the ceiling. It was quite impressive. If you didn't make it to Astronomy Day or if you did but were not there the whole day you're in luck! It's on videotape. Astronomy Day 1986 will be shown at this months meeting. It has some very hilarious moments, so even if you were at Astronomy Day and laughed while you were there, you can laugh even harder at the meeting as you watch yourself on TV.

On May 17th the 1986 Behlen Observatory Spring Encounter was held at Behlen Observatory near Meade, NE. There was a crowd of about 56 people who attended from the PAC, OAS, and DMAS. We had very tasty food plus two talks concerning the observatory presented by Dr. Ed Schmidt and Dr. Don Taylor. They spoke about the past of Behlen Observatory and its future. It was a hazy night but we were able to view the moon and Saturn through the 30 inch telescope.

Ron Veys did not win the door prize or the observing contest (for once). The door prize (the book "Supernovae") was won by Sue Badberg of the OAS. The observing contest was won by Mike and Marty Barker of the OAS, who received the book "Astrophotography" (which was reviewed in last months newsletter by Dave Knisely).

A BIG THANKS to everyone who helped make the Behlen Spring Encounter a fun time.

Andy Corkill

The Prairie Astronomer is published monthly by the Prairie Astronomy Club Inc., and is free to all club members. Membership expiration date is listed on the mailing label. Membership dues are: Junior Members and Newsletter Only Subscribers...\$8.00/yr, Regular Members...\$22.00/yr, Family Membership...\$25.00/yr. Address all membership renewals or questions to: THE PRAIRIE ASTRONOMY CLUB, INC., P.O. BOX 80553, LINCOLN, NE. 68501. For other club information contact one of the following: Andy Corkill (Pres) 488-1096, Norma Coufal (V.Pres) 483-5685, John Lortz (Sec) 390-9821 (Omaha), Lee Thomas (Tres) 483-5639, Dan Neville (Prg. Ch.) 476-7772. All articles should be sent to newsletter editor JOHN LORTZ 9255 CADY AVE #14, OMAHA, NE 68134, no later than six days before each club meeting.

Globular.bas

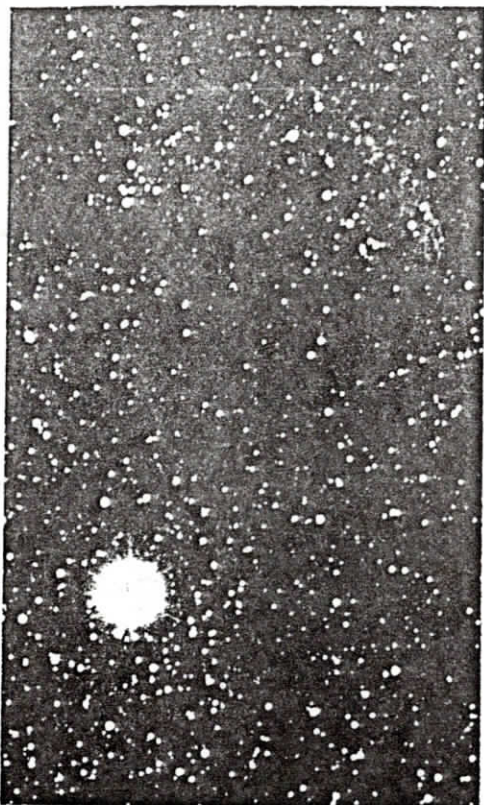
Update

THERE'S SOME GOOD NEWS FOR THE PAC... ANDY CORKILL REPORTS THAT WE HAVE MADE APROXIMATELY \$88.00 MORE ON THE OFFICAL HALLEY COMET CERTIFICATES THE CLUB IS SELLING. THAT AMOUNT SHOULD BRING OUR GRAND TOTAL TO ABOUT \$222.00. NOT TOO BAD! OF COURSE WE WILL HAVE TO DEDUCT WHATEVER MR. CORKILL IS SKIMMING OFF THE TOP, WHICH WILL PROBABLY LEAVE US WITH ... HMM... MAYBE \$75?

Before Rick Johnson took off for his Minnesota hideaway he had time to send me some update info on the globular.bas program which appeared in last months newsletter. The program was taken from Sky & Tel via one of the national online services. Rick states that the program run as is creates clusters that look all the same no matter what random number he feeds in. He believes that the problem could stem from how X and Y are used to help find R. Failure to plot a star because it's off screen or one is already in its place causes the program to try again and again until it finds an unused spot.

Rick rewrote the program avoiding having X and Y have any place in the determination of R. He also used the random number generator to generate a plot angle of 0 to 360 degrees then deriving X and Y from the angle. This eliminates the bias the program had in plotting stars on or near a line with a slope of +1 or -1.

Though room does not permit it this month, next month I will include Rick's newer version of Globular.bas and the example plots he obtained from his hi-res monitor. (Thanks Rick for all the information!)



MAGAZINE ARTICLES OF POSSIBLE INTEREST TO PAC MEMBERS...
(APRIL TO JUNE 1986)

SCIENCE DIGEST:

- APRIL - "A BRIDGE TO NOWHERE" MICHAEL D. LEMONICK P62
... INTERPLANETARY CONSTRUCTION
- "COSMIC UNCERTAINTY" MICHAEL D. LEMONICK P73
MAY - "COSMIC CLARITY" MICHAEL D. LEMONICK P26
- "DEATH OF DINOSAURS: THE TRUE STORY?" BOYCE RENSBERGER P28
- "LAST CHANCE FOR HALLEY'S" MICHAEL D. LEMONICK P73
JUNE - "HOMEGROWN OBSERVATORY" MICHAEL D. LEMONICK P72

SCIENCE NEWS:

- APRIL 5 - "VENUS'S VOLCANISM: PRESENT OR PAST?" J. EBERHART P214
APRIL 19 - "EXTREMELY MAGNETIC DEGENERATE DWARF" D.E. THOMSEN P245
APRIL 26 - "PINPOINTING SOLARCELL EFFICIENCY" I. PETERSON P261
- "ATTRACTION AND REPULSION OF GRAVITY" D.E. THOMSEN P262
MAY 10 - "THE ROAD TO SPACE GETS STEEPER STILL" J. EBERHART P292
MAY 17 - "STRINGING OUT A COSMIC IMAGE, PERHAPS" D.E. THOMSEN P310

OHNI:

- APRIL - "A BORING COMET?" JEFF HECHT P32
MAY - ENTIRE ISSUE IS ON THE 25TH ANNIVERSARY OF
AMERICAN MANNED SPACEFLIGHT
JUNE - "MAGIC MIRRORS" OWEN DAVIES P32
... MIRROR TELESCOPES

SCIENCE 86:

- MAY - "SPACE TECHNOLOGY: SELLING A WING & A PRAYER"
WILLIAM F. ALLMAN P12
- "VOYAGER TO THE SEVENTH PLANET" MICHAEL GOLD P32
JUNE - "TOY UNIVERSE" CARLA REITER P54

SCIENTIFIC AMERICAN:

- APRIL - "ISLAMIC ASTRONOMY" OWEN GINGERICH P74
MAY - "THE CLIMATE OF MARS" ROBERT M. HABERLE P54
"SUPERCONDUCTING TUNNEL DETECTORS IN RADIO ASTRONOMY"
THOMAS G. PHILLIPS P96
JUNE - "EL NINO" COLIN S. RAMAGE P76

HIGH TECHNOLOGY:

- JUNE - "RETHINKING SPACE BUSINESS" PETER GWYNNE P38

DISCOVER:

- APRIL - "WHAT DESTROYED CHALLENGER?" WAYNE BIDDLE P38
- "FLYING IN THE FACE OF DANGER" KEVIN MCKEAN P48
- "OUR BOYS ARE DEAD" GLENN GARELIK P59
- "THE NEW AMERICAN DREAM" WALTER A. MCDUGALL P65
- "VOYAGER WAS ON TARGET AGAIN" DENNIS OVERBYE P70

PHOTOMETHODS:

- MARCH - "PHOTOGRAPHING STELLAR PHENOMENA" KEVIN RITSCHER P26
- "CATCH A RISING STAR" P32

MODERN PHOTOGRAPHY:

- MAY - "KODACHROME 200?" MARTIN HERSHENSON P40
JUNE - "GOOD COLOR SLIDES AT SPEEDS OF 1600, 3200, 4800 ?!"
MARTIN HERSHENSON P46

PETERSONS PHOTOGRAPHIC:

- APRIL - "HALLEYS LAST CHANCE" MARK J. COCO P76

PAC JUNE CALENDER

1. 1965: A. Penzias and R. Wilson announce detection of three degree Kelvin primordial background radiation.
2. 1966: US Surveyor 1 lands in Oceanus Procellarum, completing first unmanned spacecraft soft-landing on the moon.
3. 1948: Mount Palomar Observatory and the 200-inch telescope are dedicated.
1965: Edward White takes first US astronaut "space walk" outside of Gemini 4 capsule.
4. 780 BC: The first total solar eclipse reliably recorded by Chinese is observed.
1946: The largest solar prominence (300,000 miles) is observed.
5. 1661: Isaac Newton is admitted as a student to Trinity College, Cambridge.
1819: John Couch Adams, codiscoverer of Neptune, is born.
6. PAC STAR PARTY AT EARL MOSERS
1436: Regiomontanus (Johannes Muller), preparer of astronomical tables, is born in Germany.
7. NEW MOON
1971: Soviet Soyuz 11 crew completes first transfer to orbiting Salyut space station.
8. 1625: Giovanni Cassini, discoverer of four satellites of Saturn, is born.
1918: Nova Aquila, the brightest nova since Kepler's nova of 1604, is discovered.
9. 1897: Alvin Graham Clark dies three weeks after the first use of the Yerkes 40-inch lens that he produced.
10. 1706: John Dollond, owner of first patent for achromatic lens, is born.
1854: Georg F.B. Reimann proposes that space is curved.
11. 1723: Johann Georg Palitzsch, first to see Halley's comet on predicted return, is born in Prolitz.
12. 1838: Hopkins Observatory, the oldest standing American observatory building, is dedicated in Williamstown, Mass.
13. 1611: John Fabricius dedicates the earliest sunspot publication.
- 14.
15. 763 BC: Assyrians record total solar eclipse event on clay tablet.
16. 1963: Valentina Tereshkova of the Soviet Union becomes the first woman in space.
1977: Wernher von Braun, rocket expert, dies.
- 17.
18. 1178: Proposed time for the origin of lunar crater Giordano Bruno by meteoric impact.
1799: William Lassell, discoverer of several satellites of Uranus and Neptune, is born.
1983: Sally Ride becomes first US woman astronaut in space aboard space shuttle Challenger.
19. 240 BC: Eratosthenes estimates the circumference of the earth.
1976: US Viking 1 goes into Martian orbit after 10-month flight from earth.
20. 1966: Georges Lemaitre, originator of the "big bang" theory, dies at age 71.
21. FULL MOON
1633: Galileo Galilei is forced by the Inquisition to "abjure, curse, and detest" his Copernican heliocentric views.
22. 1675: The Royal Greenwich Observatory is established in England by Charles II.
1978: J.W. Christy discovers Charon, a satellite of Pluto, on US Naval Observatory photographic plates.
- 23.
24. PAC MEETING 7:30PM HYDE OBSERVATORY
1778: David Rittenhouse observes a total solar eclipse in Philadelphia.
1947: Airline pilot Kenneth Arnold describes UFO seen near Mt. Rainer as flying saucer.
25. 1638: A lunar eclipse becomes the known astronomical event recorded in the continental United States.
1960: Walter Baade, astronomer who showed in 1952 that intergalactic distances were underestimated by a factor of two, dies.
26. 1730: Charles Messier, cataloguer of "M objects", is born.
1949: Walter Baade discovers asteroid Icarus with a perihelion inside the orbit of Mercury.
27. 1982: Space shuttle Columbia is launched for fourth time.
28. 1861: Leipzig Observatory discovers the short-period (6.2 years) comet d'Arrest.
1889: Maria Mitchell, first American woman astronomer, dies at age 71.
- 29.
30. 1908: Comet explodes above Tunguska, Siberia.