



# AMSAT

## NEWS LETTER

Issued by the Radio Amateur Satellite Corporation  
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(Reprinted from Jan. 1970 <u>QST</u> )	

Guest Editorial  
By W. A. Tynan, W3KMY

Due to the fact that Sajjad Durrani, who has been doing such a fine job as Newsletter Editor, is taking a one month's sabbatical to visit his native Pakistan, I have been asked to shepherd this issue. Accordingly, I will seize this opportunity to climb onto the soapbox to deliver the following remarks.

As discussed in the President's Desk Column AMSAT has recently made a proposal to NASA for two experiments to be placed on the ATS-G satellite. The aims and content of this proposal together with NASA's recent consent to the launch of A-0-A aboard a TIROS-M mission bring up a point which I, with your forbearance, would like to discuss.

It has been my observation in many conversations which I have had to date with AMSAT members and others concerning amateur space activities that all too many of these people seem to think only in terms of the immediate benefits in terms of QSO's which may accrue to them from the orbiting of amateur satellites and the placing of amateur packages on the moon, etc. This attitude is not surprising and I, for one, join these people in looking forward to communicating in the space age. On the other hand, there are those I have met who show little interest in AMSAT's activities because they feel that amateur space communication is a VHF and UHF game. They state, that since they are primarily interested in the HF bands, they see little in our program for them. Both of these groups, in this writer's opinion, are making the same mistake and they are both probably correct as far as they go. Yes, amateur space communications will be fun and yes, it will probably take place principally on the VHF, UHF and even higher frequencies. The thing which the holders of both of these views overlook is that the amateur space effort is probably more important to Amateur Radio for what it may do for non-amateur communications than it is for what it may do for amateur communications directly. This may sound contradictory but the point that I am trying to make is that in the amateur space program is new opportunity for hams to make another series of contributions to the communications art, possibly even greater than any made to date. This is the facet of our work which intrigues me the most and I know it is what inspires many others whom I have met in AMSAT.

Let's be blunt for a moment - no launch agency, whether it be NASA or any other, is going to put amateur hardware in space simply so that hams can have more QSO's, at least not until launch space becomes a lot cheaper and more plentiful than it is today. The only way that amateur experiments will be orbited or carried to the moon will be by presentation of convincing evidence showing that the particular amateur experiment in question will lead to improved communications for services in addition to the Amateur Service, or that it will make a worthwhile contribution to man's knowledge of science.

So it was with NASA's approval of the launch of A-0-A. It is felt in high Space Administration circles that the satellite may provide some significant data on ionospheric propagation. In the case of AMSAT's ATS-G proposal we have attempted to show that our two proposed experiments will have an important and lasting effect on communications. Both of the AMSAT ATS-G proposed experiments take specific advantage of the 30 foot dish which the satellite will carry. One is a channelized repeater which would relay 144 MHz signals back to earth in the 420 to 450 MHz band. While amateurs communicating through the satellite would find it fun in the truest ham sense, they would be at the same time demonstrating, for the first time in any civilian experiment, that satellite communication is practical for numerous small terminals including mobile stations, not just for large ground stations with 50 and 100 foot antennas. The implications of this for developing nations, which at present are mainly interested in grabbing more of our HF bands for point to point work and broadcasting, are immense. Other applications such as maritime and aeronautical communications also suggest themselves.

The other experiment, which AMSAT has proposed for ATS-G, is just as exciting for what it may do for amateurs directly and indirectly. It consists of a demonstration of the feasibility of direct satellite to home TV. A few especially equipped amateur stations (one at a time) would transmit television signals to the satellite in the 1215 or 2300 MHz band. The amateur experiment

package on the ATS-G satellite would translate these signals to the vicinity of 432 MHz where they would be receivable on regular home TV sets equipped with special low-noise converters and fairly high gain antennas. It is envisioned that numerous amateurs and other hobbyists, as well as many academic institutions would equip themselves to receive the amateur TV signals and hence demonstrate that TV reception from space by "home" type installations is a practical and feasible proposition. Again, the implications to others in addition to amateurs are considerable and we amateurs must then make certain that it is not forgotten that it was the "hams" who showed the way once again.

The amateur space program may therefore have a profound effect on other communications services. In so doing, the benefits which it may bring to amateur radio in terms of goodwill and in protecting our allocations can be immeasurable. At least we who are active in AMSAT activities are doing our best to achieve this objective.

Report of Board of Directors  
Meeting of Dec. 15, 1969

The newly elected board held its first meeting at 8:00 P.M. on December 15, 1969. The first item of business was the election of the new AMSAT officers to serve until the end of 1970. These officers are:

President	Perry I. Klein, K3JTE
Executive V.P.	Jan A. King, K8VTR
V. P. .Engineering	George Kinal, K2MBU V.
P.,Operations C.A. (Cap)	Petry, W3AWN
Secretary	Charles Dorian, W3JPT
Treasurer	Harry Helfrich, W3DWF

The election was followed by a discussion concerning the need for support of these people in the performance of their tasks. It was noted that help is needed particularly in the engineering, operations and secretarial functions. Those officers will be advised to appoint assistants to support them in their duties,

It was decided to hold a general meeting the night of the day following the launch of Australis-OSCAR 5. For example, if the satellite is launched on Tuesday, January 13th the meeting will be on Wednesday January 14. By the same token, if it is launched on Thursday, January 15th the meeting will be held on Friday, January 16th. Present schedule calls for launching on either January 13th or 15th. It will be on an odd numbered day.

The Board voted to extend an invitation to Project Australis to send representatives to witness the launch.

Meeting Notice

The next general membership meeting will be held at NASA-GSFC at 8: 00 P.M. the evening following the day of the launch of Australis-OSCAR 5.

See report of Board meeting, Page 3 above  
for explanation and details.

Agenda:

1. Preliminary report on the operation of the Australis-OSCAR 5 satellite.
2. Review of tracking methods and procedures.
3. Tour and demonstration of the NASA Goddard Space flight Center Amateur Radio Club's Australis-OSCAR 5 satellite tracking facility.

Bring your friends!

From the President's Desk

This is our first annual report to you, the Members and Member Clubs of AMSAT. I am very happy to be able to report that NASA has agreed to launch Australis-OSCAR 5 as a secondary (piggyback) payload on the TIROS-M mission, which is expected to be launched about mid-January. A letter dated Nov. 4 approving the launch was received from Leonard Jaffe (who, by the way, is ex-K3NVS), NASA Deputy Associate Administrator for Space Applications. It is largely through the efforts of Jack Kelleher, W4RAE, that the launch approval for Australis-OSCAR 5 was obtained. Jan King, K8VTR, AMSAT's Australis-OSCAR 5 Project Manager, has done an excellent job coordinating the more than two dozen persons who worked many, many hours to prepare the satellite for launch. Hopefully, we will soon see the results of our efforts in a successful Australis-OSCAR 5 mission.

Thanks to the efforts of Bill Grenfell, W4GF, AMSAT's FCC Liaison, a temporary third party agreement has been reached permitting third party traffic concerning the Australis satellite to be exchanged between American and Australian amateurs. This third party agreement is now in effect, and will last until four months after the Australis-OSCAR 5 mission has ended. AMSAT has been issued a club station license with the call WA3NDS ("New Directions in Space"). Although we have no club station in operation, AMSAT members have been maintaining regular weekly schedules with the Project Australis group. Frank White, W3PYW, Cap Petry, W3AWN, Joe Gatti, W4TRJ, George Jacobs, W3ASK, and Jim Puglise, W3CBJ, have all done a fine job in maintaining these schedules on twenty-meter single-sideband, and Frank White has also been a very reliable means of exchanging information with Project Australis via teletype.

In other news, AMSAT is now tax exempt, following a favorable ruling by the Internal Revenue Service. This means that AMSAT is not required to pay Federal income taxes, and that donations to AMSAT are deductible by the donor for his own personal income tax.

Membership cards are now available for all members. If you have not yet received yours, it should be sent to you shortly, along with Australis-OSCAR 5 telemetry reporting forms which are also available.

AMSAT continues to work closely with American Radio Relay League Headquarters on all aspects of our activities. AMSAT is affiliated with the League, and we have several distinguished AMSAT members who hold high League positions, including Bob Denniston, WØDX, ARRL President, Bill Dunkerley, WA2INB, ARRL Assistant Secretary (AMSAT's ARRL Coordinator), Vic Clark, W4KFC, Roanoke Division Director (AMSAT's ARRL Director Liaison), and Bob Booth, W3PS, ARRL General Counsel. Bill Dunkerley has been particularly helpful and has had a hand in all AMSAT material appearing in QST or Official Bulletins, while Vic Clark has carried the AMSAT message to several ARRL Board meetings.

We have also been receiving assistance and guidance from the Project OSCAR Association, particularly Bill Orr, W6SAI, President, and Chuck Towns, K6LFH, Vice President of that pioneer amateur space organization. Project OSCAR has also provided financial assistance, with donations totaling \$500, for which we are grateful.

AMSAT has also been in contact with the NASTAR group involved in the Moonray Project. We have agreed to assist them in their efforts to secure NASA approval of their proposal to place an amateur experiment package on the moon as part of one of the later Apollo missions.

AMSAT now has approximately 250 dues-paying members, including members in Australia, Belgium, Canada, England, France, Germany, Guam, India, Laos, Mexico, Netherlands, South Africa, Southwest Africa, Venezuela, and Viet Nam. There are currently eleven Member Clubs, including one in Venezuela.

73,  
Perry Klein, K3JTE

The Australis-OSCAR 5 Project

AMSAT's highest priority activity has been the Australis-OSCAR 5 project. The launch of this satellite is now scheduled for mid-January, and final NASA approval of the launch was given on November 4. The satellite has been put through an extensive series of thermal-vacuum, vibration, stabilization, and radio-frequency interference tests by AMSAT members at the Goddard Space Flight Center. Jan King, K8VTR, Project Manager and Charles Roettcher, K3FLS, brought the satellite to RCA in New Jersey, where it was tested side-by-side with the TIROS-M meteorological satellite it is to be launched with, to verify that there were no interference problems. New batteries, wiring harness and antennas have been installed. Also, the satellite and its subsystems were encapsulated, and the outside thermal coating has been applied. Present plans are for AMSAT members to take Australis-OSCAR 5 to the Western Test Range in California shortly before the launch, to assist in its installation in the second stage of the TIROS-M Thor-Delta launch vehicle.

Shelly Glick, WAIUO of the Talcott Mountain Science Center in Avon, Connecticut, has been given the responsibility of orbital prediction for Australis-OSCAR 5. Orbital information will be given to ARRL Headquarters for transmission as bulletins over W1AW. Project Australis will independently determine the orbit for Region 3 and Bill Browning, G2AOX, Australis regional coordinator in London will compute orbital predictions for Region 1. Russ Miller, WA3FRP has been named AMSAT's Australis-OSCAR 5 Communications Manager responsible for assuring radio communication of satellite orbital predictions to the data dissemination stations.

Australis-OSCAR 5 contains a 50 milliwatt beacon on 144.050 MHz and a 250 milliwatt beacon on 29.450 MHz. The two-meter beacon operates continually, while the ten-meter beacon is operated upon ground command and will probably be turned on only over weekends. The expected orbit is different from those used for previous OSCAR satellites, allowing more passes to be heard each day, particularly for amateurs at the higher latitudes. Australis-OSCAR 5 employs a magnetic attitude stabilization system and a seven-channel telemetry system designed to be simple enough for the signals to be decoded by the average amateur. The expected lifetime of the satellite is approximately six weeks to two months. Further details on the satellite design were reported in July and August, 1969 QST, and details on tracking the satellite were given in October QST. An article on what to listen for in observing Australis-OSCAR 5's signals are in the December QST. Articles on the satellite were also in the August, September and October issues of CQ Magazine, as well as in the December issue.

The Australis-OSCAR B Satellite Proposal

Our Project Australis colleagues in Melbourne, Australia are contemplating construction of a more advanced repeater type of communications satellite as a follow-on to the Australis-OSCAR A project. The satellite specifications are still under discussion, but it is hoped that Australis-OSCAR B will be a multi-channel, channelized repeater employing the 144 MHz amateur band for the up-link and the 432 MHz amateur band for the down-link. Project OSCAR has provided AMSAT with solar cell panels, which we hope can be used to power such a satellite for a year or more.

The Euro-OSCAR Project

AMSAT's president recently met with the IARU Region 1 Euro-OSCAR coordinator and the builder of the Euro-OSCAR satellite repeater to discuss the possibility of AMSAT helping with the Euro-OSCAR project. It was decided to turn the Euro-OSCAR satellite repeater over to AMSAT for new tests to determine whether the repeater is suitable for use in a future amateur satellite. Bill Scholtz, W3HXF has been testing the repeater at NASA Goddard, and the results of these tests should be available shortly.

## AMSAT's ATS-G Amateur Experimental Proposal

AMSAT submitted on November 1 an 83-page formal proposal to NASA to provide two amateur experiments for inclusion as part of NASA's Applications Technology Satellite-G (ATS-G) spacecraft. ATS-G, to be launched around 1973, will contain a 30-foot erectable parabolic antenna. The satellite will be placed into synchronous orbit.

The AMSAT document proposes two separate amateur experiments which take advantage of ATS-G's large antenna. One of these experiments consists of a channelized repeater which would receive signals in the 144 to 148 MHz band and retransmit them in the 420 to 450 MHz band. The aim of this experiment, aside from the direct benefit which the amateurs using it will derive from it, is to demonstrate the feasibility of satellite communications between small terminals (see Bill Tynan's Guest Editorial). The other facet of the AMSAT proposal is a demonstration of direct satellite to home TV. This will be the first time such a demonstration has been attempted. The 30-foot parabola makes it feasible, with medium power aboard the spacecraft, to obtain acceptable TV reception with a fairly good antenna and a low-noise 430 to 440 MHz converter in front of a regular home TV set.

### AMSAT Officers and Appointments

The following is a list of those who have been serving AMSAT during its initial growing pains. New officers will be chosen by the new Board of Directors elected at the recent annual meeting.

#### Board of Directors:

Charles Dorian, W3JPT  
George V. Kinal, K2MBU  
Jan A. King, K8VTR  
Perry I. Klein, K3JTE  
C. A. Petry, W3AWN  
James Puglise, W3CBJ (now W8JUJ)  
William A. Tynan, W3KMV

President: Perry I. Klein, K3JTE

Executive Vice President: Jan A. King, K8VTR

Vice President-Engineering: George V. Kinal, K2MBU

Vice President-Operations: C. A. Petry, W3AWN

Secretary: Charles Dorian, W3JPT

Treasurer: Perry I. Klein, K3JTE (acting, Richard W. Mostow found it necessary to resign in June due to the press of business)

ARRL Headquarters Coordinator: William I. Dunkerley, WA2INB

ARRL Director Liaison: Victor C. Clark, W4KFC

Australis-OSCAR 5 Communications Manager: R. Russ Miller, WA3FRP

Australis-OSCAR 5 Project Manager: Jan A. King, K8VTR

FCC Liaison: William Grenfell, W4GF

Membership Chairman: Pradeepta Shome

NASA-GSFC Liaison: Harry D. Helfrich, W3DWF

NASTAR Liaison: Nicholas K. Marshall, W6LOL/2

Newsletter Editor: Sajjad H. Durrani.

Orbit Computation and Tracking Manager: Sheldon Glick, WA1IUO

Project Australis Liaisons: Richard W. Tonkin and Owen Mace

Project OSCAR Liaisons: William I. Orr, W6SAI and Charles Towns, Jr., K6LFH

Publications and Publicity: William A. Tynan, W3KMV

SWL Liaison: Jack White

Venezuelan Liaison: Jose Rene Prince, YV1ABA

### Member Clubs

The following clubs have joined AMSAT as Member Clubs to date.

Aeronautical Radio, Inc (ARINC) Amateur Radio Club

Johns Hopkins Applied Physics Laboratory (JHU/APL) Amateur Radio Club

Asociacion de Radioaficionados de Venezuela, Maracaibo, Venezuela

Burlington (Vt.) Amateur Radio Club

Coast Guard Amateur Radio Club

Communications Satellite Corporation (Comsat) Amateur Radio Club

Davenport Iowa Amateur Radio Club

Dayton Amateur Radio Association

Goddard Space Flight Center (NASA) Amateur Radio Club

Hiawatha Amateur Wireless Keyer's Society

Talcott Mountain UHF Society

ASSETS

Current

Cash in bank.....	\$1488.11
Cash on hand .....	11.00
Accounts receivable .....	<u>25.00</u>
Total .....	\$1524.11

LIABILITIES

(none)

RECEIPTS

Member dues .....	\$1199.98
Family Member dues .....	1.00
Member Club dues .....	110.00
Donations .....	<u>525.00</u>
Total .....	\$1835.98

EXPENDITURES

Office Supplies .....	\$ 38.16
Postage .....	130.23
Printing .....	72.48
Secretarial (typing) .....	45.00
Travel * .....	10.00
F.C.C. License Fee .....	4.00
Incorporation Filing Fee .....	<u>12.00</u>
Total .....	\$ 311.87

\* Jan King's trip to Princeton, N. J. in connection with A-0-A RFI tests.

CERTIFICATION OF AUDIT

On this date I inspected the Financial Report of the AMSAT Corporation and found it to be a full and correct summary of the Corporation's accounting records. Furthermore, I closely examined all entries to the Corporation's Receipts and Expenditures Ledgers and reconciled these entries with official bank statements, cancelled checks, and invoice memoranda.

I hereby certify that the above statements concerning my audit activities for the AMSAT Corporation to be both true and complete.

James P. Casey, Jr., M.B.A.  
Member of Technical Staff  
Engineering Economy Branch  
Communications Satellite Corporation

Secretary's Column

Report of AMSAT Meeting held on 23 October 1969

The meeting was held in Building 7 of the NASA Goddard Space Flight Center. Seventeen (17) members and visitors were present.

The President, Perry Klein, K3JTE, gave a short introduction and spoke of the schedule for the evening -- a short talk by Bob Denniston, W0DX, the President of ARRL; a status report by Jan King, K8VTR on the Australis-OSCAR A; Perry on Euro-OSCAR and Harry Helfrich, W3DWF, on the status of the launch.

Harry advised that the TIROS-M was proceeding well and that the likely launch date was mid-December. The A-0-A package had survived shock, thermal and RFI tests. It would be the last item ejected from the launch vehicle and all calculations had indicated that the risk of collision with TIROS-M would be minimal.



Jan King, K8VTR, gave a short discussion of his proposal for a standardized AMSAT satellite configuration.

This was followed by a film on the erection of a new dish antenna by the Talcott Mountain UHF Society in Connecticut and a series of slides on the Australis-OSCAR 5 satellite as taken in Australia.

A vote of thanks was given to Harry Helfrich who made the arrangements for the meeting to be held at GSFC and for the very interesting tour of the testing facilities and the command center.

Charles Dorian, W3JPT

#### NOTICE

The following is an amendment to the AMSAT By-Laws as passed at the 12th November Board of Directors Meeting: Article IV, Section 5, Paragraph F, last sentence to read - He shall be responsible for assuring that an annual audit is performed by person(s) designated by the Board of Directors.

It was concluded by the Board that the present provision requiring a CPA is overly restrictive and would necessitate the spending of several hundred dollars of the organization's funds.

#### Press Releases

The following is a reprint of the press release which AMSAT distributed in connection with the A-0-A launch:

Radio Amateur Satellite Corporation  
P.O. Box 27, Washington, D. C. 20044

FOR RELEASE MONDAY, DEC. 1, 1969

(For additional information contact:

William A. Tynan

(301) 776-7100 Ext. 2978)

NASA TO LAUNCH AMATEUR RADIO SATELLITE

The National Aeronautics and Space Administration (NASA), in a letter to the Radio Amateur Satellite Corporation (AMSAT), has agreed to launch the Australis OSCAR-A satellite as a secondary payload on the upcoming TIROS-M mission presently scheduled for January 9, 1970. The amateur satellite will be ejected into orbit from the second stage engine compartment of the Thor-Delta launch vehicle in the same manner as previous Delta secondary payloads have been launched.

The planned orbit will be nearly polar at an inclination of 101.56 degrees to the earth's equator, at an altitude of approximately 790 nautical miles (910 statute miles). This will result in an orbital period of about 114 minutes. Australis OSCAR-A, which is to be known as Australis-OSCAR 5 once in orbit, is a 12" x 17" x 6", 39-pound spacecraft constructed by a group of amateur radio operators at Melbourne University in Australia - hence, the name Australis. The OSCAR portion of the name is derived from Project OSCAR, a West Coast-based organization of radio amateurs that has constructed and successfully secured launches for four amateur radio satellites to date. This will be the first launch for AMSAT, which was formed in March of this year to foster radio amateur participation in space research projects. AMSAT's role in the Australis-OSCAR mission is one of preparing the satellite for launch, performing the necessary tests to be certain that the satellite will function properly once in orbit, conducting liaison with NASA to arrange for the launch, and assisting in the collection of the satellite data.

Australis-OSCAR 5 will transmit low-power signals on two amateur bands, at frequencies of 29.45 MHz in the ten-meter band and at 144.05 MHz in the two-meter band. These transmissions will be used by radio amateurs throughout the world for training in the art of tracking satellites and for experiments in the science of radio propagation. These beacon transmissions will carry telemetry data pertaining to the condition of the spacecraft, including temperatures and the satellite's orientation with respect to the earth. The orientation information will be used to assess the effectiveness of a simple attitude control system used on Australis-OSCAR 5. This will be the first amateur satellite to employ such a system.

A transmitting life of approximately two months is expected from the 20 pounds of batteries which the satellite will carry. This lifetime is based on continuous operation of the two-meter transmitter and weekend operation of the somewhat higher power ten-meter transmitter. The ten-meter transmitter can be turned on and off by appropriate commands from the ground. Several amateur stations are being set up at various locations in the world to accomplish this command function.

The following is a reprint of the press release which NASA issued on A0A.

IMMEDIATE

RELEASE NO. 69-157

December 1, 1969

#### TIROS PIGGYBACK SATELLITE

Australis OSCAR-A, a 39-pound spacecraft designed and constructed by amateur radio operators, has been accepted for launch in January as a secondary payload aboard the National Aeronautics and Space Administration's Tiros-M satellite.

Launch of Tiros-M with Australis OSCAR-A piggyback is tentatively scheduled for Jan. 9 from the Western Test Range in California.

The piggyback satellite was built by a group of amateur radio operators at Melbourne University in Australia, giving rise to the "Australis" portion of its name. The Radio Amateur Satellite Corporation (AMSAT), a group of United States amateurs, is preparing the satellite for launch, testing and qualifying it to comply with NASA requirements.

A group of American radio operators based on the Pacific Coast has already successfully launched and operated four amateur radio satellites since 1961 in a program known as Project OSCAR. The previous four OSCAR launches were in conjunction with Department of Defense spacecraft. Australis OSCAR-A, the first radio amateur satellite to be accepted by NASA as a secondary payload, will be known as Australis-OSCAR 5 when it is successfully in orbit. The satellite will be placed into a planned 910-statute-mile orbit from the second stage of the Thor-Delta launch vehicle.

The orbit will be inclined 102 degrees to the Earth's equator and the planned orbital period is approximately 114 minutes.

Australis OSCAR-A will transmit low-power signals on two amateur bands, at frequencies of 29.45 megahertz in the ten-meter band and at 144.05 MHz in the two-meter band. These transmissions will be used by radio amateurs throughout the world for training in the art of tracking satellites and for experiments in radio propagation.

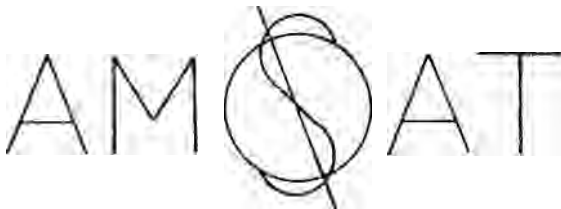
A transmitting life of approximately two months is expected from the 20 pounds of batteries carried by the satellite. This lifetime is based on continuous operation of the two-meter transmitter and weekend operation of the somewhat higher power 10-meter transmitter.

It is understood from a recent SSB schedule with VK3ARD that the AMSAT release received quite a bit of coverage in the Australian press. AMSAT will be sent clippings of the various stories.

Letters to the Editor

Dear Fellow Members:

Here is an idea for the AMSAT logo



1. The blue circle and 23.5 degree bisector represent the Earth and spin axis.
2. The red "S" represents the path of a satellite in polar orbit.
3. The red "S" and blue spin axis represent the dollar sign while the blue Earth circle represents zero, meaning zero dollars, depicting the amateur or non-profit concept.
4. The logo symbol could stand alone and/or be used as the "S" in AMSAT.

P. D. McReynolds, W3BDF

Ed. What do you think? Any further suggestions?

The following are short resumes of those recently elected as AMSAT Board Members and alternates.

Charles Dorian, W3JPT (2 year term) (Candidate of the Coast Guard Amateur Radio Club and the Applied Physics Laboratory Amateur Radio Club)

Charles Dorian, W3JPT, Captain, U.S. Coast Guard, is Assistant Director, Office of Telecommunications in the U.S. Department of Transportation, Washington, D. C. He is active with a number of international committees involved in frequency allocation and regulatory matters concerning the use of communications and navigation satellites for aircraft and ships. He was formerly Chief of Communications in the U.S. Coast Guard. He has served as Secretary of AMSAT and a member of the Board of Directors since June 1969. He has also represented AMSAT at meetings of the Foundation for Amateur Radio.

William I. Dunkerley, Jr., WA2INB (1 year term) (Candidate of the Talcott Mountain UHF Society and the Dayton Amateur Radio Association)

William Dunkerley, WA2INB, is an Assistant Secretary at ARRL Headquarters, Newington, Conn., where he is responsible for correspondence with members and preparing material for QST. He is also involved in IARU activities and is an Assistant Secretary of the LARD. He was a founder and vice president of the Earbenders Radio Club, founder and secretary of the Radio Press Association, and a founder of the Space Communications Group of the East Coast VHF Society, where he was vice president. This latter group was active in OSCAR and moonbounce work. He was chairman for the International VHF Convention held as a part of the 1964 ARRL National Convention, and served as VHF chairman for the 1966 Hudson Division Convention. He has been a director of the Hudson Amateur Radio Council and an assistant director of the ARRL Hudson Division. He is currently a director of the Talcott Mountain UHF Society and is chairman of the Society's Education Committee. He has been serving as AMSAT's ARRL Coordinator, and as such has handled all AMSAT material appearing in QST and in ARRL Official Bulletins.

Sajjad H. Durrani (1st Alternate)  
(Candidate of the Communications Satellite Corporation Amateur Radio Club)

Dr. Sajjad Durrani is a member of the technical staff at the Communications Satellite Corporation's Systems Analysis Laboratory, Clarksburg, Md. He was formerly with RCA and GE, and he has been a professor at engineering colleges and universities in the United States and Pakistan. He has published numerous papers and reports on space-related subjects concerned with communications and propagation. Dr. Durrani has served as Editor of the AMSAT Newsletter and has made major contributions to AMSAT's ATIS-G satellite experiment proposal submitted to NASA. He is also serving as one of AMSAT's investigators in the Australis-OSCAR 5 propagation experiment.

Sheldon A. Glick, WAIUO (2nd Alternate) (Candidate of the Talcott Mountain UHF Society)

Shelly Glick, WAIUO, is a Radio-Electronics Instructor at the Talcott Mountain Science Center for Student Involvement, Avon, Conn., where he teaches (

Radio and Electronics to students from the various schools associated with the Science Center. He is one of the original members of the Space Communications Group of the East Coast VHF Society and was responsible for the Society's tracking operations for OSCAR 3 and 4. He is a past president of the East Coast VHF Society and is a former assistant director of the ARRL Hudson Division. He is also a former director of the Hudson Amateur Radio Council. He has been serving as AMSAT's manager of tracking and orbital prediction for Australis-OSCAR 5 and is the author of an article on Australis-OSCAR 5 tracking in the October 1969 issue of QST.

Harry D. Helfrich, W3DWF (1 year term) (Candidate of the NASA Goddard Amateur Radio Club and the ARINC Amateur Radio Club)

Harry Helfrich, W3DWF, is head of the Flight Program Office of the Test and Evaluation Division at the NASA Goddard Space Flight Center, Greenbelt, Md., where he is involved in the coordination of tests of all Goddard managed spacecraft and is responsible for the proper assignment of test facilities to meet test schedules for those spacecraft tested at Goddard. He has been AMSAT's Liaison with the Goddard Space Flight Center and has been instrumental in arranging for the use of Goddard's test facilities by AMSAT members involved in the launch preparation of the Australis-OSCAR 5 satellite.

Jan A. King, K8VTR (2 year term)  
(Candidate of the NASA Goddard Amateur Radio Club)

Jan King, K8VTR, is an Aerospace Technologist in the Test and Evaluation Division at the NASA Goddard Space Flight Center, Greenbelt, Md. At NASA he has been active in the area of spacecraft testing and qualification, particularly in the area of functional testing. He has served as a director and Executive Vice President of AMSAT since March 1969, and has also been AMSAT's Australis-OSCAR 5 Project Manager responsible for the satellite qualification tests and launch preparations. In this capacity, he has coordinated a team of over two dozen persons involved in the preparation of Australis-OSCAR 5 for launch. He is the author of technical articles on Australis-OSCAR 5 in the December 1969 issues of both QST and CQ magazines.

Perry I. Klein, K3JTE (2 year term) (Candidate of the Communications Satellite Corporation Amateur Radio Club)

Perry Klein, K3JTE, is a member of the technical staff at the Communications Satellite Corporation, Washington, D.C., where he is involved in studies of aeronautical communications and navigation satellites in the Advanced Systems Analysis Department. He has published over a dozen papers on propagation experiments and navigation satellite techniques, and is Associate Editor for Long Range Navigational Systems of the IEEE Transactions on Aerospace and Electronic Systems. He is a founder, station trustee and past president of the Comsat Amateur Radio Club. He is also a Research Associate at the University of Pennsylvania's Moore School of Electrical Engineering in Philadelphia, and is a former station trustee, president, vice president and secretary of the University's Amateur Radio Club. He has served as a director and President of AMSAT since March 1969, and has been actively involved in all phases of AMSAT's activities.

C. A. Petry, W3AWN (1 year term)  
(Candidate of the ARINC Amateur Radio Club and the Dayton Amateur Radio Association)

C. A. "Cap" Petry, W3AWN, is Special Assistant to the Vice President, Systems Development at Aeronautical Radio, Inc. (ARINC), Annapolis, Md., where he has worked for the past twenty years. At ARINC he has been responsible for coordination of airline participation in VHF communication experiments with the NASA Applications Technology Satellites ATS-1 and ATS-3, and is promoting operational applications of aeronautical satellite services. He has been active in the field of aeronautical communication/electronics since 1932. He was founder and first president of the Dayton Amateur Radio Association and chairman of Dayton's first Hamvention. As a director of AMSAT and Vice President-Operations since March 1969, he is currently helping organize AMSAT's communications network supporting the Australis-OSCAR 5 project.



The following is reprinted from the January 1970 issue of QST.

# Australis-Oscar 5

## When to Listen

BY SHELDON A. GLICK,\* WA1IUO AND  
WILLIAM I. DUNKERLEY JR.,<sup>†</sup> WA2INB

Australis-Oscar 5 is shown in this official NASA photograph, in its final stage of preparation before launch.

29.450MHz.....WS.....

Australis-Oscar 5 Frequencies:

MHz 144.050 MHz

"WITH everything going according to plans, on January 9, 1970, a NASA Thor-Delta rocket will lift-off the pad at the Western Test Range, California. It will carry Australis-Oscar 5, and Tiros-M, a meteorological satellite. The rocket will head south and slightly west from

its launch point, crossing the equator at an angle of 101.56° ± 0.3°. At 3925.5 seconds (about 65 minutes) after lift-off, Tiros-M will be ejected from its position in the nose of the Delta vehicle — 30 seconds later Australis-Oscar 5 will be released from its resting place near the rocket's nozzle. Both will finally settle into a circular Orbit about the Earth's poles, at an altitude of 790 nautical miles, ± 20 u. mi., or 900.76 statute miles. NASA has agreed to launch Australis-Oscar 5 as a secondary payload on the Tiros-A1 mission. Oscar 5 is fitted into the Delta second stage engine compartment where previous Delta secondary payloads have been housed, and the satellite uses the same mechanical and electrical arrangements as these other secondary payloads. Australis-Oscar 5 will be in what is known as its retrograde orbit, meaning that the vehicle was launched east-to-west against the direction of the Earth's rotation on its axis. The orbit will

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\*\* Assistant Secretary, ARRL  
Note: The authors wish to acknowledge the assistance with orbit computation, of William Danielson of the Talcott Mountain Science Center.  
<sup>†</sup> Listen to WIAW bulletins for possible date change and further information on the launch.

Table II  
Panes near selected cities

1st Day		2nd Day		3rd Day	
Honolulu	1312 GMT	Detroit	0806 GMT	Honolulu	0033 GMT
Fairbanks	1452 GMT	Deaver	150 GMT	Dallas	1014 GMT
New York	1818 GMT	San Francisco	1156 GMT	San Francisco	1014 GMT
Dallas	2008 GMT	Fairbanks	1240 GMT	Honolulu	1242 GMT
San Francisco	2201 GMT	Detroit	1940 GMT	New York	1748 GMT
Honolulu	2354 GMT	Drover	2052 GMT	Dallas	1038 GMT
		Fairbanks	2256 GMT	Fairbanks	2144 GMT
				Honolulu	2324 GMT
4th Day		6th Day		6th Day	
Detroit	0730 GMT	New York	0021 GMT	Detroit	0700 GMT
Las Vegas	0932 GMT	Dallas	0820 GMT	Las Vegas	0902 GMT
Honolulu	1130 GMT	San Francisco	1014 GMT	Honolulu	1100 GMT
Fairbanks	1310 GMT	Honolulu	1212 GMT	Fairbanks	1240 GMT
Detroit	1830 GMT	New York	1718 GMT	Dallas	1756 GMT
Las Vegas	2022 GMT	Denver	1610 GMT	San Francisco	1952 GMT
Honolulu	2212 GMT	Fairbanks	2114 GMT	Honolulu	2142 GMT
Honolulu	2406 GMT	Honolulu	2254 GMT		
		7th Day			
New York	0554 GMT	Detroit	1618 GMT		
Denver	0718 GMT	Denver	1800 GMT		
San Francisco	0541 GMT	Fairbanks	2011 GMT		
Fairbanks	1120 GMT	Honolulu	2221 GMT		



OFFICIAL BULLETIN 244 FROM ARRL HEADQUARTERS  
NEWINGTON CONN OCTOBER 23 1969 TO ALL RADIO AMATEURS BT

Amsat, the Radio Amateur Satellite Corporation, reports that an early winter launch of the Australis Oscar 5 satellite is likely. The amateur satellite is designed to transmit on 29.450 and 144.050 MHz. Amateurs interested in tracking the satellite should review the QST article series beginning in the July issue. The orbit of Australis Oscar 5 is expected to be essentially the same as the example used in the October QST tracking article. Special reporting forms are available without charge from Amsat. Send an addressed stamped envelope to Amsat, Box 27, Washington, D.C. 20044. Listen to W1AW bulletins for further informatin on the launch AR

OFFICIAL BULLETIN VP 246 FROM ARRL HEADQUARTERS  
NEWINGTON CONN NOVEMBER 13 1969 TO ALL RADIO AMATEURS BT

In connection with the Australis Oscar 5 amateur satellite experiment, third party communication has been authorized between United States amateur stations and Australian amateur stations on matters relating to satellite experiments. These arrangements, which are effective immediately, will continue for a period ending four months after the satellite ceases to transmit. Australis Oscar 5 is scheduled for a piggyback launch with the Tiros-M mission. The expected orbit will be circular at 790 nautical miles with an inclination of 101.56 degrees. Listen to W1AW for further information on the launch AR