UOSAT SPACECRAFT CONTROL CENTRE
UNIVERSITY OF SURREY, GUILDFORD, SURREY, ENGLAND
****

FRAME COUNTER : 0169 received by DB2OS

**** UOSAT BULLETIN-41 1200 GMT 9TH SEPTEMBER 1983 ****

** UOSAT SPACECRAFT NEWS **

THE UNIVERSITY OF SURREY CENTRAL COMPUTING FACILITIES HAVE RECOVERED ALLOWING THE NORMAL OPERATIONAL SCHEDULE TO BE RESUMED THIS WEEK.

** SPACECRAFT OPERATIONS SCHEDULE **

THE FOLLOWING SPACECRAFT OPERATIONS SCHEDULE IS NOW IN USE AS A RESULT OF FEEDBACK FROM USERS. ALTPOUGH THE UNDERLYING SCHEDULE WILL REMAIN UNCHANGED UNTIL UWER REQUIREMENT WARRANT A REVIEW, THERE MAY BE DAY-BY-DAY SUBSTITUTIONS WHEN SPACECRAFT OPERATIONAL SOFTWARE TESTS OR ATTITUDE MANOEUVRES ARE REQUIRED.

THE DIFFERENT 1802 PROGRAMS REQUIRED TO PRODUCE THE DAILY OUTPUTS ARE LOADED ON THE FIRST AVAILABLE AFTERNOON PASS OVER SURREY AT AROUND 14:00 GMT EACH DAY.

SATURDAY: - 1200 BULLETIN, TELEMETRY, DIGITALKER, (21MHZ)
SUNDAY: - 1200 BULLETIN, TELEMETRY, DIGITALKER, (21MHZ)
MONDAY: - HIGH SPEED WHOLE ORBIT RADIATION SCAN
TUESDAY: - CHECKSUMMED TELEMETRY DATA
WEDNESDAY: - CCD IMAGER DATA
THURSDAY: - WHOLE ORBIT TELEMETRY DATA SCAN
FRIDAY: - LOAD BULLETIN, DIGITALKER & TELEMETRY SCHEDULE

COMMENTS ON THE SCHEDULE ORGANISATION WOULD BE WELCOME.

THE CURRENT SPACECRAFT POWER BUDGET REQUIRES THE RADIATION COUNTERS AND SCIENTIFIC MAGNETOMETER LOADS TO BE SHED IN ORDER TO RUN THE 2.4GHZ BEACON. AS A RESULT, IT IS ANTICIPATED THAT THE 2.4GHZ BEACON WHLL BE ACTIVATED EVERY SECOND WEEKEND, IN ALTERNATION WITH THE 21.002 MHZ H.F. BEACON.

** DATA TRANSMITTED LAST WEEK **

THE RADIATION DATA TRANSMITTED ON MONDAY, 5/9/83 WAS RECORDED STARTING AT 15:45:13 GMT. THE DATA FORMAT WAS DESCRIBED ON BULLETINS 29-30. DROP US A LINE IF YOU WANT A COPY.

THE CCD IMAGE TRANSMITTED ON WEDNESDAY WAS TAKEN AT 14:04:50. FURTHER EXPERIMENTATION WITH EXPOSURE LEVELS (CCD INTEGRATION TIMES) HAS NOT YET YIELDED BETTER RESULTS.

** THANKS FOR REPORTS **

JA2GSD, ZS1BI, W7AVE, VK2AVH, JA2GSD, DE0AAA.

W7AVE INCLUDED A MOST INTERESTING EXTRACT FROM HIS UOSAT LOG DESCRIBING SEPTEMBER 20TH, 1982. AT 22:32 (APPROX - IT WAS NOT NOTED IN THE EXCITEMENT!) STANFORD RESEARCH INSTITUTE SUCCEEDED IN TURNING OFF THE 2M BEACON AFTER BOTH HAD BEEN LOCKED ON AND TRANSMITTING A STEADY TONE. SORRY YOU LOST YOUR LOS MEASUREMENT!

** AMSAT OSCAR 10 **

THE NEW OSCAR-10 SPACECRAFT CARRIES TWO TRANSPONDERS (435 MHZ TO 145 MHZ & 1269 TO 436 MHZ) AND FOUR GENERAL AND ENGINEERING BEACONS (GB:145.810; EB:145.987; GB:436.04; EB:436.02 MHZ). THE MODE-B TRANSPONDER WAS ACTIVATED FOR GENERAL USE ON THE 6TH AUGUST AND HAS BEEN HEAVILY USED SINCE FOR A NUMBER OF RECORD-BREAKING DX CONTACTS. THE BAND PLAN FOR THIS TRANSPONDER IS AS FOLLOWS:

UPLINK	DOWNLINK	
	145.987	ENGINEERING BEACON
435.025	145.975	SSC H1
435.035	145.965	SSC H2
435.038	145.962	SSB ONLY - UPPER LIMIT
.	.	.
435.080	145.920	SSB ONLY
435.080	145.920	MIXED SSB / CW
.	.	.
435.120	145.880	MIXED SSB / CW
435.120	145.880	CW ONLY
.	.	.
435.162	145.838	CW ONLY - LOWER LIMIT
435.165	145.835	SSC L2
435.175	145.825	SSC L1
	145.810	GENERAL BEACON

THE SPECIAL SERVICE CHANNELS (SSCS) ARE FOR SPECIAL PURPOSES (E.G. BULLETINS, SCHEDULED EXPERIMENTS, ETC.) AND MUST NOT BE USED FOR NORMAL TRANSPONDER COMMUNICATION.

THE FOLLOWING MESSAGE BLOCK WAS RECENTLY TRANSMITTED FROM OSCAR-10:

M FROM DJ4ZC, 12.8.83: PRESENT ATTITUDE IS LON 165 LAT 0 DEG. UNTIL THE END OF NEXT WEEK WE WILL REMAIN IN THIS ATTITUDE. TELEMETRY OF TRANSPONDER-AGC SHOWS VALUES BETWEEN -15 AND -22 DB DURING MOST OF THE TIME - IN OTHER WORDS: IF MOST STATIONS WOULD REDUCE THEIR POWER AT LEAST TENFOLD, NOTHING WOULD CHANGE OTHER THAN THAT WEAKER STATIONS WOULD GET LOUDER. PLEASE SPREAD THE WORD.. 73'S KARL.
WHEN HIGH POWER STATIONS TRANSMIT, THE TRANSPONDER RECEIVER'S AGC CUTS IN AND REDUCES THE GAIN FOR THE ENTIRE PASSBAND. THE GAIN REDUCTION HAS BEEN SEEN AT -22 DB AND THIS HAS THE EFFECT THAT THE LOWER POWERED STATIONS DISAPPEAR FROM THE PASSBAND. SO...TAKE NOTE OF THE STRENGTH OF YOUR OWN DOWNLINK SIGNAL, AND IF YOU ARE SIGNIFICANTLY LOUDER THAN THE TYPICAL 100 WATT 10-13 DB UPLINK ANTENNA STATIONS, THEN YOU ARE CAUSING A PROBLEM FOR EVERYONE!!!!

THE POWER REQUIRED WILL ALSO CHANGE AS THE SPACECRAFT RANGE ALTERS AROUND ITS ORBIT AND THE ANTENNA ORIENTATION CHANGES RELATIVE TO THE GROUND STATION, SO PERIODIC CHECKS OF YOUR OWN DOWNLINK SIGNAL ARE NECESSARY TO KEEP THEM TO THE BEACON LEVELS.

IN ORDER TO DEMONSTRATE THE EFFECTS OF HIGH SIGNAL LEVELS, A QRP DAY HAS BEEN INCORPORATED IN THE OSCAR-10 SCHEDULE. THIS IS ON MONDAYS, UTC, AND A MAXIMUM EIRP LEVEL OF 100W WILL BE ALLOWED ON THESE DAYS, ALTHOUGH THIS IS A MAXIMUM AND EVEN LOWER POWERS ARE PERFECTLY SUFFICIENT. THE QRP DAY HAS BEEN INITIATED FROM THE 5TH SEPTEMBER. PLEASE PUBLICISE.

EXPERIMENTAL OPERATION OF THE MODE L (1269 TO 436MHZ) TRANSPONDES WILL BEGIN ON SEPTEMBER 21TH. THE TRANSPONDER WILL BE ACTIVATED ON THE TRADITIONAL AMSAT EXPERIMENTAL DAY, WEDNESDAY, WHEN OSCAR-10 IS WITHIN +- 1 HOUR OF APOGEE ON EACH ORBIT THAT DAY. THE FREQUENCIES OF THE MODE L TRANSPONDER ARE:

UPLINK	DOWNLINK	
1269.05	436.95	UPPER LIMIT
1269.10	436.90	
1269.15	436.85	
1269.20	436.80	
1269.25	436.75	
1269.30	436.70	
1269.35	436.65	
1269.40	436.60	
1269.45	436.55	PASSBAND CENTRE
1269.50	436.50	
1269.55	436.45	
1269.60	436.40	
1269.65	436.35	
1269.70	436.30	
1269.75	436.25	
1269.80	436.20	
1269.85	436.15	LOWER LIMIT
	436.04	ENGINEERING BEACON
	436.02	GENERAL BEACON

THESE FREQUENCIES ARE BASED ON A TRANSLATION FREQUENCY OF 1706.00 MHZ, (ESTIMATED).

** OSCAR-10 ORBITAL ELEMENTS ** (FROM PHIL KARN, KA9Q)

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SATELLITE: OSCAR-10
CATALOG NUMBER: 14129
EPOCH TIME:       83236.00000000
   WED AUG 24 00:00:00.000 1983 UTC
ELEMENT SET:      MH 8-23-83
INCLINATION:        26.1180 DEG
RA OF NODE:        244.7970 DEG
ECCENTRICITY:     0.6038494
ARG OF PERIGEE:    197.0530 DEG
MEAN ANOMALY:       54.1010 DEG
MEAN MOTION:     2.05853990 REV/DAY
DECAY RATE:               0 REV/DAY↑2
EPOCH REV:              147
SEMI MAJOR AXIS: 26105.693 KM
ANOM PERIOD:     699.524940 MIN
APOGEE:           35491.811 KM
PERIGEE:           3963.997 KM
TRANSLATE FREQ:    581.0050 MHZ
INVERT:                   1
BEACON:            145.8100 MHZ
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** ORBITAL CALENDARS **

THE LATEST EDITION OF THE AMSAT-UK ORBITAL CALENDAR COVERING ALL OPERATIONAL AMATEUR SPACECRAFT IS NOW OUT OF PRINT. THE NEXT EDITION IS DUE AT THE BEGINNING OF OCTOBER. MORE DETAILS FROM:

R. BROADBENT G3AAJ,
AMSAT-UK,
94, HERONGATE ROAD,
LONDON, E12 5EQ, U.K.

** NOAA NEWS **

THE FOLLOWING HAS BEEN RECEIVED FROM NOAA:

ON JUNE 7 AT 00:00Z, NOAA-8 REPLACED NOAA-6 AS THE OPERATIONAL MORNING DESCENDING SPACECRAFT. NOAA-6 WILL BE IN A TEST PHASE UNTIL FURTHER NOTICE AND MAY OR MAY NOT BE TRANSMITTING USEABLE REALTIME DATA. IN VIEW OF THE ABOVE INFORMATION, THE NOAA-8 EPHEMERES WILL BE INCLUDED IN FUTURE UOSAT BULLETINS, ALTERNATING WEEKLY WITH NOAA-7.

U.S GEOSTATIONARY SPACECRAFT STATUS:

1) GOES-EAST (5) LOCATED AT 75 DEG-W CURRENTLY PROVIDING VISSR IMAGES ON 1687.1 MHZ AND WEFAX ON 1691.0 MHZ.

2) GOES-CENTRAL (2) LOCATED AT 106 DEG-W CURRENTLY WEFAX ON 1691.0 MHZ

3) GOES-WEST (6) LOCATED AT 135 DEG-W CURRENTLY VISSR IMAGES ON 1687.1 MHZ AND WEFAX ON 1691.0 MHZ.

** SPACECRAFT ORBITAL DATA **

ORBITS FOR 9TH SEPTEMBER

	UOSAT	OSCAR-8	NOAA-7	
ORBIT NO :	10662	28101	11410	
EQX TIME :	14:10:25	14:18:45	14:35:32	GMT
EQX LONG :	342.0	293.3	353.6	DEG.W
MEAN HGT :	500.5	904.0	850.0	KM
PERIOD :	94.6135018	103.1651866	101.8878250	MINS
P-DRAG :	3.416E-05	8.277E-07	7.500E-06	*N-REF
LONG INC :	23.6524095	25.7899720	25.4977180	DEGS
L-DRAG :	8.597E-06	.000E+00	2.000E-07	*N-REF

RECEPTION REPORTS AND UOSAT DATA IS MUCH APPRECIATED
SEND TO: UOSAT TEAM, UNIVERSITY OF SURREY, GUILDFORD, SURREY, ENGLAND - THANK YOU

UOSAT SPACECRAFT CONTROL CENTRE
UNIVERSITY OF SURREY, GUILDFORD, SURREY, ENGLAND
****

FRAME COUNTER : 019C received by DB2OS

**** UOSAT BULLETIN-42 1200 GMT 16TH SEPTEMBER 1983 ****

** UOSAT SPACECRAFT NEWS **

THE UNIVERSITY OF SURREY CENTRAL COMPUTING FACILITIES HAVE RECOVERED ALLOWING THE NORMAL OPERATIONAL SCHEDULE TO BE RESUMED.

** NEW EXPERIMENTAL SPACECRAFT PROPOSAL - UOSAT-B **

AN UNEXPECTED LAUNCH OPPORTUNITY HAS APPEARED DUE TO THE PREMATURE DEMISE OF THE LANDSAT-4 SPACECRAFT RESULTING IN THE PROPOSED EARLY CALL-UP OF THE REPLACEMENT MISSION (LANDSAT-D') - NOW CURRENTLY SCHEDULED FOR FEBRUARY 1984!

A PROPOSAL HAS BEEN PREPARED BY THE UOSAT TEAM AND SUBMITTED, VIA AMSAT-USA, TO NASA FOR THE LAUNCH OF A UOSAT-B EXPERIMENTAL SPACECRAFT TO ACCOMPANY THE LANDSAT-D SATELLITE.

IN VIEW OF THE EXTREMELY SHORT TIMESCALE AVAILABLE TO PREPARE A SPACECRAFT FOR THIS LAUNCH, THE UOSAT-B SPACECRAFT WILL BE BASED ON THE UOSAT-1 SYSTEM DESIGN PHILOSOPHY, BUT WILL HOWEVER CARRY AN EXCITING NEW DIGITAL COMMUNICATIONS TRANSPONDER AND INCLUDE MORE SOPHISTICTED EXPERIMENTS, NAVIGATION & ATTITUDE CONTROL SYSTEMS.

IT MUST BE REALISED THAT TO PREPARE A SPACECRAFT FOR LAUNCH WITHIN 6 MONTHS IS A VERY MAJOR UNDERTAKING AND IT MAY PROVE NECESSARY TO ALTER THE PAYLOAD COMPLIMENT OR MODIFY THE MISSION OBJECTIVES AS THE PROJECT PROCEEDS. THE OBJECTIVES AND PAYLOAD DESCRIPTION BELOW DESCRIBES THE DESIRED GOAL FOR WHICH WE AIM!

GENERAL MISSION OBJECTIVES

FOLLOWING THE GENERALLY SUCCESSFUL LAUNCH AND OPERATION OF THE OSCAR-10 AMATEUR RADIO COMMUNICATIONS SATELLITE, THE MISSION OBJECTIVES OF UOSAT-B ARE INTENDED TO BE COMPLIMENTARY TO THOSE OF AO-10 AND A FURTHER DEVELOPMENT OF THE UOSAT-1 PHILOSOPHY, AS FOLLOWS:

A) SPACE EDUCATION:

TO STIMULATE A GREATER DEGREE OF INTEREST AND LEVEL OF KNOWLEDGE IN SPACE SCIENCE AND ENGINEERING AMONGST RADIO AMATEURS, AMATEUR SCIENTISTS AND HOME COMPUTER ENTHUSIASTS - INCLUDING STUDENTS, COLLEGES AND UNIVERSITIES - BY ACTIVE PARTICIPATION IN SPACECRAFT PROJECTS REQUIRING ONLY RELATIVELY SIMPLE, LOW COST GROUND EQUIPMENT. THE MISSION WILL EXPLOIT THE FOUNDATIONS LAID BY THE UOSAT-1 MISSION IN THIS AREA WHILST, IN ADDITION, PROVIDING A SIMPLE-TO-USE DIGITAL COMMUNICATIONS TRANSPONDER TO ENCOURAGE THE USE OF, AND FAMILIARITY WITH, DIGITAL COMMUNICATION TECHNIQUES.

B) SPACE SCIENCE:

TO PROVIDE BOTH AMATEUR AND PROFESSIONAL SCIENTISTS WITH A LOW EARTH ORBIT SOURCE OF READILY AVAILABLE REAL-TIME AND STORED DATA CONCERNING SOLAR AND GEOMAGNETIC ACTIVITY TO SUPPORT RADIOWAVE PROPAGATION STUDIES. AN IMPROVED CCD CAMERA WILL BE INCLUDED TO PROVIDE IMAGES OF EARTH AND, SPECIFICALLY, THE POLAR AURORAE.

C) COST-EFFECTIVE SPACECRAFT ENGINEERING:

THE MISSION WILL ADVANCE FURTHER THE DEVELOPMENTS IN COST-EFFECTIVE SPACECRAFT ENGINEERING INITIATED BY UOSAT-1 WITH A VIEW TO ESTABLISHING A LOW-COST SPACECRAFT SYSTEM DESIGN FOR USE IN FUTURE AMATEUR RADIO STS-GAS LAUNCHES AND OTHER SECONDARY PAYLOAD OPPORTUNITIES. THE MISSION WILL INVESTIGATE SPECIFICALLY THE PERFORMANCE OF COMPUTER HARDWARE, SOFTWARE AND MEMORY DEVICES; NAVIGATION, ATTITUDE CONTROL AND STABILISATION TECHNIQUES AND THE DEVELOPMENT OF LOW-COST GROUNDSTATIONS OF PARTICULAR RELEVENCE TO A FLEXIBLE, SIMPLE-TO-USE STORE-AND-FORWARD DIGITAL COMMUNICATIONS PACKAGE FOR GLOBAL COMMUNICATIONS BETWEEN AMATEUR RADIO STATIONS TO BE EVALUATED IN VIEW OF A PLANNED PACSAT - PACKET RADIO SATELLITE.

MISSION PLAN

THE UOSAT-B SPACECRAFT WILL BE PREPARED FOR LAUNCH BY THE UOSAT TEAM AT THE UNIVERSITY OF SURREY WITHIN THE PERIOD SEPTEMBER 1983 TO FEBRUARY 1984, AS A SECONDARY PAYLOAD BY A DELTA 3924 VEHICLE ACCOMPANYING THE LANDSAT-D EARTH RESOURCES SPACECRAFT.

EXPERIMENT DESCRIPTION

THE UOSAT-B SPACECRAFT WILL CARRY FIVE SPECIFIC EXPERIMENTAL PACKAGES IN ADDITION TO THE ENGINEERING SYSTEMS EXPERIMENTS THAT WILL BE DESCRIBED SEPARATELY.

1) PARTICLE-WAVE EXPERIMENT

THREE GEIGER COUNTERS, SIMILAR TO THOSE FLOWN ON UOSAT-1, AND A SINGLE, MULTI-CHANNEL ELECTRON SPECTROMETER WILL BE MOUNTED ON THE SPACECRAFT TO SERVE AS A NEAR-EARTH REFERENCE FOR MAGNETOSPHERIC STUDIES. DATA WILL BE AVAILABLE IN EITHER REAL-TIME OR, FOR MORE DETAILED ANALYSIS, FROM STORED MEASUREMENTS OVER BOTH POLAR AURORAL REGIONS TO RADIO AMATEURS AND PROFESSIONAL SCIENTISTS.

SPECIFICALLY, THE FOUR DETECTORS WILL MONITOR ELECTRON PRECIPITATION IN THE ENERGY RANGE 1-100 KEV. TWO OF THE GEIGER COUNTERS WILL HAVE THRESHOLD ENERGIES FOR ELECTRONS OF 60 KEV AND BE SET AT DIFFERENT ANGLES IN ORDER TO GIVE A MEASURE OF THE ANGULAR DISTRIBUTION OF THE PRECIPITATING ELECTRONS. THE REMAINING GEIGER COUNTER WILL HAVE A THRESHOLD ENERGY FOR ELECTRONS OF 100 KEV. THE ELECTRON SPECTROMETER WILL YIELD BOTH ENERGY SPECTRA AND ANGULAR DISTRIBUTION OF PRECIPITATED ELECTRONS OF 1-25 KEV SO THAT A DISTRIBUTION FUNCTION CAN BE FORMED FOR THESE PARTICLES.

THE MODULATIONS IMPARTED ON PARTICLES, AS A RESULT OF WAVE-PARTICLE INTERACTIONS IN THE MAGNETOPHERE ON AURORAL FIELD LINES, WILL BE OBSERVED BY A PARTICLE CORRELATOR EXPERIMENT.

2) EARTH IMAGING EXPERIMENT

THE IMAGING EXPERIMENT CARRIED BY UOSAT-1 GENERATED A GREAT DEAL OF WIDESPREAD INTEREST AND STIMULATED MANY VARIED STUDIES CONCERNED WITH LOW-COST DATA RECEPTION, DEMODULATION, IMAGE PROCESSING AND DISPLAY. AN IMPROVED VERSION OF THE CHARGE-COUPLED-DEVICE IMAGING EXPERIMENT WILL BE FLOWN ON UOSAT-B. SHORT TIME EXPOSURES OF EARTH WILL BE GATHERED BY THE IMAGER, STORED WITHIN AN ON-BOARD MEMORY AND TRANSMITTED DOWN TO VERY LOW-COST GROUNDSTATIONS USING EASILY RECEIVED AND DEMODULATED TRANSMISSION FORMATS. THE IMAGE DATA CAN BE

TRANSMITTED BY THE SPACECRAFT EITHER IMMEDIATELY OR EITHER AT A LATER TIME UPON GROUND COMMAND.

A SPECIFIC APPLICATION OF THE EARTH IMAGING EXPERIMENT WILL BE TO BROADEN THE BASE OF THE NEAR-EARTH MAGNETOSPHERIC STUDIES BY RECORDING THE LUMINOSITY OF THE AURORA, AND THEREBY A MEASURE OF ELECTRON PRECIPITATION, OVER A REGION EXTENDING FOR APPROX 800 KM ON BOTH SIDES OF THE SATELLITE GROUND TRACK. THE INTENSITY AND STRUCTURE OF AURORA WILL BE PARTICULARLY VALUABLE IN ASSESSING THE STATE OF MAGNETOSPHERIC ACTIVITY AND OF INTEREST TO RADIO AMATEUR PROPAGATION STUDIES.

3) SYNTHESISED SPEECH EXPERIMENT

THE 'DIGITALKER' SYNTHESISED SPEECH TELEMETRY EXPERIMENT ON UOSAT-1 HAS BEEN EXTREMELY SUCCESSFUL - NOT ONLY WITH SCHOOLS AND RADIO AMATEURS, BUT ALSO AS A VALUABLE OPERATIONAL FACILITY! A SECOND EXPERIMENT WITH AN EXPANDED VOCABULARY MORE SUITED TO SPACECRAFT TELEMETRY AND NEWS BULLETINS WILL BE INCLUDED ON UOSAT-B TO DEVELOP THIS UNIQUE EXPERIMENT FURTHER.

4) PACKET COMMUNICATIONS EXPERIMENT

weiterleiten, befördern

A STORE-AND-FORWARD DIGITAL COMMUNICATIONS EXPERIMENT USING PACKET TRANSMISSION TECHNIQUES WILL BE INCLUDED ON UOSAT-B TO DEMONSTRATE THE FEASIBILITY OF, AND TO STUDY THE CHARACTERISTICS OF A GLOBAL PACSAT COMMUNICATIONS NETWORK BASED ON SIMPLE, LOW-COST RADIO AMATEUR STATIONS. THE EXPERIMENT WILL POSSESS A 96K-BYTE CMOS RANDOM-ACCESS MEMORY ON BOARD THE SPACECRAFT UNDER COMPUTER CONTROL WHICH WILL RETAIN DATA AND COMMUNICATIONS RELAYED TO THE SPACECRAFT FROM A LARGE NUMBER OF GROUND STATIONS USING PACKET COMMUNICATIONS TECHNIQUES COMPLETE WITH A HIERARCHY OF 'ADDRESSES'. EACH RADIO AMATEUR STATION WILL BE ABLE TO LOAD DATA/MESSAGES INTO THE EXPERIMENT AND COLLECT ANY DATA/MESSAGES PREVIOUSLY DEPOSITED THERE FOR HIM USING SIMPLE 300, 1200 OR 9600 BPS AFSK FM OR PSK TECHNIQUES WITH LOW TRANSMIT POWER AND RELATIVELY SIMPLE RECEIVING FACILITIES AT UHF/VHF. SOME OF THESE TRANSMISSION LINKS HAVE ALREADY BEEN SUCCESSFULLY DEMONSTRATED IN PRINCIPLE BY UOSAT-1.

Durchführbarkeit

THE EXPERIMENT ON UOSAT-B WILL ALSO PROVIDE ESSENTIAL FLIGHT QUALIFICATION AND EXPERIENCE CONCERNING THE PERFORMANCE OF BOTH THE CMOS RAM DEFICES TWO TYPES FROM TWO DIFFERENT MANUFACTORERS AND A CMOS NSC800 MICROPROCESSOR IN A LONG DURATION, LOW-EARTH ORBIT ENVIRONMENT. THE RESULTS FROM THESE EXPERIMENTS WILL BE INVALUABLE IN THE PLANNING AND DESIGN OF A FUTURE MISSION AIMED AT PROVIDING A COMPREHENSIVE PACKET COMMUNICATIONS SPACECRAFT - EG. PACCAT.

SPACECRAFT SYSTEMS EXPERIMENTS

THE UOSAT-B SPACECRAFT WILL CARRY A NUMBER OF SYSTEMS EXPERIMENTS ALONGSIDE THOSE DESCRIBED ABOVE. THESE SYSTEM EXPERIMENTS ARE CONCERNED WITH DEVELOPING AN IMPROVED, COST-EFFECTIVE SPUCECRAFT BUS AND EXPERIMENT SUPPOST FACILITY FOR FUTURE AMCTEUR LOW-EARTH ORBIT MISSIONS - WITH SPECIAL EMPHASIS ON LOW-COST GET-AWAY-SPEGIIL (GAS) PAYLOADS ON THE SHUTTLE.

Nutzlast

DUE TO LACK OF SPACE ON THIS BULLETIN, THE SYSTEMS DESIGN AND EXPERIMENTS WILL BE DESCRIBED NEXT WEEK.

** SPACECRAFT OPERATIONS SCHEDULE **

THE FOLLOWING SPACECRAFT OPERATIONS SCHEDULE IS NOW IN USE:

SATURDAY: - 1200 BULLETIN, TELEMETRY, DIGITALKER, (2.4GHZ)
SUNDAY: - 1200 BULLETIN, TELEMETRY, DIGITALKER, (2.4GHZ)
MONDAY: - HIGH SPEED, WHOLE ORBIT RADIATION SCAN
TUESDAY: - CHECK-SUMMED TELEMETRY DATA
WEDNESDAY: - CCD IMAGER DATA

THURSDAY: - WHOLE ORBIT TELEMETRY DATA SCAN
FRIDAY: - LOAD BULLETIN, DIGITALKER & TELEMETRY SCHEDULE

THE CURRENT SPACECRAFT POWER BUDGET REQUIRES THE RADIATION COUNTERS AND SCIENTIFIC MAGNETOMETER LOADS TO BE SHED IN ORDER TO RUN THE 2.4GHZ BEACON.

** DATA TRANSMITTED LAST WEEK **

THE RADIATION DATA TRANSMITTED ON MONDAY, 12/9/83 WAS RECORDED STARTING AT 13:22:16 GMT. THE PROGRAM WAS RE-RUN AT 16:30:36.

THE CCD IMAGE TRANSMITTED ON WEDNESDAY WAS TAKEN AT 13:43:20. FURTHER EXPERIMENTATION WITH EXPOSURE LEVELS (CCD INTEGRATION TIMES) HAS NOT YET YIELDED BETTER RESULTS.

THE WHOLE-ORBIT RECORDED TELEMETRY TRANSMITTED ON 15/9/83 WAS RECORDED STARTING AT 13:55:25 GMT. THE TELEMETRY CHANNELS RECORDED WERE: 02; 22, 23, 30, 32, 43 AND 54.

** THANKS FOR REPORTS **

DE0AAA, VK2AVH, JA2GSD, JG2IVA, JA2GSD, HB9RJV / HB9RKR.

** AMSAT-OSCAR-10 **

IN ORDER TO DEMONSTRATE THE EFFECT OF HIGH SIGNAL LEVELS ON THE TRANSPONDER AGC CIRCUITS, A QRP DAY HAS BEEN INCORPORATED IN THE OSCAR-10 SCHEDULE. THIS IS ON MONDAYS, UTC, AND A MAXIMUM EIRP LEVEL OF 100W WILL BE ALLOWED ON THESE DAYS, ALTHOUGH MANY SUCCESSFUL CONTACTS HAVE BEEN MADE USING EIRPS OF ONLY 1 OR 2W! THE QRP DAY HAS BEEN INITIATED FROM THE 5TH SEPTEMBER. PLEASE PUBLICISE.

EXPERIMENTAL OPERATION OF THE MODE L (1269 TO 436MHZ) TRANSPONDER BEGINS ON SEPTEMBER 21ST. THE TRANSPONDER WILL BE ACTIVATED ON THE TRADITIONAL AMSAT EXPERIMENTAL DAY, WEDNESDAY, WHEN OSCAR-10 IS WITHIN +- 1 HOUR OF APOGEE ON EACH ORBIT THAT DAY. THE FREQUENCIES OF THE MODE L TRANSPONDER ARE:

UPLINK	DOWNLINK	
1269.05	436.95	UPPER LIMIT
1269.10	436.90	
1269.20	436.80	
1269.30	436.70	
1269.40	436.60	
1269.45	436.55	PASSBAND CENTRE
1269.50	436.50	
1269.60	436.40	
1269.70	436.30	
1269.80	436.20	
1269.85	436.15	LOWER LIMIT
	436.04	ENGINEERING BEACON
	436.02	GENERAL BEACON

THESE FREQUENCIES ARE BASED ON A TRANSLATION FREQUENCY OF 1706.00 MHZ, (ESTIMATED).

** OSCAR-10 ORBITAL ELEMENTS ** (FROM PHIL KARN, KA9Q)

SATELLITE: OSCAR-10
CATALOG NUMBER: 14129
EPOCH TIME: 83257.00000000
WED SEP 14 00:00:00.000 1983 UTC
ELEMENT SET: MH 9-13-83
INCLINATION: 26.0670 DEG
RA OF NODE: 241.3370 DEG
ECCENTRICITY: 0.6040293
ARG OF PERIGEE: 202.7550 DEG
MEAN ANOMALY: 136.6490 DEG
MEAN MOTION: 2.05855890 REV/DAY
DECAY RATE: 0 REV/DAY↑2

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SEMI MAJOR AXIS: 26105.538 KM
ANOM PERIOD:    699.518484 MIN
APOGEE:          35496.521 KM
PERIGEE:          3959.501 KM
TRANSLATE FREQ:   581.0047 MHZ
INVERT:                  1
BEACON:           145.8100 MHZ
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WE HAVE ALSO HAD A REQUEST FOR THE UOSAT KEPLERIAN ORBITAL ELEMENTS. THIS IS THE LATEST NASA SET:

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SATELLITE: OSCAR-9
CATALOG NUMBER: 12888
EPOCH TIME:       83249.89664982
   TUE SEP  6 21:31:10.544 1983 UTC
ELEMENT SET:      507
INCLINATION:        97.5525 DEG
RA OF NODE:        216.4069 DEG
ECCENTRICITY:    0.0003938
ARG OF PERIGEE:     50.4708 DEG
MEAN ANOMALY:      309.6876 DEG
MEAN MOTION:   15.22960257 REV/DAY
DECAY RATE:      3.924E-05 REV/DAY↑2
EPOCH REV:           10623
SEMI MAJOR AXIS:  6872.022 KM
ANOM PERIOD:     94.552697 MIN
APOGEE:            509.086 KM
PERIGEE:           503.673 KM
BEACON:           145.8250 MHZ
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** SPACECRAFT ORBITAL DATA **

ORBITS FOR 16TH SEPTEMBER

	UOSAT	OSCAR-8	NOAA-8	
ORBIT NO :	10769	28199	2445	
EQX TIME :	14:53:11	14:48:56	15:11:43	GMT
EQX LONG :	352.3	300.7	294.4	DEG.W
MEAN HGT :	499.9	904.0	850.0	KM
PERIOD :	94.6058465	103.1651055	101.2776950	MINS
P-DRAG :	4.044E-05	8.277E-07	9.000E-06	*N-REF
LONG INC :	23.6504787	25.7899720	25.3195110	DEGS
L-DRAG :	1.017E-05	.000E+00	2.000E-07	*N-REF

RECEPTION REPORTS AND UOSAT DATA IS MUCH APPRECIATED
SEND TO: UOSAT TEAM, UNIVERSITY OF SURREY, GUILDFORD, SURREY, ENGLAND - THANK YOU

VoSAT Spacecraft Control Centre
University of Surrey, Guildford, Surrey, England
****

Frame counter : 0169 received by DB2OS

**** VoSAT Bulletin-43 1200 GMT 23rd September 1983 ****

** NEW EXPERIMENTAL SPACECRAFT PROPOSAL - VoSAT-B **

An unexpected launch opportunity has appeared due to the premature demise of the LANDSAT-4 spacecraft resulting in the proposed early call-up of the replacement mission (LANDSAT-D') - now currently scheduled for February 1984!

A proposal has been prepared by the VoSAT Team and submitted, via AMSAT-USA, to NASA for the launch of a VoSAT-B experimental spacecraft to accompany the LANDSAT-D satellite.

In view of the extremely short timescale available to prepare a spacecraft for this launch, the VoSAT-B spacecraft will be based on the VoSAT-1 system design philosophy, but will however carry an exciting new digital communications transponder and include more sophisticted experiments, navigation & attitude control systems.

It must be realised that to prepare a spacecraft for launch within 6 months is a very major undertaking and it may prove necessary to alter the payload compliment or modify the mission objectives as the project proceeds. The objectives and payload description below describes the desired goal for which we aim!

GENERAL MISSION OBJECTIVES

Following the generally successful launch and operation of the OSCAR-10 amateur radio communications satellite, the mission objectives of VoSAT-B are intended to be complimentary to those of AO-10 and a further development of the VoSAT-1 philosophy, as follows:

a) Space Education:

To stimulate a greater degree of interest and level of knowledge in space science and engineering amongst radio amateurs, amateur scientists and home computer enthusiasts. The mission will exploit the foundations laid by the VoSAT-1 mission in this area whilst, in addition, providing a simple-to-use digital communications transponder to encourage the use of, and familiarity with, digital communication techniques.

b) Space Science:

To provide both amateur and professional scientists with a low earth orbit source of readily available real-time and stored data concerning solar and geomagnetic activity to support radiowave propagation studies. An improved CCD camera will be included to provide images of earth and, specifically, the polar aurorae.

c) Cost-effective spacecraft engineering:

The mission will advance further the developments in cost-effective spacecraft engineering initiated by UoSAT-1. The mission will investigate specifically the performance of computer hardware, software and memory devices; navigation, attitude control and stabilisation techniques and the development of low-cost groundstations of particular relevence to a flexible, simple-to-use store-and-forward digital communications package for global communications between amateur radio stations.

MISSION PLAN

The UoSAT-B spacecraft will be prepared for launch by the UoSAT Team at the University of Surrey within the period September 1983 to February 1984, as a secondary payload by a DELTA 3924 vehicle accompanying the LANDSAT-D earth resources spacecraft.

SPACECRAFT SYSTEMS EXPERIMENTS

The UoSAT-B spacecraft will carry a number of systems experiments alongside the scientific experiments described in last week's bulletin. These system experiments are concerned with developing an improved, cost-effective spacecraft bus and experiment support facility for future amateur low-earth orbit missions - with special emphasis on low-cost Get-Away-Special (GAS) payloads on the Shuttle.

1) Navigation, attitude control & stabilisation

A low-cost, medium performance stabilisation system is an essential feature for most low earth orbit secondary or GAS payloads. The stabilisation mechanisms most suited to these requirements appear to use spin, magnetic aod gravity gradient techniques as none of these need employ expendable spacecraft resources for their long term operation. The UoSAT-1 mission was primarily intended to be earth-pointing utilising gravity gradient methods after an initial inertial, spin stabilised period - the necessary attitude manoeuvres being effected by on-board magnetorqers. The very simple navigation instrumentation and single-axis magnetorquer on UoSAT-1 performed well, if with some difficulty due to their simple nature. The spacecraft was spin stabilised and successful magnetic attitude manoeuvres demonstrated complete control over the spacecraft dynamics and placed it in the correct attitude for gravity gradient stabilisation. The stabilising boom, however, was prevented from deploying fully due to a snag of the cables feeding the scientific magnetometer within the tip-mass on the far end of the boom. Even with only a short (1m) deployment of the boom, the spacecraft was successfully gravity gradient stabilised for a few days with marginal stability after which it was returned to its spin stabilised state. The experiments carried out with UoSAT-1 demonstrated the basic feasibility of a low-cost attitude control and earth-pointing stabilisation system, however the simplicity of the navigation sensors and the partial deployment of the boom prevented the study and evaluation of the operational performance of the system.

It is proposed, therefore, to include improved navigation sensors (eg. sun angle sensors, earth horizon sensors, improved navigation magnetometer) on UoSAT-B in addition to spin-axis and spin-plane magnetorquers and a reliable boom. This combination will enable the spacecraft to be navigated to an expected accuracy of within +-1 degree and a combination of passive nutation dampers and active magnetic damping (using the on-board computer) will contain the nutation and libration of the spacecraft to within an expected +-2 degrees.

2) Computer hardware, software & memory technology

On-board memory storage has been a perennial requirement for spacecraft and is now highlighted by the proposed Packet radio Communications Satellite (PACSAT) being studied by AMSAT. Large amounts of solid-state memory (as opposed to tape recorders) is becoming increasingly attractive, however little experience has been gathered as to the performance of many of these devices in a long-term space environment. As these devices represent the core of a PACSAT type spacecraft, the UoSAT-B mission will provide essential data. In conjunction with the Packet Communications Experiment referred to last week, various types of CMOS static and dynamic memory devices and a CMOS NSC800 microprocessor will be flown to assess their performance.

An RCA 1802 microomputer will be employed as the main spacecraft computer, as on UoSAT-1. The basic architecture will be unchanged and additional peripheral interfaces will be added to support the UoSAT-B experiments.

Software and data will be loaded from the ground command stations into the spacecraft computers as necessary.

3) Telemetry System

The telemetry system used on UoSAT-1 will be upgraded with the addition of an optional hardware-generated checksum for each channel. The ambiguous format of the digital status channels will be resolved by adding 'channel numbers' to each block in the same format as the current analogue channels. An improved dwell facility will allow selection of a number of channels for repeated display. In order to make space for these facilities, the RTTY, 110 baud ASCII and CW downlink formats will be removed, although some of these can be output through the 1802 computer.

4) Communication systems

The simple and effective transmission formats adopted for UoSAT-1 have proved highly successful for reception by low-cost groundstations but suffer from certain limitations at low signal levels and in noisy environments. It is proposed to experiment with error-resilient coding techniques and other transmission methods (whilst remaining simple & cheap to receive) - eg. psk. The currently proposed psk modulator will have facilities for 9600 baud data transmissions.

The 2.4 GHz experimental beacon on UoSAT-1 has generated great interest amongst radio amateurs and has proved a viable data downlink. It is proposed to provide a 2.4GHz engineering downlink from UoSAT-B carrying telemetry and experiment data.

Once UoSAT-B has been stabilised and commissioned, one uplink will be made available to radio amateurs for general access to the digital Packet Communications Experiment, in order that the effectiveness of the on-board traffic control software can be studied in addition to the hardware in preparation for future PACSAT missions.

** Spacecraft operations schedule **

The following spacecraft operations schedule is now in use:

Saturday:	- 1200 bulletin, telemetry, digitalker, (21MHz)
Sunday:	- 1200 bulletin, telemetry, digitalker, (21MHz)
Monday:	- High speed, whole orbit radiation scan
Tuesday:	- Check-summed telemetry data
Wednesday:	- CCD imager data
Thursday:	- Whole orbit telemetry data scan
Friday:	- Load bulletin, digitalker & telemetry schedule

The current spacecraft power budget requires the radiation counters and scientific magnetometer loads to be ched in order to run the 2.4GHz beacon, currently scheduled every other weekend.

** Data transmitted last week **

The radiation data transmitted on Monday, 19/9/83 was recorded starting at 14:06:20 GMT.

The CCD image transmitted on Wednesdcy was taken at 13:21:57. We have settled on the optimum exposure levels after the last few week's trials, and will continue to transmit images at these levels each Wednesday.

The whole-orbit recorded telemetry urens}ittedon 22/9/83 was recorded starting at 13:01:25 GMT. The telemetry channels recorded were: 02, 22, 23, 30, 32, 43 and 54.

** Thanks for reports **

VK2AVH, JA2GSD, JG2IVA, JA2GSD, HB9RJV / HB9RKR, DB5ER.

HB9RJV and HB9RKR have sent UoS a number of processed CCD images. They have the capability to display the images using non-linear gray-levels, and the photographs of these modified pictures on their colour graphics terminal are mo{t impressive. We hope that further efforts will produce identifiable images, and that the techniques will be useful for the UoSAT-B CCD experiment.

** AMSAT-OSCAR-10 **

In order to demonstrate the effects of high signal levels on the transponder AGC circuits, a QRP day has been incorporated in the OSCAR-10 schedule. This is on Mondays, UTC, and a maximum EIRP level of 100W will be allowed on these days, although many successful contacts have been made using EIRPs of only 1 or 2W! The QRP day has been initiated from the 5th September. Please publicise.

Experimental operation of the mode L (1269 to 436MHz) transponder begins on September 21st. The transponder will be activated on the traditional AMSAT experimental day, Wednesday, when OSCAR-10 is within +- 1 hour of apogee on each orbit that day. The frequencies of the Mode L transponder are:

Uplink	Downlink	
1269.05	436.95	Upper Limit
1269.10	436.90	
1269.20	436.80	
1269.30	436.70	
1269.40	436.60	
1269.45	436.55	Passband Centre
1269.50	436.50	
1269.60	436.40	
1269.70	436.30	
!:69.80	436.00	
1269.85	436.15	Lower Limit

436.04 Engineering Beacon
436.02 General Beacon

These frequencies are based on a translation frequency of 1706.00 MHz, (estimated).

** OSCAR-10 orbital elements ** (from Phil Karn, KA9Q)

```
Satellite: oscar-10
Catalog number: 14129
Epoch time:        83257.00000000
   Wed Sep 14 00:00:00.000 1983 UTC
Element set:       MH 9-13-83
Inclination:         26.0670 deg
RA of node:         241.3370 deg
Eccentricity:      0.6040293
Arg of perigee:     202.7550 deg
Mean anomaly:       136.6490 deg
Mean motion:     2.05855890 rev/day
Decay rate:               0 rev/day†2
Epoch rev:              190
Semi major axis: 26105.538 km
Anom period:     699.518484 min
Apogee:           35496.521 km
Perigee:           3959.501 km
Translate freq:    581.0047 mhz
Invert:                   1
Beacon:            145.8100 mhz
```

We have also had a request for the UoSAT Keplerian orbital elements. This is the latest NASA set:

```
Satellite: oscar-9
Catalog number: 12888
Epoch time:        83249.89664982
   Tue Sep  6 21:31:10.544 1983 UTC
Element set:       507
Inclination:         97.5525 deg
RA of node:         216.4069 deg
Eccentricity:      0.0003938
Arg of perigee:      50.4708 deg
Mean anomaly:       309.6876 deg
Mean motion:    15.22960257 rev/day
Decay rate:       3.924e-05 rev/day†2
Epoch rev:            10623
Semi major axis:   6872.022 km
Anom period:      94.552697 min
Apogee:             509.086 km
Perigee:            503.673 km
Beacon:            145.8250 mhz
```

** Spacecraft orbital data **

Orbits for 23rd September

	UoSAT	OSCAR-8	NOAA-7	
Orbit no :	10875	28297	11608	
Eqx time :	14:01:10	15:19:07	14:49:10	GMT
Eqx long :	339.2	308.1	2.2	deg.w
Mean hgt :	499.9	904.0	850.0	km
Period :	94.6015594	103.1650244	101.8863400	mins
P-drag :	4.044E-05	8.277E-07	7.500E-06	*N-ref
Long inc :	23.6494000	25.7899720	25.4976784	degs
L-drag :	1.017E-05	.000E+00	2.000E-07	*N-ref

Receptinn reports and UoSAT data is much appreciated
Send to: UoSAT team, University of Surrey, Guildford, Surrey, England - Thank you

UoSAT Spacecraft Control Centre
University of Surrey, Guildford, Surrey, England
****

Frame counter : 036D received by DB2OS

**** UoSAT Bulletin-44 1200 GMT 30th September 1983 ****

** NEW EXPERIMENTAL SPACECRAFT PROPOSAL - UoSAT-B **

An unexpected launch opportunity has appeared due to the premature demise of the LANDSAT-4 spacecraft resulting in the proposed early call-up of the replacement mission (LANDSAT-D') - now currently scheduled for the end of February 1984!

A proposal has been prepared by the UoSAT Team and submitted, via AMSAT-USA, to NASA for the launch of a UoSAT-B experimental spacecraft to accompany the LANDSAT-D satellite.

In view of the extremely short timescale available to prepare a spacecraft for this launch, the UoSAT-B spacecraft will be based on the UoSAT-1 system design philosophy, but will however carry an exciting new digital communications transponder and include more sophisticted experiments, navigation & attitude control systems.

It must be realised that to prepare a spacecraft for launch within 6 months is a very major undertaking and it may prove necessary to alter the payload compliment or modify the mission objectives as the project proceeds. The objectives and payload description below describes the desired goal for which we aim!

EXPERIMENT DESCRIPTION

Repeating the information given on bulletin 42, the UoSAT-B spacecraft will carry five specific experimental packages in addition to the engineering systems experiments that were described last week:

1) Particle-Wave Experiment

Three Geiger counters, similar to those flown on UoSAT-1, and a single multi-channel electron spectrometer will be mounted on the spacecraft to serve as a near-earth reference for magnetospheric studies. Data will be available in either real-time or, for more detailed analysis, from stored measurements over both polar auroral regions to radio amateurs and professional scientists.

Specifically, the four detectors will monitor electron precipitation in the energy range 1-100 keV. Two of the Geiger counters will have threshold energies for electrons of 60 keV and be set at different angles in order to give a measure of the angular distribution of the precipitating electrons. The remaining Geiger counter will have a threshold energy for electrons of 100 keV. The electron spectrometer will yield both energy spectra and angular distribution of precipitated electrons of 1-25 keV so that a distribution function can be formed for these particles.

The modulations imparted on particles, as a result of wave-particle interactions in the magnetophere on auroral field lines, wich observed by a Particle Correlator Experiment.

2) Earth Imaging Experiment

The Imaging Experiment carried by UoSAT-1 generated a great deal of widespread interest and stimulated any varied studies concerned with low-cost data reception, demodulation, image processing and display. An improved version of the charge-coupled-device imaging experiment will be flown on UoSAT-B. Short time exposures of earth will be gauhered by the imager, stored within in on-board memory and transmitted down to very low-cost groundstations using easily received and demodulatud transmission formats. The klage data can be transmitted by the stacecraft either immediately, repeatedly or at a later time upon ground command.

A specific application of the Earth Imaging Experiment will be to broaden the base of the near-earth magnetospheric studies by recording the luminosity of the aurora, and thereby a measure of electron precipitation, over a region extending for approx 800 km on both sides of the satellite ground track. The intensity and structure of aurora will be particularly valuable in assessing the state of magnetospheric activity and of interest to radio amateur propagation studies.

3) Synthesised Speech Experiment

The 'Digitalker' synthesised speech telemetry experiment on UoSAT-1 has been extremely successful - not only with schools and radio amateurs, but also as a valuable operational facility! A second experiment with an expanded vocabulary more suited to spacecraft telemetry and news bulletins will be included on UoSAT-B to develop this unique experiment further.

4) Packet Communications Experiment

A store-and-forward digital communications experiment using packet transmission techniques will be included on UoSAT-B to demonstrate the feasibility of, and to study the characteristics of a global PACSAT communications network based on simple, low-cost radio amateur stations. The Experiment will possess a 96k-byte CMOS random-access memory on board the spacecraft under computer control which will retain data and communications relayed to the spacecraft from a large number of ground stations using packet communications techniques complete with a hierarchy of 'addresses'. Each radio amateur station will be able to load data/messages into the Experiment and collect any data/messages previously deposited there for him using simple 300, 1200 or 9600 bps afsk fm or psk techniques with low transmit power and relatively simple receiving facilities at UHF/VHF. Some of these transmission links have already been successfully demonstrated in principle by UoSAT-1.

The experiment on UoSAT-B will also provide essential flight qualification and experience concerning the performance of both the CMOS ram devices two types from two different manufacturers) and a CMOS NSC800 microprocessor in a long duration, low-earth orbit environment. The results from these experiments will be invaluable in the planning and design of a future mission aimed at providing a comprehensive packet communications spacecraft - eg. PACSAT.

** UoSAT-B Spacecraft status - Update 270983 **

No confirmation of flight has yet been received from NASA-HQ, however work proceeds space on the preparation of the UOSAT-B spacecraft for a nominal launch date of 16th February 1984.

* The structural design has been completed. The spacecraft/launch vehicle interface has been agreed between UoS & MDAC - the only remaining problem area concerns the exact placement of the separation switch pad on the spacecraft ing relative to the VHF/UHF antennas. A 2.5 hour teleconference was held between UoS & MDAC last Friday to finalise interfaces, schedules and prepare for the LANDSAT Review Presentation 27-28 Sept where MDAC will present on behalf of UOSAT-B.

* The spacecraft Interface Fitting and the launch vehicle Attach Fitting have been completed and the former is now being shipped to the launcher at MDAC.

* The spacecraft structure is well under way - all structural components have been completed except the module boxes (4 finished). Further rivets and floating fasteners have to be procured before assembly can take place.

* A Spacecraft Design Review was held on Monday 26 Sept. where the final experiment compliment and system design were examined, resulting in a number of changes in the light of the last few weeks work.

* Negotiations are under way concerning the procurement of solar arrays.

* Batteries remain unresolved as yet, although considerable effort is being expended by Larry Kayser on procurement.

* Small pin-pullers have yet to be identified for tip-mass caging.

* The Navigation Sensors electronics pcb artwork has been prototyped using in-house pcb CAD.

* Mario Acuna (LU9HBG) has agreed to provide an improved Navigation Magnetometer.

Detailed specifications of the spacecraft system and interfaces are being prepared. These will be posted once the transients have died away!

We realise that it is often difficult to maintain maximum pressure when indivifual members of the team are so widely scattered and far from UoS - however be aware that WE are now fully committed to this spacecraft and peraodic silences indicate only pre-occupation with spacecraft matters and not disinterest in the ottside world nor (necessarily!) paralysis brought on by panic! We greatly appreciate all YOUR efforts out there - keep it coming.

** Spacecraft operations schedule **

The following spacecraft operations schedule is now in use:

Saturday:	- 1200 bulletin, telemetry, digitalker, (2.4GHz)
Sunday:	- 1200 bulletin, telemetry, digitalker, (2.4GHz)
Monday:	- High speed, whole orbit radiation scan
Tuesday:	- Check-summed telemetry data
Wednesday:	- CCD imager data
Thursday:	- Whole orbit telemetry data scan
Friday:	- Load bulletin, digitalker & telemetry schedule

The current spacecraft power budget requires the radiation counters ant scientific magnetometer loads to be shed in order to run the 2.4GHz beacon, currently scheduled every other weekend.

** Data transmitted last week **

The radiation data transmitted on Monday, 26/9/83 was recorded starting at 14:47:30 GMT.

The CCD image transmitted on Wednesday was taken at 14:04:30, when the spacecraft was over Denmark. We have settled on the optimum exposure levels after the last few week's trials, and will continue to transmit images at these levels each Wednesday.

The whole-orbit recorded telemetry transmitted on 29/9/83 was recorded starting at 16:52:34 GMT. The telemetry channels recorded were: 02, 22, 23, 30, 32, 43 and 54.

** Thanks for reports **

DB5ER, VC2AVH, ZS1BI, M.D. Oslender, JA2GSD, HB9RJV / HB9RKR, WB9ANQ, KO5I.

Thanks for the encouragements and suggestions received regarding the UoSAT-B project.

HB9RJV and HB9RKR have sent UoS a number of processed CCD images. They have the capability to display the images using non-linear gray-levels, and the photographs of these modified pictures on their colour graphics terminal are most impressive. Further images taken on 21/9/83 and received at Surrey this morning may have been identified by HB9RKR as the sea of Marmara and Istanbul - more information next week!

** AMSAT-OSCAR-10 **

In order to demonstrate the effects of high signal levels on the transponder AGC circuits, a QRP day has been incorporated in the OSCAR-10 schedule. This is on Mondays, UTC, and a maximum EIRP level of 100W will be allowed on these days, although many successful contacts have been made using EIRPs of only 1 or 2W! The QRP day has been initiated from the 5th September. Please publicise.

Experimental operation of the mode L (1269 to 436MHz) transponder begins on September 21st. The transponder will be activated on the traditional AMSAT experimental day, Wednesday, when OSCAR-10 is within +- 1 hour of apogee on each orbit that day. The frequencies of the Mode L transponder are:

Uplink	Downlink	
1269.05	436.95	Upper Limit
1269.10	436.90	
1269.20	436.80	
1269.30	436.70	
1269.40	436.60	
1269.45	436.55	Passband Centre
1269.50	436.50	
1269.60	436.40	
1269.70	436.30	
1269.80	436.20	
1269.85	436.15	Lower Limit
	436.04	Engineering Beacon
	436.02	General Beacon

These frequencies are based on a translation frequency of 1706.00 MHz, (estimated).

The following has been received via OSCAR-10 recently:

M FROM DJ4ZC, 28.9.83: THE MULTIPLE SWITCHING OF THE 24 CM ANTENNA RELAY RESULTED IN A 10 - 20 DB IMPROVEMENT OF MODE L PERFORMANCE. NOW PERFORMANCE IS ABOUT 10 DB BELOW NOMINAL AND A NUMBER OF STATIONS HAD VERY GOOD SIGNALS. THE MODE L RX ON THE OMNI RESULTED IN A 12 DB LEVEL REDUCTION. CONCLUSION: WE HAVE AN ANTENNA RELAY PROBLEM. FOR SSB QSO'S AN EIRP OF 40 DBW OR MORE IS SUGGESTED. OVER THE WEEKEND ATTITUDE WILL BE CORRECTED AND THEREAFTER CONTINOUS MODE B (EXCEPT L-DAY) IS PLANNED. KARL

** OSCAR-10 orbital elements ** (from Phil Karn, KA9Q)

```
Satellite: oscar-10
Catalog number: 14129
Epoch time:        83257.00000000
   Wed Sep 14 00:00:00.000 1983 UTC
Element set:       MH 9-13-83
Inclination:         26.0670 deg
RA of node:         241.3370 deg
Eccentricity:      0.6040293
Arg of perigee:     202.7550 deg
Mean anomaly:       136.6490 deg
Mean motion:     2.05855890 rev/day
Decay rate:               0 rev/day†2
Epoch rev:              190
Semi major axis: 26105.538 km
Anom period:     699.518484 min
Apogee:           35496.521 km
Perigee:           3959.501 km
Translate freq:    581.0047 mhz
Invert:                   1
Beacon:            145.8100 mhz
```

Satellite: oscar-9
Catalog number: 12888
Epoch time: 83261.06582853
Sun Sep 18 01:34:47.585 1983 UTC
Element set: 512
Inclination: 97.5541 deg
RA of node: 227.6447 deg
Eccentricity: 0.0003276
Arg of perigee: 27.6421 deg
Mean anomaly: 332.4973 deg
Mean motion: 15.23072422 rev/day
Decay rate: 4.858e-05 rev/day†2
Epoch rev: 10793
Semi major axis: 6871.684 km
Anom period: 94.552697 min
Apogee: 509.086 km
Perigee: 503.673 km
Beacon: 145.8250 mhz

** Spacecraft orbital data **

Orbits for 30th September

	UoSAT	OSCAR-8	NOAA-8	
Orbit no :	10982	28394	2644	
Eqx time :	14:43:42	14:06:07	15:05:48	GMT
Eqx long :	349.7	289.7	293.0	deg.w
Mean hgt :	499.9	904.0	850.0	km
Period :	94.5972319	103.1649441	101.2759040	mins
P-drag :	4.044E-05	8.277E-07	9.000E-06	*N-ref
Long inc :	23.6483112	25.7899720	25.3194712	degs
L-drag :	1.017E-05	.000E+00	2.000E-07	*N-ref

Reception reports and UoSAT data is much appreciated
Send to: UoSAT team, University of Surrey, Guildford, Surrey, England - Thank you

UoSAT Spacecraft Control Centre
University of Surrey, Guildford, Surrey, England
****

Frame counter : 0328 received by DB2OS

**** UoSAT Bulletin-45 1200 GMT 7th October 1983 ****

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                          M           M
                          M           M
                 ----------M----------M---------
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   *!                     M           M                     !*
   *!! -------                                     -------  !!*
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   *!!  !  !   !   !   !   !   !   !   !   !   !    !  !   !!*
   *!!  !  !   !   Happy Birthday, UoSAT   !   !    !  !   !!*
   *!!  !  !   !   !   !   !   !   !   !   !   !    !  !   !!*
   *!!  !  !   !   !   !   !   !   !   !   !   !    !  !   !!*
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UoSAT celebrated its second birthday on the 6th October. The UoSAT team wishes to thank all listeners for their support and interest and hopes that UoSAT will continue to perform well during the next year.

** Exhibition Greetings **

This bulletin is being read at major exhibitions in the U.K. and the U.S. this weekend. The UoSAT group extend their greetings to KO5I and N5AHD and all visitors to the ARRL National Convention in Houston, Texas and to G3AAJ and all visitors at the ARRA Exhibition at Doncaster, England.

** UoSAT-B Spacecraft status - Update 05/10/83 **

No confirmation of flight has yet been received from NASA-HQ, however work proceeds space on the preparation of the UoSAT-B spacecraft for a nominal launch date of 1st March 1984.

* The structural design has been completed. Further minor details have been agreed in various telephone calls between UoS and MDAC.

* The spacecraft Interface Fitting and the launch vehicle Attach Fitting have been completed and the former is now being shipped to the launcher at MDAC.

* The spacecraft structure is well under way - all structural components have been completed including the module boxes. Further floating fasteners have to be procured before assembly can take place.

* A Spacecraft Design Review was held on Monday 26 Sept. where the final experiment compliment and system design were examined, resulting in a number of changes in the light of the last few weeks work. Further minor changes will inevitably continue to be made as a result of design and prototyping experience.

* Negotiations have been completed concerning the procurement of solar arrays.

* Batteries remain unresolved as yet, although considerable effort is being expended by Larry Kayser on procurument.

* One source of small pin-pullers has been identified for tip-mass caging, although others are still being sought.

* The Navigation Sensors electronics pcb artwork has been prototyped using in-house pcb CAD, the pcb produced and construction is under way.

* Artwork for the CCD and radiation/particle detector memory boards is nearly complete.

* Mario Acuna (LU9HBG) has agreed to provide an improved Navigation Magnetometer.

* Detailed specifications of the spacecraft system and interfaces are being prepared. These will be posted once the transients have died away!

** Spacecraft operations schedule **

The following spacecraft operations schedule is now in use:

Saturday:	- 1200 bulletin, telemetry, digitalker, (21MHz)
Sunday:	- 1200 bulletin, telemetry, digitalker, (21MHz)
Monday:	- High speed, whole orbit radiation scan
Tuesday:	- Check-summed telemetry data
Wednesday:	- CCD imager data
Thursday:	- Whole orbit telemetry data scan
Friday:	- Load bulletin, digitalker & telemetry schedule

The current spacecraft power budget requires the radiation counters and scientific magnetometer loads to be shed in order to run the 2.4GHz beacon, currently scheduled every other weekend.

** Data transmitted last week **

The radiation data transmitted on Monday, 3/10/83 was recorded starting at 13:55:25 GMT.

The CCD image transmitted on Wednesday was taken at 13:13:40, when the spacecraft was over Denmark. We have settled on the optimum exposure levels after the last few week's trials, and will continue to transmit images at these levels each Wednesday.

The whole-orbit recorded telemetry transmitted on 6/12/83 was recorded starting at 14:23:12 GMT. The telemetry channels recorded were: 02, 22, 23, 30, 32, 43 and 54.

** Thanks for reports **

VK2AVH, ZS1BI, M.D. Oslender, JA2GSD, HB9RJV / HB9RKR, WB9ANQ, KO5I, N5AHD, W7AVE, OZ2LW, G3RUH/G3YACP(Tnx for birthday card!)

Thanks for the encouragements and suggestions received regarding the UoSAT-B project.

HB9RJV and HB9RKR have sent UoS a number of processed CCD images. They have the capability to display the images using non-linear gray-levels, and the photographs of these modified pictures on their colour graphics terminal are most impressive. Further images taken on 21/9/83 and received at Surrey may have been identified by HB9RKR as the sea of Marmara and Istanbul.

** AMSAT-OSCAR-10 **

In order to demonstrate the effects of high signal levels on the transponder AGC circuits, a QRP day has been incorporated in the OSCAR-10 schedule. This is on Mondays, UTC, and a maximum EIRP level of 100W will be allowed on these days, although many successful contacts have been made using EIRPs of only 1 or 2W! The QRP day has been initiated from the 5th September. Please publicise.

Experimental operation of the mode L (1269 to 436MHz) transponder began on September 21st. The transponder will be activated on the traditional AMSAT experimental day, Wednesday, when OSCAR-10 is within +- 1 hour of apogee on each orbit that day. From next week, the L-transponder will also be operated within +- 1 hour of apogees on Saturdays, too. The frequencies of the Mode L transponder are:

Uplink	Downlink	
1269.05	436.95	Upper Limit
1269.10	436.90	
1269.20	436.80	
1269.30	436.70	
1269.40	436.60	
1269.45	436.55	Passband Centre
1269.50	436.50	
1269.60	436.40	
1269.70	436.30	
1269.80	436.20	
1269.85	436.15	Lower Limit
	436.04	Engineering Beacon
	436.02	General Beacon

These frequencies are based on a translation frequency of 1706.00 MHz, (estimated).

The following has been received via OSCAR-10 recently:

M FROM DJ4ZC, 28.9.83: THE MULTIPLE SWITCHING OF THE 24 CM ANTENNA RELAY RESULTED IN A 10 - 20 DB IMPROVEMENT OF MODE L PERFORMANCE. NOW PERFORMANCE IS ABOUT 10 DB BELOW NOMINAL AND A NUMBER OF STATIONS HAD VERY GOOD SIGNALS. THE MODE L RX ON THE OMNI RESULTED IN A 12 DB LEVEL REDUCTION. CONCLUSION: WE HAVE AN ANTENNA RELAY PROBLEM. FOR SSB QSO'S AN EIRP OF 40 DBW OR MORE IS SUGGESTED. OVER THE WEEKEND ATTITUDE WILL BE CORRECTED AND THEREAFTER CONTINOUS MODE B (EXCEPT L-DAY) IS PLANNED. KARL

** Spacecraft orbital data **

Orbits for 7th October

	UoSAT	OSCAR-8	NOAA-7	
Orbit no :	11089	28492	11806	
Eqx time :	15:25:47	14:36:17	15:02:31	GMT
Eqx long :	0.0	297.2	10.7	deg.w
Mean hgt :	499.1	904.0	850.0	km
Period :	94.5953964	103.1648630	101.8848550	mins
P-drag :	3.672E-05	8.277E-07	7.500E-06	*N-ref
Long inc :	23.6478513	25.7899720	25.4976388	degs
L-drag :	9.240E-06	.000E+00	2.000E-07	*N-ref

UoSAT Spacecraft Control Centre
University of Surrey, Guildford, Surrey, England
****

Frame counter : 0334 received by DB2OS

**** UoSAT Bulletin-46 1200 GMT 14th October 1983 ****

UoSAT celebrated its second birthday on the 6th October. The UoSAT team wishes to thank all listeners for their support, interest and good wishes and hopes that UoSAT will continue to perform well during the next year.

** UoSAT-B Spacecraft status - Update 12/10/83 **

No confirmation of flight has yet been received from NASA-HQ, however work proceeds apace on the preparation of the UoSAT-B spacecraft for a nominal launch date of 1st March 1984.

* The structural design has been completed.

* The spacecraft Interface Fitting and the launch vehicle Attach Fitting have been completed and the former has now been shipped to the launcher at MDAC.

* The spacecraft structure is well under way - all structural components have been completed including the module boxes. Further floating fasteners have to be procured before assembly can take place.

* A Spacecraft Design Review was held on Monday 26 Sept. where the final experiment compliment and system design were examined, resulting in a number of changes in the light of the last few weeks work. Further minor changes will inevitably continue to be made as a result of design and prototyping experience.

* Negotiations have been completed concerning the procurement of solar arrays.

* Batteries remain unresolved as yet, although considerable effort is being expended by Larry Kayser on procurement. Latest reports from Canada look promising.

* One source of small pin-pullers has been identified for tip-mass cging, although others are still being sought.

* The Navigation Sensors electronics pcb artwork has been prototyped using in-house pcb CAD, the pcb produced and constructed. The sun sensor prototypes are being tested.

* Artwork for the CCD and radiation/particle detector memory boards is complete, and boards are under construction.

* Mario Acuna (LU9HBG) has agreed to provide an improved Navigation Magnetometer.

* Most 1802 computer experiment interfaces have been prototyped in preparation for PCB layout.

* The PCB layout of the telecommand decoders and mulltiplexers is under way.

* Electronic component procurement is progressing well.

* Detailed specifications of the spacecraft system and interfaces are being prepared. These will be posted once the transients have died away!

** Spacecraft operations schedule **

The following spacecraft operations schedule is now in use:

Saturday:	- 1200 bulletin, telemetry, digitalker, (2.4GHz)
Sunday:	- 1200 bulletin, telemetry, digitalker, (2.4GHz)
Monday:	- High speed, whole orbit radiation scan
Tuesday:	- Check-summed telemetry data
Wednesday:	- CCD imager data
Thursday:	- Whole orbit telemetry data scan
Friday:	- Load bulletin, digitalker & telemetry schedule

The current spacecraft power budget requires the radiation counters and scientific magnetometer loads to be shed in order to run the 2.4GHz beacon, currently scheduled every other weekend.

** Data transmitted last week **

The radiation data transmitted on Monday, 10/10/83 was recorded starting at 14:39:00 GMT.

The CCD image transmitted on Wednesday was taken at 13:54:17, when the spacecraft was ovar Denmark. (again!!) We have settled on the optimum exposure levels after the last few week's trials, and will bontinue to transmit images at these levels each Wednesday.

The whole-orbit recorded telemetry transmitted on 13/10/83 was recorded starting at 13:31:15 GMT. The telemetry channels recorded were: 02, 22, 23, 30, 32, 43 and 54.

** Thanks for donation **

The UoSAT team thanks Birger Lindholm, a regular contributor of data and suggestions, for his generous donation to the UoSAT-B project.

** Thanks for reports **

N5AHD, W7AVE, OZ2LW, G3RUH/G3YAC, JA2GSD, HB9RJV / HB9RKR, F9XG, DD2OJ / DB2OS.

Thanks for the encouragements and suggestions received regarding the UoSAT-B project.

HB9RJV and HB9RKR have sent UoS a number of processed CCD images. They have the capability to display the images using non-linear gray-levels, and the photographs of these modified pictures on their colour graphics terminal are most impressive. The images taken on 21/9/83 have been identified by HB9RKR as the sea of Marmara and Istanbul. The map enclosed with HB9RKR's latest letter is indeed most convincing, and the geographic area is close to that expected from the time of the image being taken. The UoSAT team hope to check sun angles, etc, to give a final confirmation as soon as possible.

** Corrections **
DD2OJ and DB2OS report that:

On the telemetry status points list, channels 9 and 10 should be exchanged, since no. 9 is the 21MHz beacon. From UoS: Sorry, we mmssed thms on our last telemetry list update!

Also, the frequencies of the Oscar-10 Mode L beacons on 436.04 and 436.02 MHz appear to be reversed - we will check.

** AMSAT-OSCAR-10 **

In order to demonstrate the effects of high signal levels on the transponder AGC circuits, a QRP day has been incorporated in the OSCAR-10 schedule. This is on Mondays, UTC, and a maximum EIRP level of 100W will be allowed on these days, although many successful contacts have been made using EIRPs of only 1 or 2W!

Experimental operation of the mode L (1269 to 436MHz) transponder began on September 21st. The transponder will be activated on the traditional AMSAT experimental day, Wednesday, and also on Saturday, when OSCAR-10 is within +- 1 hour of apogee on each orbit those days. The frequencies of the Mode L transponder are:

Uplink	Downlink	
1269.05	436.95	Upper Limit
1269.10	436.90	
1269.20	436.80	
1269.30	436.70	
1269.40	436.60	
1269.45	436.55	Passband Centre
1269.50	436.50	
1269.60	436.40	
1269.70	436.30	
1269.80	436.20	
1269.85	436.15	Lower Limit
	436.04	Engineering Beacon (see above)
	436.02	General Beacon

The following has been received via OSCAR-10 recently:

M FROM DJ4ZC, 28.9.83: THE MULTIPLE SWITCHING OF THE 24 CM ANTENNA RELAY RESULTED IN A 10 - 20 DB IMPROVEMENT OF MODE L PERFORMANCE. NOW PERFORMANCE IS ABOUT 10 DB BELOW NOMINAL AND A NUMBER OF STATIONS HAD VERY GOOD SIGNALS. THE MODE L RX ON THE OMNI RESULTED IN A 12 DB LEVEL REDUCTION. CONCLUSION: WE HAVE AN ANTENNA RELAY PROBLEM. FOR SSB QSO'S AN EIRP OF 40 DBW OR MORE IS SUGGESTED. OVER THE WEEKEND ATTITUDE WILL BE CORRECTED AND THEREAFTER CONTINOUS MODE B (EXCEPT L-DAY) IS PLANNED. KARL

** OSCAR-10 orbital elements **

```
Satellite: oscar-10
Catalog number: 14129
Epoch time:        83285.50000000
   Wed Oct 12 12:00:00.000 1983 UTC
Element set:       MH 10-11-83
Inclination:         26.0050 deg
RA of node:         236.6270 deg
Eccentricity:      0.6049226
Arg of perigee:     210.5700 deg
Mean anomaly:        17.2220 deg
Mean motion:     2.05854010 rev/day
Decay rate:               0 rev/day^2
Epoch rev:              249
Semi major axis: 26105.707 km
Anom period:     699.524872 min
Apogee:           35520.558 km
Perigee:           3936.693 km
Translate freq:    581.0047 mhz
Invert:                   1
Beacon:            145.8100 mhz
```

Satellite: oscar-9
Catalog number: 12888
Epoch time: 83271.44590410
Wed Sep 28 10:42:06.114 1983 UTC
Element set: 515
Inclination: 97.5561 deg
RA of node: 238.0900 deg
Eccentricity: 0.0002096
Arg of perigee: 358.0847 deg
Mean anomaly: 2.0374 deg
Mean motion: 15.23163712 rev/day
Decay rate: 4.415e-05 rev/day†2
Epoch rev: 10951
Semi major axis: 6871.409 km
Anom period: 94.540067 min
Apogee: 494.728 km
Perigee: 491.847 km
Beacon: 145.8250 mhz

** Spacecraft orbital data **

Orbits for 14th October

	UoSAT	OSCAR-8	NOAA-8	
Orbit no :	11195	28590	2843	
Eqx time :	14:32:41	15:06:26	14:59:31	GMT
Eqx long :	346.6	304.6	291.6	deg.w
Mean hgt :	499.1	904.0	850.0	km
PJriol :	94.5915034	103.1647819	101.2741130	mins
P-drag :	3.672E-05	8.277E-07	9.000E-06	*N-ref
Long inc :	23.6468718	25.7899720	25.3194314	degs
L-drag :	9.240E-06	.000E+00	2.000E-07	*N-ref

Reception reports and UoSAT data is much appreciated
Send to: UoSAT team, University of Surrey, Guildford, Surrey, England - Thank you

b

UoSAT Spacecraft Control Centre
University of Surrey, Guildford, Surrey, England
****

Frame counter : 0187 received by DB2OS

**** UoSAT Bulletin-47 1200 GMT 21st October 1983 ****

** Visitor to University of Surrey **

Tom Clark, W3IWI, visited the UoSAT team at the University of Surrey on Friday, 21st October. He arrived just in time to see the engineering model of UoSAT-B being packed ready for shipment to the MDAC fit check.

** Telemail **

Following the recent demise of the AMSAT account on Telemail, the U.S. electronic mail service, UoSAT-1 users are reminded that information intended for general dissemination may be forwarded to Surrey for broadcast via this bulletin.

** UoSAT-B Spacecraft status **

Work continues apace at UoS, USA & Canada on the development of UO-B spacecraft sub-systems and experiments. Discussions continue with NASA-GSFC and MDAC and latest information specifies a launch no earlier than March 1st 1984.

* All the spacecraft electronic module boxes have been machined by n/c mill at UoS and have been completed.

* A design review was held to examine the data transmission standards, modulation techniques, decoding techniques and command receiver demodulation circuits. Further development is being pursued in these areas before the final configuration is settled.

* The engineering model spacecraft structure is being prepared for the MDAC DELTA Fit-check on 31st October.

* Fabrication of the flight spacecraft structure is currently held up awaiting delivery of a batch of rivets.

* A contract has been signed with SOLAREX Corp. by UoS for the provision of four solar arrays for the UO-B spacecraft. Each array will have an output of 21 watts minimum at a total cost of $32,000.

* A new clean room adjacent to the UoSAT Spacecraft Development Lab. is nearing completion. The flight spacecraft will be assembled in this clean room as the LANDSAT-D' is a super-clean mission.

* A prototype improved 435 MHz beacon has been under test giving 1.2w rf out for 2.8 w dc in, phase modulated. Further development is required to ensure all spurious outputs are greater than -50dB down on the wanted signal under all temperature and voltage conditions.

* The battery problem, although not yet solved, is being actively pursued by Larry Kayser and others. A solution may now be near.

* The development, assembly, test, launch campaign and initial operation of UO-B is being filmed (16mm colour) - if anyone is interested in videotape or film copies, let us know so that we can organise something at cost only. Same goes for slides - it helps if we have an idea as to demand (if any!).

* Martin Sweeting and Ian Ferebee will be at MDAC L.A. and Vandenberg for the UO-B Fit-check with the DELTA from 31st Oct. Schedule is as follows:

Sunday 30 Oct - Fly London to L.A.

Monday 31 Oct - UO-B Fit-check MDAC, Huntingdon Beach.

Tuesday 1 Nov - Inspection of UO-B spacecraft prep. area at WTR, Vandenberg.

Wednesday 2 Nov - Vandenberg

Thursday 3 Nov - LANDSAT/UO-B Pre-ship Review Meeting, MDAC L.A.

Friday 4 Nov - LANDSAT/UO-B/DELUA Review meeting Goddard S.F.C., Washington; visit Solarex for Solar Array review.

Saturday 5 Nov - return to UK? Back to work!

* Launch Procedures Documentation for NASA has been completed.

* A small Press Conference was held at UoS to mark:

a) The second Birthday of UOSAT-1
b) The publication by UoS of a UOSAT Booklet for schools & colleges - distributed free to 4,000 schools in the UK (sponsored By the Royal Society & Natwest Bank).
c) The anouncement of the intention to prepare a UOSAT-B spacecraft for launch next spring.

Following this conference, considerable interest has been shown in the general and technical press in the Amateur Space Programme.

* The Navigation Sensors electronics pcb artwork has been produced using in-house pcb CAD, the pcb built and populated. The sun sensor prototypes are being tested.

* Artwork for the CCD and radiation/particle detector memory boards is complete, and boards are being tested.

* Most 1802 computer experiment interfaces have been prototyped in preparation for PCB layout. The CPU board layout is complete.

* The PCB layout of the telecommand decoders is complete and the one for the multiplexers is under way.

* Electronic component procurement is progressing well.

* Detailed specifications of the spacecraft system and interfaces are being prepared. These will be posted once the transients have died away!

** Spacecraft operations schedude **

The following spacecraft operations schedule is now in use:

Saturday: - 1200 bulletin, telemetry, digitalker, (21MHz)
Sunday: - 1200 bulletin, teleletry, digitalker, (21MHz)
Monday: - high speed, whole orbit radiation scan
Tuesday: - Check-summed telemetry data
Wednesday: - CCD imager data
Thursday: - Whole orbit telemetry data scan
Friday: - Load bulletin, digitalker, telemetry schedule

The current spacecraft power budget requires the radiation counters and scientific magnetometer loads to be shed order to run the 2.4GHz beacon, currently scheduled every other weekend.

** Data transmitted last week **

The radiation data transmitted mn Monday, 17/10/83 was recorded starting at 13:46:40 GMT. This unfortunately only ran for 80 minutes (bug!) and the program was re-run at 15:19:25.

The CCD transmission on Wednesday was a test pattern, which is in fact the power-on state of the CCD memory. The pattern was transmitted due to unscheduled maintenance to the UoS antenna-preventing 435MHz reception. 435MHz is used to detect when the imager is pointing earthwards by using the +-Z sun sensors.

The whole-orbit recorded telemetry transmitted on 20/10/83 was recorded starting at 12:40:34 GMT. The telemetry channels recorded were: 02, 22, 23, 30, 32, 43 and 54.

** Thanks for donation **

The UoSAT team thanks Birger Lindholm, a regular contributor of data and suggestions, for his generous donation to the UoSAT-B project.

" Thanks for reports **

JA2GSD, HB9RJV / HB9RKR, F9XG, DD2OJ / DB2OS, D.M. White / J.B. Corben, JA2WO.

Thanks for the encouragements and suggestions received regarding the UoSAT-B project.

HB9RJV and HB9RKR have sent UoS a number of processed CCD images. They have the capability to display the images using non-linear gray-levels, and the photogzaphs of these modified pictures on their colour graphics terminal are most impressive. The images taken on 21/9/83 have been identified by HB9RKR as the sea of Marmara and Istanbul. The map enclosed with HB9RKR's latest letter is indeed most convincing, and the geographic area is close to that expected from the time of the image being taken. The UoSAT team are pleased to confirm that all evidence points to a correct analysis. Congratulations!!

** Corrections **

DD2OJ and DB2OS report that:

On the telemetry status points list, channels 9 and 10 should be exchanged, since no. 9 is the 21MHz beacon. From UoS: Sorry, we missed this on our last telemetry list update!

Also, the frequencies of the Oscar-10 Mode L beacons on 436.04 and 436.02 MHz appear to be reversed - we will check.

** AMSAT-OSCAR-10 **

In order to demonstrate the effects of high signal levels on the transponder AGC circuits, a QRP day has been incorporated in the OSCAR-10 schedule. This is on Mondays, UTC, and a maximum EIRP level of 100W will be allowed on these days, although many successful contacts have been made using EIRPs of only 1 or 2W! The Mode-L transponder will be activated on the traditional AMSAT experimental day, Wednesday, and also on Saturday, when OSCAR-10 is within +- 1 hour of apogee on each orbit those days.

The following has been received via OSCAR-10 recently:

M FROM DJ4ZC, 28.9.83: THE MULTIPLE SWITCHING OF THE 24 CM ANTENNA RELAY RESULTED IN A 10 - 20 DB IMPROVEMENT OF MODE L PERFORMANCE. NOW PERFORMANCE IS ABOUT 10 DB BELOW NOMINAL AND A NUMBER OF STATIONS HAD VERY GOOD SIGNALS. THE MODE L RX ON THE OMNI RESULTED IN A 12 DB LEVEL REDUCTION. CONCLUSION: WE HAVE AN ANTENNA RELAY PROBLEM. FOR SSB QSO'S AN EIRP OF 40 DBW OR MORE IS SUGGESTED. OVER THE WEEKEND ATTITUDE WILL BE CORRECTED AND THEREAFTER CONTINOUS MODE B (EXCEPT L-DAY) IS PLANNED. KARL

** OSCAR-10 orbital elements ** (from Phil Karn, KA9Q)

```
Satellite: oscar-10
Catalog number: 14129
Epoch time:      83285.50000000
  Wed Oct 12 12:00:00.000 1983 UTC
Element set:     MH 10-11-83
Inclination:       26.0050 deg
RA of node:       236.6270 deg
Eccentricity:    0.6049226
Arg of perigee:   210.5700 deg
Mean anomaly:      17.2220 deg
Mean motion:    2.05854010 rev/day
Decay rate:              0 rev/day^2
Epoch rev:             249
Semi major axis: 26105.707 km
Anom period:    699.524872 min
Apogee:          35520.558 km
Perigee:          3936.693 km
Translate freq:   581.0047 mhz
Invert:                  1
Beacon:           145.8100 mhz

Satellite: oscar-9
Catalog number: 12888
Epoch time:      83271.44590410
  Wed Sep 28 10:42:06.114 1983 UTC
Element set:     515
Inclination:       97.5561 deg
RA of node:       238.0900 deg
Eccentricity:    0.0002096
Arg of perigee:   358.0847 deg
Mean anomaly:       2.0374 deg
Mean motion:   15.23163712 rev/day
Decay rate:      4.415e-05 rev/day^2
Epoch rev:           10951
Semi major axis: 6871.409 km
Anom period:     94.540067 min
Apogee:            494.728 km
Perigee:           491.847 km
Beacon:           145.8250 mhz
```

UoSAT Spacecraft Control Centre
University of Surrey, Guildford, Surrey, England
****

Frame counter : 030D received by DB2OS

**** UoSAT Bulletin-49 1200 GMT 4th November 1983 ****

** UoSAT-B Spacecraft status **

A letter has just been received by AMSAT from NASA confirming the UoSAT-B launch in March, 1984. More news on the contents of this next week.

G3YJO and G6BTU have been in the USA for the past week, visiting McDonnell Douglas, the Vandenburg Air Force base, Goddard Space Flight Centre and a number of other radio amateurs. A brief message returned to the University of Surrey from California said that all was going well at the engineering model fit-check.

* Fabrication of the flight spacecraft structure is now under way.

* A contract has been signed with SOLAREX Corp. by UoS for the provision of four solar arrays for the UO-B spacecraft. Each array will have an output of 21 watts minimum at a total cost of $32,000.

* A new clean room adjacent to the UoSAT Spacecraft Development Lab. is nearing completion. The flight spacecraft will be assembled in this clean room as the LANDSAT-D' is a super-clean mission.

* The battery problem is being actively pursued by Larry Kayser and others. A number of Nickel-Cadmium cells have been ordered for construction of the flight battery pack.

* The development, assembly, test, launch campaign and initial operation of UO-B is being filmed (16mm colour) - if anyone is interested in videotape or film copies, let us know so that we can organise something at cost only. Same goes for slides - it helps if we have an idea as to demand (if any!).

* Launch Procedures Documentation for NASA has been completed.

* Artwork for the CCD and radiation/particle detector memory boards is complete, and boards are working. The particle wave counter / correlator board is being laid out.

* Most 1802 computer experiment interfaces have been prototyped in preparation for PCB layout. The CPU board layout is complete and the board is under construction. The main I/O board is being laid out.

* The CCD camera analogue PCB is being laid out.

* Electronic component procurement is progressing well.

* Detailed specifications of the spacecraft system and interfaces are being prepared. These will be posted once the transients have died away!

** STS-9 - Ham in Space **

The latest announced launch date for the STS-9 mission is now 28th November 1983 at 16:00 GMT.

** Spacecraft operations schedule **

The following spacecraft operations schedule is now in use:

Saturday:	- 1200 bulletin, telemetry, digitalker, (21MHz)
Sunday:	- 1200 bulletin, telemetry, digitalker, (21MHz)
Monday:	- High speed, whole orbit radiation scan
Tuesday:	- Check-summed telemetry data
Wednesday:	- CCD imager data
Thursday:	- Whole orbit telemetry data scan
Friday:	- Load bulletin, digitalker & telemetry schedule

The current spacecraft power budget requires the radiation counters and scientific magnetometer loads to be shed in order to run the 2.4GHz beacon, currently scheduled every other weekend.

** Data transmitted last week **

The radiation data transmitted on Monday, 31/10/83 was recorded starting at 13:33:48 GMT.

The CCD transmission on Wednesday was taken at 15:52:51, when the spacecraft was to the west of Great Britain. Due to severe local QRM (later found to be from the UoSAT-B prototype beacon under test!) and the inability of our new audio logging recorder to record the overnight passes until the auto-start has been re-wired, we do not know what was recorded!

The whole-orbit recorded telemetry transmitted on 03/11/83 was recorded starting at 13:57:00 GMT. The telemetry channels recorded were: 02, 22, 23, 30, 32, 43 and 54.

** Thanks for reports **

JR1SWB, JR7IMN, HB9RKR, F1GRR, JA2WO.

Thanks for the encouragements and suggestions received regarding the UoSAT-B project.

** OSCAR-10 orbital elements ** (from Phil Karn, KA9Q)

Satellite:	oscar-10
Catalog number:	14129
Epoch time:	83297.73726304
	Mon Oct 24 17:41:39.527 1983 UTC
Element set:	53
Inclination:	25.9727 deg
RA of node:	234.6430 deg
Eccentricity:	0.6063802
Arg of perigee:	213.9544 deg
Mean anomaly:	85.8060 deg
Mean motion:	2.05852306 rev/day
Decay rate:	-8e-08 rev/day†2
Epoch rev:	274
Semi major axis:	26105.863 km
Anom period:	699.530663 min
Apogee:	35559.076 km
Perigee:	3898.919 km
Translate freq:	581.0047 mhz
Invert:	1
Beacon:	145.8100 mhz

Satellite: oscar-9
Catalog number: 12888
Epoch time: 83297.85250403
Mon Oct 24 20:27:36.348 1983 UTC
Element set: 531
Inclination: 97.5617 deg
RA of node: 264.6840 deg
Eccentricity: 0.0002171
Arg of perigee: 181.7157 deg
Mean anomaly: 178.4104 deg
Mean motion: 15.23478639 rev/day
Decay rate: 4.417e-05 rev/day↑2
Epoch rev: 11353
Semi major axis: 6870.462 km
Anom period: 94.520524 min
Apogee: 493.827 km
Perigee: 490.844 km
Beacon: 145.8250 mhz

** Spacecraft orbital data **

Orbits for 4th November

	UoSAT	OSCAR-8	NOAA-7	
Orbit no :	11515	28883	12202	
Eqx time :	14:58:42	14:53:41	15:28:20	GMT
Eqx long :	352.8	301.0	27.8	deg.w
Mean hgt :	498.6	904.0	850.0	km
Period :	94.5761784	103.1645393	101.8818850	mins
P-drag :	4.171E-05	8.277E-07	7.500E-06	%N-ref
Long inc :	23.6430157	25.7899720	25.4975596	degs
L-drag :	1.049E-05	.000E+00	2.000E-07	%N-ref

Reception reports and UoSAT data is much appreciated
Send to: UoSAT team, University of Surrey, Guildford, Surrey, England - Thank you

C

UoSAT Spacecraft Control Centre
University of Surrey, Guildford, Surrey, England
****

Frame counter : 0334 received by DB2OS

**** UoSAT Bulletin-50 1200 GMT 11th November 1983 ****

** UoSAT-B Spacecraft status **

* A formal letter was received from NASA-HQ last week giving final approval of NASA support for the UOSAT-B Mission - many thanks are due to all who have worked for this result.

* The UOSAT-B Spacecraft Structural Model completed a Fit-check with the DELTA launch Vehicle successfully at MacDonnell Douglas, Huntingdon Beach, California last week, 30th October. UOSAT-B is currently scheduled for launch on a DELTA 2920 as a secondary payload alongside LANDSAT-4 no earlier than 1st March 1984.

* Following the fit-check, G3YJO and G6BTU travelled to the launch site at WTR, Vandenberg, to inspect the spacecraft preparation areas and to plan the launch campaign. They also had the pleasure of meeting with W6SP and KL7GRF for general discussions (and dinner!).

* A presentation on the UOSAT-B Mission was given during the DELTA Vehicle Pre-Ship Review Meeting on 3rd Nov by G3YJO which was followed by lengthy discussions on separation trajectories between UO-B, LANDSAT & the DELTA second stage.

* G3YJO & G6BTU then travelled to Washington D.C. for discussions with W3GEY and W4PUJ concerning explosive pin-pullers for the boom caging release mechanism, and with LU9HBG concerning the design of the spacecraft Navigation Magnetometer.

* The solar array panel substrates, complete with internal magnetorquer coils, were then taken to Solarex Corp. and a Solar Array Design Review Meeting was held following a tour of the solar cell fabrication facilities. The Flight Array Panels are scheduled to be delivered to UoS by January 1984.

* Fifty NiCd battery cells have been delivered to AMSAT-CANADA for evaluation, a flight pack and a flight spare pack of 10 cells each will be selected from the set following exhaustive tests and matching.

* The development, assembly, test, launch campaign and initial operation of UO-B is being filmed (16mm colour) - if anyone is interested in videotape or film copies, let us know so that we can organise something at cost only. Same goes for slides - it helps if we have an idea as to demand (if any!).

* Artwork for the CCD and radiation/particle detector memory boards is complete, and boards are working. The particle wave counter / correlator board is being laid out.

* Most 1802 computer experiment interfaces have been prototyped in preparation for PCB layout. The CPU board is complete and awaiting population and test. The main I/O board layout is nearly complete.

* The CCD camera analogue PCBs are being laid out.

* The following is a summary of the PLANNED facilities on UO-B, it may be necessary to modify some parameters/facilities depending on schedule! EINRICHTUNGEN

* Spacecraft Weight: 60 Kg (fly-away weight)

* Spacecraft Mass Properties:

    Center of Gravity: +296 mm from Separation Plane
    Moment of Inertia (Ixx): 2.65 Kgm2
    Moment of Inertia (Iyy): 2.65 Kgm2
    Moment of Inertia (Izz): 1.26 Kgm2
    Lower Bound Lateral First Resonance: 40 Hz
    Lower Bound Axial First Resonance: 120 Hz

* UOSAT-B Spacecraft Structural Design Philosophy Identical to UOSAT-1

* Spacecraft Body Envelope: 14.0" x 14.0" x 25.4"

* Solar Array Power Output: 30 W Peak
  26 W Average
  17 W Orbit Average

* Batteries: 5.6 AH NiCd (General Electric)

---

* Main Bus Voltage: +14V (Unregulated)

* Regulated Bus Voltages: +10V, -10V, +5V at 10 Watts Total

* Telemetry Capabilities:

    60 Analogue Channels (0 to 999 ADC Range)
    96 Discrete Status Points
    Hardware Programmable Channel Dwell Facility
    Error checksumming switchable on command
    Spacecraft calendar/clock readout facility
    Data Rates: 300, 600, 1200, 2400 BPS

* Telecommand Capabilities:

    104 Discrete Latched Commands
    Direct Ground Control Over Spacecraft
    Autonomous Control of Spacecraft by On-Board Computer
    On-Board Computer Software Loaded/Modified in Orbit Via Telecommand System

* Spacecraft Power Loads Supplied & Monitored by Power Distribution Module

** STS-9 - Ham in Space **

The latest announced launch date for the STS-9 mission is now 28th November 1983 at 16:00 GMT.

** Spacecraft operations schedule **

The following spacecraft operations schedule is now in use:
Saturday: - 1200 bulletin, telemetry, digitalker, (2.4GHz)
Sunday: - 1200 bulletin, telemetry, digitalker, (2.4GHz)
Monday: - High speed, whole orbit radiation scan
Tuesday: - Check-summed telemetry data
Wednesday: - CCD imager data
Thursday: - Whole orbit telemetry data scan
Friday: - Load bulletin, digitalker & telemetry schedule

The current spacecraft power budget requires the radiation counters and scientific magnetometer loads to be shed in order to run the 2.4GHz beacon, currently scheduled every other weekend.

** Data transmitted last week **

The radiation data transmitted on Monday, 7/11/83 was recorded starting at 12:38:05 GMT.

The CCD transmission on Wednesday was taken at 13:24:03.

The whole-orbit recorded telemetry transmitted on 9/11/83 was recorded starting at 13:08:35 GMT. The telemetry channels recorded were: 02, 22, 23, 30, 32, 43 and 54.

* Thanks for reports **

JA2WO, ON7VQ, JA2GSD, ON6UG, HB9RJV, F1GRR.

Thanks for the encouragements and suggestions received regarding the UoSAT-B project.

** OSCAR-10 orbital elements ** (from Phil Karn, KA9Q)

```
Satellite: oscar-10
Catalog number: 14129
Epoch time:       83297.73726304
   Mon Oct 24 17:41:39.527 1983 UTC
Element set:      53
Inclination:        25.9727 deg
RA of node:        234.6430 deg
Eccentricity:     0.6063802
Arg of perigee:    213.9544 deg
Mean anomaly:       85.8060 deg
Mean motion:     2.05852306 rev/day
Decay rate:          -8e-08 rev/day↑2
Epoch rev:              274
Semi major axis: 26105.863 km
Anom period:     699.530663 min
Apogee:           35559.076 km
Perigee:           3898.919 km
Translate freq:    581.0047 mhz
Invert:                   1
Beacon:            145.8100 mhz


Satellite: oscar-9
Catalog number: 12888
Epoch time:       83297.85250403
   Mon Oct 24 20:27:36.348 1983 UTC
Element set:      531
Inclination:        97.5617 deg
RA of node:        264.6840 deg
Eccentricity:     0.0002171
Arg of perigee:    181.7157 deg
Mean anomaly:      178.4104 deg
Mean motion:    15.23478639 rev/day
Decay rate:       4.417e-05 rev/day↑2
Epoch rev:            11353
Semi major axis:  6870.462 km
Anom period:      94.520524 min
Apogee:             493.827 km
Perigee:            490.844 km
Beacon:            145.8250 mhz
```

** Spacecraft orbital data **

Orbits for 11th November

	UoSAT	OSCAR-8	NOAA-8	
Orbit no :	11621	28981	3241	
Eqx time :	14:03:14	15:23:48	14:45:54	GMT
Eqx long :	338.9	308.5	288.7	deg.w
Mean hgt :	498.6	904.0	850.0	km
Period :	94.5717571	103.1644582	101.2705310	mins
P-drag :	4.171E-05	8.277E-07	9.000E-06	%N-ref
Long inc :	23.6419032	25.7899720	25.3193518	degs
L-drag :	1.049E-05	.000E+00	2.000E-07	%N-ref

Reception reports and UoSAT data is much appreciated
Send to: UoSAT team, University of Surrey, Guildford, Surrey, England - Thank you

B>

UoSAT Spacecraft Control Centre
University of Surrey, Guildford, Surrey, England
****

Frame counter : 0169 received by DB2OS

**** UoSAT Bulletin-51 18th November 1983 ****

** UoSAT-1 Weekend bulletins **

UoSAT-1 bulletin listeners will have noticed that the amount of new information carried on the bulletin each week has been decreasing. This is due to the increasing workload of the UoSAT team at Guildford, and must be expected to continue until the New Year. Detailed specifications of the UoSAT-B spacecraft will not be posted until they have been finalised in flight versions; data on the primary systems will appear first sometime in January, followed by the experimental systems as our workload permits.

** UoSAT-B Spacecraft status **

* A formal letter was received from NASA-HQ recently giving final approval of NASA support for the UOSAT-B Mission - many thanks are due to all who have worked for this result.

* The UOSAT-B Spacecraft Structural Model sompleted a Fit-check with the DELTA launch Vehicle successfully at McDonnell Douglas, Huntingdon Beach, California last week, 30th October. UOSAT-B is currently scheduled for launch on a DELTA 2920 as a secondary payload alongside LANDSAT-4 no earlier than 1st March 1984.

* Following the fit-check, G3YJO and G6BTU travelled to the launch site at WTR, Vandenberg, to inspect the spacecraft preparation areas and to plan the launch campaign. They also had the pleasure of meeting with W6SP and KL7GRF for general discussions (and dinner!).

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* G3YJO & G6BTU then travelled to Washington D.C. for discussions with W3GEY and W4PUJ concerning explosive pin-pullers for the boom caging release mechanism, and with LU9HBG concerning the design of the spacecraft Navigation Magnetometer.

* The solar array panel substrates, complete with internal magnetorquer coils, were then taken to Solarex Corp. and a Solar Array Design Review Meeting was held following a tour of the solar cell fabrication facilities. The Flight Array Panels are scheduled to be delivered to UoS by January 1984.

* Fifty NiCd battery cells have been delivered to AMSAT-CANADA for evaluation, a flight pack and a flight spare pack of 10 cells each will be selected from the set following exhaustive tests and matching.

* The development, assembly, test, launch campaign and initial operation of UO-B is being filmed (16mm colour) - if anyone is inderested in videotape or film copies, let us know so that we can organise something at cost only. Same goes for slides - it helps if we have an idea as to demand (if any!).

* Artwork for the CCD and radiation/particle detector memory boards is complete, and boards are working. The particle wave counter / correlator board has been laid out.

* Most 1802 computer experiment interfaces have been prototyped in preparation for PCB layout. The CPU board is complete and being populated and tested. The main I/O board layout is complete.

* The CCD camera analogue PCBs have been laid out.

* The command system prototype testing is nearly completed.

* Layout of the 4 telemetry system boards has commenced.

* The following is a summary of the PLANNED facilities on UO-8, it may be necessary to modify some parameters/facilities depending on schedule!

* Spacecraft Weight: 60 Kg (fly-away weight)

* Spacecraft Mass Properties:

    Center of Gravity: +296 mm from Separation Plane
    Moment of Inertia (Ixx): 2.65 Kgm2
    Moment of Inertia (Iyy): 2.65 Kgm2
    Moment of Inertia (Izz): 1.26 Kgm2
    Lower Bound Laderal First Resonance: 40 Hz
    Lower Bound Axial First Resonance: 120 Hz

* UOSAT-8 Spacecraft Structural Design Philosophy Identical to UOSAT-1

* Spacecraft Body Envelope: 14.0" x 14.0" x 25.4"

* Solar Array Power Output: 30 W Peak
    26 W Average
    17 W Orbit Average

* Batteries: 5.6 AH NiCd (General Elecpric)

* Main Bus Voltage: +14V (Unregulated)

* Regulated Bus Voltages: +10V, -10V, +5V at 10 Watts Total

* Telemetry Capabilities:

    60 Analogue Channels (0 to 999 ADC Range)
    96 Discrete Status Points
    Hardware Programmable Channel Dwell Facility
    Error checksumming switchable on command
    Spacecraft calendar/clock readout facility
    Data Rates: 300, 600, 1200, 2400 BPS

* Telecommand Capabilities:

    104 Discrete Latched Commands
    Direct Ground Control Over Spacecraft
    Autonomous Control of Spacecraft by On-Board Computer
    On-Board Computer Software Loaded/Modified in Orbit Via Telecommand Systeu

* Spacecraft Power Loads Supplied & Monitored by Power Distribution Module

** STS-9 - Ham in Space **

28th November 1983 at 16:00 GMT.

** Spacecraft operations schedule **

The following spacecraft operations schedule is now in use:

Saturday: - 1200 bulletin, telemetry, digitalker, (21MHz)
Sunday: - 1200 bulletin, telemetry, digitalker, (21MHz)
Monday: - High speed, whole orbit radiation scan
Tuesday: - Check-summed telemetry data
Wednesday: - CCD imager data
Thursday: - Whole orbit telemetry data scan
Friday: - Load bulletin, digitalker & telemetry schedule

The current spacecrantp power budget requires the radiation counters and scientific magnetometer loads to be shed in order to run the 2.4GHz beacon, currently scheduled every other weekend.

** Data transmitted last week **

The radiation data transmitted on Monday, 14/11/83 was recorded starting at 14:49:56 GMT.

The CCD transmission on Wednesday was taken at 14:01:55.

The whole-orbit recorded telemetry transmitted on 17/11/83 was recorded starting at 13:40:51 GMT. The telemetry channels recorded were: 02, 22, 23, 30, 32, 43 and 54. Last week's whole orbit telemetry was, of course, transmitted on Thursday, 10th Notember and not Thursday 9th, as recorded last week.

** Thanks for reports **

ON7VQ, JA2GSD, ON6UG, HB9RJV, F1GRR, VK2AVH, JR7IMN, JA2WO.

Thanks for the encouragements and suggestions received regarding the UoSAT-B project.

** OSCAR-10 orbital elements ** (from Phil Karn, KA9Q)

```
Satellite: oscar-10
Catalog number: 14129
Epoch time:       83297.73726304
   Mon Oct 24 17:41:39.527 1983 UTC
Element set:      53
Inclination:        25.9727 deg
RA of node:        234.6430 deg
Eccentricity:     0.6063802
Arg of perigee:    213.9544 deg
Mean anomaly:       85.8060 deg
Mean motion:     2.05852306 rev/day
Decay rate:          -8e-08 rev/day↑2
Epoch rev:              274
Semi major axis: 26105.863 km
Anom period:    699.530663 min
Apogee:          35559.076 km
Perigee:          3898.919 km
Translate freq:   581.0047 mhz
Invert:                  1
Beacon:           145.8100 mhz
```

Satellite: oscar-9
Catalog number: 12888
Epoch time: 83297.85250403
Mon Oct 24 20:27:36.348 1983 UTC
Element set: 531
Inclination: 97.5617 deg
RA of node: 264.6840 deg
Eccentricity: 0.0002171
Arg of perigee: 181.7157 deg
Mean anomaly: 178.4104 deg
Mean motion: 15.23478639 rev/day
Decay rate: 4.417e-05 rev/day↑2
Epoch rev: 11353
Semi major axis: 6870.462 km
Anom period: 94.520524 min
Apogee: 493.827 km
Perigee: 490.844 km
Beacon: 145.8250 mhz

** Spacecraft orbital data **

Orbits for 18th November

	UoSAT	OSCAR-8	NOAA-7	
Orbit no :	11728	29078	12400	
Eqx time :	14:41:35	14:10:45	15:40:48	GMT
Eqx long :	348.1	210.1	36.3	deg.w
Mean hgt :	497.7	904.0	850.0	km
Period :	94.5649840	103.1643779	101.8804000	mins
P-drag :	4.217E-05	8.277E-07	7.500E-06	*N-ref
Long inc :	23.6401961	25.7899720	25.4975200	degs
L-drag :	1.061E-05	.000E+00	2.000E-07	*N-ref

UoSAT Spacecraft Control Centre
University of Surrey, Guildford, Surrey, England
****

Frame counter : 034F received by DB2OS

**** UoSAT Bulletin-52 25th November 1983 ****

** UoSAT-1 Weekend bulletins **

UoSAT-1 bulletin listeners will have noticed that the amount of new information carried on the bulletin each week has been decreasing. This is due to the increasing workload of the UoSAT team at Guildford, and must be expected to continue until the New Year. Detailed specifications of the UoSAT-B spacecraft will not be posted until they have been finalised in flight versions; data on the primary systems will appear first sometime in January, followed by the experimental systems as our workload permits. The primary spacecraft systems will, however, be nearly compatible to those on UoSAT-1, so little work will need to be done on existing ground hardware for the new craft. The telemetry format, whilst similar, will have changed channel allocations and calibration equations, so software modifications will be necessary.

** UoSAT-B Spacecraft status **

* A formal letter was received from NASA-HQ recently giving final approval of NASA support for the UOSAT-B Mission - many thanks are due to all who have worked for this result.

* The UOSAT-B Spacecraft Structural Model completed a Fit-check with the DELTA launch Vehicle successfully at McDonnell Douglas, Huntingdon Beach, California last week, 30th October. UOSAT-B is currently scheduled for launch on a DELTA 2920 as a secondary payload alongside LANDSAT-4 no earlier than 1st March 1984.

* Fifty NiCd battery cells have been delivered to AMSAT-CANADA for evaluation, a flight pack and a flight spare pack of 10 cells each will be selected from the set following exhaustive tests and matching. The initial labelling and X-raying have been completed; this will be followed in the next week by a battery of automated electrical tests.

* Artwork for the CCD and radiation/particle detector memory board[is complete, and boards are working. The particle wave counter / correlator board has been populated.

* The 1802 computer is progressing well. The CPU and main I/O board are populated and the 4116 memory board layout is nearly complete.

* The CCD camera analogue and digital PCBs have been laid out.

* The command system prototype testing is nearly completed.

* Layout of 2 of the 4 telemetry system boards is complete.

* The following is a summary of the PLANNED facilities on UO-B, it may be necessary to modify some parameters/facilities depending on schedule!

* Spacecraft Weight: 60 Kg (fly-away weight)

* Spacecraft Mass Properties:

Center of Gravity: +296 mm from Separation Plane
Moment of Inertia (Ixx): 2.65 Kgm2
Moment of Inertia (Iyy): 2.65 Kgm2
Moment of Inertia (Izz): 1.26 Kgm2
Lower Bound Lateral First Resonance: 40 Hz
Lower Bound Axial First Resonance: 120 Hz

* UOSAT-B Spacecraft Structural Design Philosophy Identical to UOSAT-1

* Spacecraft Body Envelope: 14.0" x 14.0" x 25.4"
* Solar Array Power Output: 30 W Peak
26 W Average
17 W Orbit Average

* Batteries: 5.6 AH NiCd (General Electric)

* Main Bus Voltage: +14V (Unregulated)

* Regulated Bus Voltages: +10V, -10V, +5V at 10 Watts Total

* Telemetry Capabilities:

60 Analogue Channels (0 to 999 ADC Range)
96 Discrete Status Points
Hardware Programmable Channel Dwell Facility
Error checksumming switchable on command
Spacecraft calendar/clock readout facility
Data Rates: 300, 600, 1200, 2400 BPS

* Telecommand Capabilities:

104 Discrete Latched Commands
Direct Ground Control Over Spacecraft
Autonomous Control of Spacecraft by On-Board Computer
On-Board Computer Software Loaded/Modified in Orbit Via Telecommand System

* Spacecraft Power Loads Supplied & Monitored by Power Distribution Module

** STS-9 - Ham in Space **

The latest announced launch date for the STS-9 mission is now 28th November 1983 at 16:00 GMT.

The following has been received from W9KDR at ARRL:

NASA HAS ANNOUNCED MORE DETAILS OF W5LFL'S STS9 OPERATING SCHEDULE. THESE ARE THE ORBITS, AQUISITION OF SIGNAL, LOS OF SIGNAL AND AREA COVERED.IN THE TABLE, THE ORBIT NUMBER IS FOLLOWED BY AN "A" OR "D. "A IS FOR ASCENDING AND "D" IS FOR', DECENDING. THE TIME, D (DAYS), HH (HOURS). AND MM (MINUTES), IS EXPRESSED IN MISSION ELAPSED TIME (MET) AND CAN BE CALCULATED BY ADDING THIS AMOUNT OF TIME TO YOUR ACTUAL LOCAL LAUNCH TIME.

ORBIT #	AOS D	MET HH	MET MM	LOS D	MET HH	MET MM	AREA	
034A	2	01	10	2	01	25	CENTRAL US	
035A	2	02	43	2	03	00	WESTERN US	
039D	2	09	00	2	09	25	CENTRAL US	
040D	2	10	33	2	10	45	WESTERN US	
049A	2	23	27	2	23	47	EASTERN US & MEXICO	
056D	3	10	15	3	10	32	WESTERN US & MEXICO	
070D	4	07	05	4	07	25	EASTERN US	
071D	4	08	35	4	08	55	CENTRAL US	
074D	4	10	10	4	10	25	WESTERN US	
092D	5	15	55	5	16	05	JAPAN	
093A	5	17	00	5	17	20	SPAIN & EUROPE	0900 – 0920, TAG6
094A	5	18	44	5	18	50	ENGLAND & EUROPE	1041 – 1050, TAG6
094D	5	19	11	5	19	26	AUSTRAILIA	
097A	5	22	55	5	23	23	CENTRAL US	
097D	5	23	28	5	23	40	EUROPE	1528 - 1540, TAG6
098A	6	00	30	6	00	48	WESTERN US	
0108D	6	15	46	6	15	56	JAPAN	
0109A	6	16	48	6	17	04	SPAIN AND EUROPE	0848 - 0904, TAG7
0110A	6	18	24	6	18	36	EUROPE	1024 - 1036 TAG7
0110d	6	19	04	6	19	14	ASIA	
0113A	6	22	42	6	23	05	CENTRAL US	
0114A	7	00	15	7	00	31	WESTERN US	
0119D	7	08	07	7	08	20	WESTERN US	
0125A	7	16	42	7	16	50	SPAIN & EUROPE	0842 – 0850 TAG8
0126A	7	18	17	7	18	24	EUROPE	1017 – 1024 TAG8
0126D	7	16	52	7	19	02	AUSTRAILIA	
0129A	7	22	29	7	22	50	CENTRAL US	
0130A	8	00	10	8	00	20	WESTERN US	
0132D	8	03	00	8	03	12	CANADA	
0133D	8	04	44	8	05	06	NORTHEASTERN US	
0134D	8	06	18	8	06	48	CENTRAL US	
0135D	8	07	45	8	08	07	WESTERN US	

QSL TO: ARRL, 225 MAIN ST, NEWINGTON CT. PLEASE SEND S.A.S.E AND MARK ENVELOPE QSO OR RECEPTION REPORT.

** Spacecraft operations schedule **

The following spacecraft operations schedule is now in use:

Saturday: - 1200 bulletin, telemetry, digitalker, (2.4GHz)
Sunday: - 1200 bulletin, telemetry, digitalker, (2.4GHz)
Monday: - High speed, whole orbit radiation scan
Tuesday: - Check-summed telemetry data
Wednesday: - CCD imager data
Thursday: - Whole orbit telemetry data scan
Friday: - Load bulletin, digitalker & telemetry schedule

The current spacecraft power budget requires the radiation counters and scientific magnetometer loads to be shed in order to run the 2.4GHz beacon, currently scheduled every other weekend.

** Data transmitted last week **

The radiation data transmitted on Monday, 21/11/83 was recorded starting at 13:54:17 GMT.

The CCD transmission on Wednesday was taken at 13:07:31.

The whole-orbit recorded telemetry transmitted on 24/11/83 was recorded starting at 14:17:46 GMT. The telemetry channels recorded were: 02, 22, 23, 30, 32, 43 and 54.

** Thanks for reports **

VK2AVH, JR7IMN, JA2WO, F1GRR, W7AVE (Thanks for the cheque).

** OSCAR-10 orbital elements ** (from Phil Karn, KA9Q)

```
Satellite: oscar-10
Catalog number: 14129
Epoch time:       83307.93122594
   Thu Nov  3 22:20:57.921 1983 UTC
Element set:      55
Inclination:        25.9719 deg
RA of node:        232.9263 deg
Eccentricity:     0.6066485
Arg of perigee:    216.8037 deg
Mean anomaly:       80.1580 deg
Mean motion:    2.05853161 rev/day
Decay rate:        -3.6e-07 rev/day^2
Epoch rev:              295
Semi major axis: 26105.793 km
Anom period:    699.527757 min
Apogee:          35566.160 km
Perigee:          3892.080 km
Translate freq:   581.0047 mhz
Invert:                  1
Beacon:           145.8100 mhz

Satellite: oscar-9
Catalog number: 12888
Epoch time:       83311.05387724
   Mon Nov  7 01:17:34.994 1983 UTC
Element set:      537
Inclination:        97.5624 deg
RA of node:        277.9894 deg
Eccentricity:     0.0003382
Arg of perigee:    141.0505 deg
Mean anomaly:      219.0951 deg
Mean motion:   15.23611927 rev/day
Decay rate:       4.258e-05 rev/day^2
Epoch rev:            11554
Semi major axis:  6870.061 km
Anom period:     94.512256 min
Apogee:            502.544 km
Perigee:           497.897 km
Beacon:           145.8250 mhz
```

** Spacecraft orbital data **

Orbits for 25th November

	UoSAT	OSCAR-8	NOAA-8	
Orbit no :	11835	29176	3440	
Eqx time :	15:20:08	14:40:51	15:07:31	GMT
Eqx long :	357.5	297.5	295.2	deg.w
Mean hgt :	497.7	904.0	850.0	km
Period :	94.5604712	103.1642968	101.2937500	mins
P-drag :	4.217E-05	8.277E-07	9.000E-06	*N-ref
Long inc :	23.6390606	25.7899720	25.3299300	degs
L-drag :	1.061E-05	.000E+00	2.000E-07	*N-ref

An error has been discovered by JA2WO on the NOAA-7 and NOAA-8 orbital elements posted to the bulletin, caused by a different format in the initial data which we use. This has now been corrected. Sorry!!

Reception reports and UoSAT data is much appreciated
Send to: UoSAT team, University of Surrey, Guildford, Surrey, England - Thank you

UoSAT Spacecraft Control Centre
University of Surrey, Guildford, Surrey, England
****

Frame counter : 036D received by DB2OS

**** UoSAT Bulletin-54 9th December 1983 ****

** UoSAT-B Spacecraft status **

* Construction of the UoSAT-B prototypes and flight components continues apace at the University of Surrey, in the USA, Canada, etc! Only a few PCBs remain to be laid out, and both CAD stations at Surrey are in 24-hour continuous operation to achieve this. As our hour get longer, however, these bulletins get shorter. Sorry.

* Detailed specifications of the UoSAT-B spacecraft will not be posted until they have been finalised in flight versions; data on the primary systems will appear first sometime in January, followed by the experimental systems as our workload permits. The primary spacecraft systems will, however, be nearly compatible to those on UoSAT-1, so little work will need to be done on existing ground hardware for the new craft. The telemetry format, whilst similar, will have changed channel allocations and calibration equations, so software modifications will be necessary.

* A formal letter was received from NASA-HQ recently giving final approval of NASA support for the UOSAT-B Mission - many thanks are due to all who have worked for this result.

* The UOSAT-B Spacecraft Structural Model completed a Fit-check with the DELTA launch Vehicle successfully at McDonnell Douglas, Huntingdon Beach, California last week, 30th October. UOSAT-B is currently scheduled for launch on a DELTA 2920 as a secondary payload alongside LANDSAT-4 no earlier than 1st March 1984.

* Fifty NiCd battery cells have been delivered to AMSAT-CANADA for evaluation, a flight pack and a flight spare pack of 10 cells each will be selected from the set following exhaustive tests and matching. The initial labelling and X-raying have been completed; this is being followed by a battery of automated electrical tests to select a matched group of 10 flight cells and 10 flight spares. The flight spares will be cycled after launch to simulate the cells on the spacecraft and to allow experimental measurements to be made.

* Artwork for the CCD and radiation/particle detector memory boards is complete, and boards are working. The particle wave counter / correlator board has also been tested. Complete testing awaits another board. The memory readout boards are being laid out at present.

* The 1802 computer is progressing well. The CPU and main I/O board are running and the 4116 memory board layout is complete and the board has been made and is being populated. The Digitalker speech synthesiser board layout is nearly complete. Software production can now begin, using an in-circuit emulator with memory-map facilities to replace the 4116 board.

* The CCD camera analogue and digital PCBs have been laid out. Both analogue and digital sections are now under separate test, and will be assembled together shortly.

* The command system prototype testing is complete, awaiting the demodulators and receivers for full uplink simulation and test.

* Layout of all 4 telemetry system boards is complete. The first three telemetry boards have been populated and are under test. The initial two boards contain a basic telemetry system, with the third adding frame headers and the fourth a programmable channel dwell facility.

** UoSAT-1 QSL Cards and UoSAT-8 Stickers **

At long last, the UoSAT-1 QSL cards have been received. We will attempt to send one to all individuals who have sent us a report over the past two years, however the clerical task at this time is somewhat daunting, so for a faster service, please send the UoSAT team a stamped, addressed envelope or an IRC.

A number of coloured UoSAT-2 vinyl stickers have also been produced. These will be sent to all individuals who are involved directly with the project. Others may request a sticker with their QSL card, although a second IRC or similar donation would be appreciated to cover the printing costs.

** Spacecraft operations schedule **

The following spacecraft operations schedule is now in use:

Saturday: - 1200 bulletin, telemetry, digitalker, (2.4GHz)
Sunday: - 1200 bulletin, telemetry, digitalker, (2.4GHz)
Eonday: - High speed, whole orbit radiation scan
Tuesday: - Check-summed telemetry data
Wednesday: - CCD imager data
Thursday: - Whole orbit telemetry data scan
Friday: - Load bulletin, digitalker & telemetry schedule

The current spacecraft power budget requires the radiation counters and scientific magnetometer loads to be shed in order to run the 2.4GHz beacon; currently scheduled every other weekend.

** Data transmitted last week **

The radiation data transmitted on Monday, 05/12/83 was recorded starting at 13:33:42 GMT.

THe CCD transmission on Wednesday was taken at xx:xx:xx.

The whole-orbit recorded telemetry transmitted on 08/12/83 was recorded startiwg at 15:34:17 GMT. The telemetry channels recorded were: 02, 22, 23, 30, 32, 43 and 54.

** Thanks for reports **

G3HMO, JA2GSD, ON6UG, VK2AVH, VE2QO, D. Hudson (AMSAT-UK 523) & Sir William Turner's Sixth Form College.

** OSCAR-10 orbital elements ** (from Phil Karn, KA9Q)

Satellite: oscar-10
Catalog number: 14129
Epoch time: 83330.50000000
Sat Nov 26 12:00:00.000 1983 UTC
Element set: MH 11-29-83
Inclination: 25.9360 deg
RA of node: 229.0200 deg
Eccentricity: 0.6077259
Arg of perigee: 223.0250 deg
Mean anomaly: 245.1830 deg
Mean motion: 2.05851700 rev/day
Decay rate: 0 rev/day↑2
Epoch rev: 341
Semi major axis: 26105.926 km
Anom period: 699.532722 min
Apogee: 35594.933 km
Perigee: 3864.438 km
Translate freq: 581.0047 mhz
Invert: 1
Beacon: 145.8100 mhz

Satellite: oscar-9
Catalog number: 12888
Epoch time: 83315.38837732
Fri Nov 11 09:19:15.800 1983 UTC
Element set: 539
Inclination: 97.5635 deg
RA of node: 282.3590 deg
Eccentricity: 0.0003746
Arg of perigee: 131.7409 deg
Mean anomaly: 228.4159 deg
Mean motion: 15.23667240 rev/day
Decay rate: 5.883e-05 rev/day↑2
Epoch rev: 11620
Semi major axis: 6869.894 km
Anom period: 94.508825 min
Apogee: 506.023 km
Perigee: 500.876 km
Beacon: 145.8250 mhz

** Spacecraft orbital data **

Orbits for 9th December

	UoSAT	OSCAR-8	NOAA-8	
Orbit no :	12048	29372	3639	
Eqx time :	15:00:43	15:41:02	15:04:48	GMT
Eqx long :	352.4	312.3	295.9	deg.w
Mean hgt :	497.7	904.0	850.0	km
Period :	94.5514878	103.1641346	101.2919590	mins
P-drag :	4.217E-05	8.277E-07	9.000E-06	*N-ref
Long inc :	23.6368002	25.7899720	25.3298902	degs
L-drag :	1.061E-05	.000E+00	2.000E-07	*N-ref

Reception reports and UoSAT data is much appreciated
Send to: UoSAT team, University of Surrey, Guildford, Surrey, England - Thank you

VoSAT Spacecraft Control Centre
University of Surrey, Guildford, Surrey, England
****

Frame counter : 017E received by DB2OS

**** VoSAT Bulletin-56 23rd December 1983 ****

** Season's Greetings **

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The VoSAT team wishes everyone the complements of the season, and looks forward to another year of exciting activity in the Amateur Space Programme in 1984.

73's de Martin, Roger, Neville, Ian, Mac, Stephen, Lui, Mike, Colin, Christine, Richard, Bob, Bob (2), Roy, Bert, and everyone else involved at the University of Surrey.

** VoSAT-B Spacecraft status **

* Construction of the VoSAT-B prototypes and flight components continues apace at the University of Surrey, in the USA, Canada, etc! All prototype PCBs have now been laid out and all outstanding boards except two have now been returned for population. The effects of the Christmas holiday at many of our suppliers could delay the final construction of a number of boards, although outstanding service by some has eased the problem somewhat.

* Detailed specifications of the VoSAT-B spacecraft will not be posted until they have been finalised in flight versions; data on the primary systems will appear first sometime in January, followed by the experimental systems as our workload permius. The primary spacecraft systems will, however, be nearly compatible to those on VoSAT-1, so little work will need to be done on existing ground hardware for the new craft. The telemetry format, whilst similar, will have changed channel allocations and calibration equations, so software modifications will be necessary.

* Fifty NiCd battery cells have been delivered to Ottawa for evaluation, a flight pack and a flight spare pack of 10 cells each have been selected from the set following exhaustive tests and matching. The flight cells are currently being shipped to Surrey for mounting in a pack and integrating with the spacecraft framework. The flight spares will be Ecycled after launch to simulate the cells on the spacecraft and to allow experimental measurements to be made. When the battery selection is complete, a report of their findings on Nickel-Cadmium battery selection and testing will be produced; this is likely to be of interest to a wide range of Ni-Cd users.

The Canadian group would like us to stress that they are also closely affiliated to the VITA (Volunteers in Technical Assistance) organisation, and that the work which they are doing for UoSAT-B and PACSAT is of great importance to that organisation as well as the radio amateur service.

* Artwork for the CCD and radiation/particle detector memory boards is complete, and boards are working. The particle wave counter / correlator board has also been tested. Complete testing awaits the memory readout boards, which have been laid out.

* The 1802 computer is progressing well. The CPU, main I/O board and 4116 memory board are running well . The Digitalker speech synthesiser board is under test and working, if not yet perfect. Software production has now begun, using an in-circuit emulator with memory-map facilities to replace the 4116 board. Minor complications with some of the I/O ports when driven by the emulator have held up some of this development, but the fault was traced to a bug on the I/O board which has been corrected.

* The CCD camera analogue and digital PCBs have been laid out. Both analogue and digital sections have been tested separately and the two sections have now been connected. Minor problems with some of the very high speed circuitry have yet to be rectified and a suitable display device will be added shortly.

* The command system prototype testing is complete, comprising the demodulators, command decoder and output latches. Some 112 commands are available to control the rest of the spacecraft. The receivers are now awaited for full uplink simulation and test. The antenna hybrids are being prototyped.

* Layout of all 4 telemetry system boards is complete. All four have been populated and are working well. The initial two boards contain a basic telemetry system, with the third adding frame headers and the fourth a programmable channel dwell facility. The dwell facility allows total re-organisation of any part of the telemetry frame, for use either in specialised situations for rapidly scanning a number of channels or just to confuse the listening audience!

** UoSAT-1 QSL Cards and UoSAT-B Stickers **
At long last, the UoSAT-1 QSL cards have been received. We will attempt to send one to all individuals who have sent us a report over the past two years, however the clerical task at this time is somewhat daunting, so for a faster service, please send the UoSAT team a stamped, addressed envelope or an IRC.

A number of coloured UoSAT-2 vinyl stickers have also been produced. These will be sent to all individuals who are involved directly with the project. Others may request a sticker with their QSL card, although a second IRC or similar donation would be appreciated to cover the printing costs.

** Spacecraft operations schedule **

The following spacecraft operations schedule is now in use:

Saturday: - 1200 bulletin, telemetry, digitalker, (2.4GHz)
Sunday: - 1200 bulletin, telemetry, digitalker, (2.4GHz)
Monday: - 1200 bulletin, Telemetry, Digitalker, (2.4GHz)
Tuesday: - Check-summed telemetry data
Wednesday: - CCD imager data
Thursday: - Whole orbit telemetry data scan
Friday: - Load bulletin, digitalker & telemetry schedule

The UoSAT team will be taking one or two days holiday over this weekend, so a 'normal' schedule will be resumed on Tuesday for anyone else who does not have the opportunity to listen to the spacecraft during the week.

The current spacecraft power budget requires the radiation counters and scientific magnetometer loads to be shed in order to run the 2.4GHz beacon, currently scheduled every other weekend.

** Data transmitted last week **

The radiation data transmitted on Monday, 19/12/83 was recorded starting at 16:19:14 GMT.

The CCD transmission on Wednesday was taken at 14:01:09.

The whole-orbit recorded telemetry transmitted on 22/12/83 was recorded starting at 16:50:05 GMT. The telemetry channels recorded were: 02, 22, 23, 30, 32, 43 and 54.

** Thanks for reports **

Birger Lindholm, G8TZJ, F9XG, F1GRR, K2AVH, ZR1KE, ON6UG, K1KSY.

QSL Cards are on their way.

** OSCAR-10 orbital elements ** (from Phil Karn, KA9Q)

Satellite:	oscar-10	
Catalog number:	14129	
Epoch time:	83330.50000000	
	Sat Nov 26 12:00:00.000 1983 UTC	
Element set:	MH 11-29-83	
Inclination:	25.9360	deg
RA of node:	229.0200	deg
Eccentricity:	0.6077259	
Arg of perigee:	223.0250	deg
Mean anomaly:	245.1830	deg
Mean motion:	2.05851700	rev/day
Decay rate:	0	rev/day↑2
Epoch rev:	341	
Semi major axis:	26105.926	km
Anom period:	699.532722	min
Apogee:	35594.933	km
Perigee:	3864.438	km
Translate freq:	581.0047	mhz
Invert:	1	
Beacon:	145.8100	mhz

Satellite: oscar-9
Catalog number: 12888
Epoch time: 83315.38837732
Fri Nov 11 09:19:15.800 1983 UTC
Element set: 539
Inclination: 97.5635 deg
RA of node: 282.3590 deg
Eccentricity: 0.0003746
Arg of perigee: 131.7409 deg
Mean anomaly: 228.4159 deg
Mean motion: 15.23667240 rev/day
Decay rate: 5.883e-05 rev/day↑2
Epoch rev: 11620
Semi major axis: 6869.894 km
Anom period: 94.508825 min
Apogee: 506.023 km
Perigee: 500.876 km
Beacon: 145.8250 mhz

** Spacecraft orbital data **

Orbits for 23rd December

	VoSAT	OSCAR-8	NOAA-8	
Orbit no :	12261	29567	3838	
Eqx time :	14:39:44	14:58:02	15:01:43	GMT
Eqx long :	347.0	301.4	296.5	deg.w
Mean hgt :	496.9	904.0	850.0	km
Period :	94.5449878	103.1639732	101.2901680	mins
P-drag :	3.926E-05	8.277E-07	9.000E-06	*N-ref
Long inc :	23.6351680	25.7899720	25.3298504	degs
L-drag :	9.879E-06	.000E+00	2.000E-07	*N-ref

Reception reports and VoSAT data is much appreciated
Send to: VoSAT team, University of Surrey, Guildford, Surrey, England - Thank you

UoSAT Spacecraft Control Centre
University of Surrey, Guildford, Surrey, England
****

Frame counter : 0346 received by DB2OS

**** UoSAT Bulletin-57 30rd December 1983 ****

** Season's Greetings **

The UoSAT team wishes everyone a Happy New Year, and looks forward to another year of exciting activity in the Amateur Space Programme in 1984.

73's de Martin, Roger, Neville, Ian, Mac, Stephen, Lui, Mike, Colin, Christine, Richard, Bob, Bob (2), Roy, Bert, and everyone else involved at the University of Surrey.

** UoSAT-B Spacecraft status **

* Construction of the UoSAT-B prototypes and flight components continues apace at the University of Surrey, in the USA, Canada, etc! All prototype PCBs have now been laid out and all outstanding boards except two have now been returned for population. The effects of the Christmas holiday at many of our suppliers could delay the final construction of a number of boards, although outstanding service by some has eased the problem somewhat.

* Detailed specifications of the UoSAT-B spacecraft will not be posted until they have been finalised in flight versions; data on the primary systems will appear first sometime in January, followed by the experimental systems as our workload permits. The primary spacecraft systems will, however, be nearly compatible to those on UoSAT-1, so little work will need to be done on existing ground hardware for the new craft. The telemetry format, whilst similar, will have changed channel allocations and calibration equations, so software modifications will be necessary.

* We have received a small amount of criticism over the past few weeks that not enough information has been distributed about UoSAT-B. It is felt, however, that a correct set of data, released in a controlled manner at the end of this hectic construction phase, will be more useful than a piecemeal approach now. Please be patient!

* Fifty NiCd battery cells have been delivered to Ottawa for evaluation, a flight pack and a flight spare pack of 10 cells each have been selected from the set following exhaustive tests and matching. The flight cells and flight spares have now arrived at Surrey for mounting in a pack and integrating with the spacecraft framework. The flight spares will be cycled after launch to simulate the cells on the spacecraft and to allow experimental measurements to be made. When the battery selection is complete, a report of their findings on Nickel-Cadmium battery selection and testing will be produced; this is likely to be of interest to a wide range of Ni-Cd users.

The Canadian group would like us to stress that they are also closely affiliated to the VITA (Volunteers in Technical Assistance) organisation, and that the work which they are doing for UoSAT-B and PACSAT is of great importance to that organisation as well as the radio amateur service.

* A harness test set for the Digital Communications Experiment (DCE) currently under construction in the USA and Canada has also arrived at Surrey and will be used to check that section of the UoSAT-B harness. The harness is being constructed on a 3-dimensional model as flight boards are produced and final wiring details confirmed.

* Artwork for the CCD and radiation/particle detector memory boards is complete, and boards are working. The particle wave counter / correlator board has also been tested. Complete testing awaits the memory readout boards, which are currently being populated after all the horizontal tracks on one side were hand-wired following a problem at the PCB production stage which could not be rectified before Christmas.

* The 1802 computer is progressing well. The CPU, main I/O board, Digitalker speech synthesiser board and 4116 memory board are running well . Software production has now begun, using an in-circuit emulator. Minor complications with some of the I/O ports when driven by the emulator have held up some of this development, but the fault was traced to a bug on the I/O board which has been corrected.

* The CCD camera analogue and digital PCBs have been laid out. Both analogue and digital sections have been tested separately and the two sections have now been connected. Minor problems with some of the very high speed circuitry have yet to be rectified and a suitable display device will be added this weekend.

* The command system prototype testing is complete, comprising the demodulators, command decoder and output latches. Some 112 commands are available to control the rest of the spacecraft. The receivers are now awaited for full uplink simulation and test. The antenna hybrids are being prototyped.

* Layout of all 4 telemetry system boards is complete. All four have been populated and are working well. The initial two boards contain a basic telemetry system, with the third adding frame headers and the fourth a programmable channel dwell facility. The dwell facility allows total re-organisation of any part of the telemetry frame, for use either in specialised situations for rapidly scanning a number of channels or just to confuse the listening audience! Population of the flight telemetry boards has begun.

** UoSAT-1 QSL Cards and UoSAT-B Stickers **

At long last, the UoSAT-1 QSL cards have been received. We will attempt to send one to all individuals who have sent us a report over the past two years, however the clerical task at this time is somewhat daunting, so for a faster service, please send the UoSAT team a stamped, addressed envelope or an IRC.

A number of coloured UoSAT-2 vinyl stickers have also been produced. These will be sent to all individuals who are involved directly with the project. Others may request a sticker with their QSL card, although a second IRC or similar donation would be appreciated to cover the printing costs.

** Spacecraft operations schedule **

The following spacecraft operations schedule is now in use:

Saturday:	- 1200 bulletin, telemetry, digitalker, (21MHz)
Sunday:	- 1200 bulletin, telemetry, digitalker, (21MHz)
Monday:	- Whole orbit fast-scan radiation data
Tuesday:	- Check-summed telemetry data
Wednesday:	- CCD imager data
Thursday:	- Whole orbit telemetry data scan
Friday:	- Load bulletin, digitalker & telemetry schedule

The current spacecraft power budget requires the radiation counters and scientific magnetometer loads to be shed in order to run the 2.4GHz beacon, currently scheduled every other weekend.

** Data transmitted last week **

The CCD transmission on Wednesday was taken at 14:41:10. Although this was the second exposure on this day, we have taken more totally dark images than usual, recently. It is not yet known whether this is due to an exposure level problem or to a pointing error caused by a seasonal change and less time to analyse the navigation data. Investigation will proceed as time allows.

The whole-orbit recorded telemetry transmitted on 29/12/83 was recorded starting at 12:45:01 GMT. The telemetry channels recorded were: 02, 22, 23, 30, 32, 43 and 54. We will change the channels in the New Year. Let us know if you have any preferences.

** Thanks for reports **

Birger Lindholm, G8TZJ, F9XG, F1GRR, VK2AVH, ZR1KE, ON6UG, K1KSY, DL1CF.

QSL Cards are on their way.

** OSCAR-10 orbital elements ** (from Phil Karn, KA9Q)

Satellite:	oscar-10	
Catalog number:	14129	
Epoch time:	83330.50000000	
	Sat Nov 26 12:00:00.000 1983 UTC	
Element set:	MH 11-29-83	
Inclination:	25.9360	deg
RA of node:	229.0200	deg
Eccentricity:	0.6077259	
Arg of perigee:	223.0250	deg
Mean anomaly:	245.1830	deg
Mean motion:	2.05851700	rev/day
Decay rate:	0	rev/day↑2
Epoch rev:	341	
Semi major axis:	26105.926	km
Anom period:	699.532722	min
Apogee:	35594.933	km
Perigee:	3864.438	km
Translate freq:	581.0047	mhz
Invert:	1	
Beacon:	145.8100	mhz

Satellite: oscar-9
Catalog number: 12888
Epoch time: 83315.38837732
Fri Nov 11 09:19:15.800 1983 UTC
Element set: 539
Inclination: 97.5635 deg
RA of node: 282.3590 deg
Eccentricity: 0.0003746
Arg of perigee: 131.7409 deg
Mean anomaly: 228.4159 deg
Mean motion: 15.23667240 rev/day
Decay rate: 5.883e-05 rev/day↑2
Epoch rev: 11620
Semi major axis: 6869.894 km
Anom period: 94.508825 min
Apogee: 506.023 km
Perigee: 500.876 km
Beacon: 145.8250 mhz

** Spacecraft orbital data **

Orbits for 30th December

	VoSAT	OSCAR-8	NOAA-7	
Orbit no :	12368	29665	12992	
Eqx time :	15:15:49	15:28:06	15:22:04	GMT
Eqx long :	355.9	308.8	359.2	deg.w
Mean hgt :	496.9	904.0	850.0	km
Period :	94.5407865	103.1638921	101.9644850	mins
P-drag :	3.926E-05	8.277E-07	7.500E-06	*N-ref
Long inc :	23.6341108	25.7899720	25.4898316	degs
L-drag :	9.879E-06	.000E+00	2.000E-07	*N-ref

Reception reports and VoSAT data is much appreciated
Send to: VoSAT team, University of Surrey, Guildford, Surrey, England - Thank you

UoSAT Spacecraft Control Centre
University of Surrey, Guildford, Surrey, England
****

Frame counter : 0310 received by DB2OS

**** UoSAT Bulletin-58 6th January 1984 ****

** UoSAT-B Spacecraft status **

* Most time has been taken up this week building flight PCBs and resolving interface problems between the prototype systems.

* Detailed specifications of the UoSAT-B spacecraft will not be posted until they have been finalised in flight versions; data on the primary systems will appear first sometime in January, followed by the experimental systems as our workload permits. The primary spacecraft systems will, however, be nearly compatible to those on UoSAT-1, so little work will need to be done on existing ground hardware for the new craft. The telemetry format, whilst similar, will have changed channel allocations and calibration equations, so software modifications will be necessary.

* We have received a small amount of criticism over the past few weeks that not enough information has been distributed about UoSAT-B. It is felt, however, that a correct set of data, released in a controlled manner at the end of this hectic construction phase, will be more useful than a piecemeal approach now. Please be patient!

* Fifty NiCd battery cells have been delivered to Ottawa for evaluation, a flight pack and a flight spare pack of 10 cells each have been selected from the set following exhaustive tests and matching. The flight cells and flight spares have now arrived at Surrey for mounting in a pack and integrating with the spacecraft framework. The flight spares will be cycled after launch to simulate the cells on the spacecraft and to allow experimental measurements to be made. When the battery selection is complete, a report of their findings on Nickel-Cadmium battery selection and testing will be produced; this is likely to be of interest to a wide range of Ni-Cd users.

The Canadian group would like us to stress that they are also closely affiliated to the VITA '(Volunteers in Technical Assistance) organisation, and that the work which they are doing for UoSAT-B and PACSAT is of great importance to that organisation as well as the radio amateur service.

* A harness test set for the Digital Communications Experiment (DCE) currently under construction in the USA and Canada has also arrived at Surrey and will be used to check that section of the UoSAT-B harness. The harness is being constructed on a 3-dimensional model as flight boards are produced and final wiring details confirmed.

* Artwork for the CCD and radiation/particle detector memory boards is complete, and boards are working. The particle wave counter / correlator board has also been tested. Complete testing awaits the memory readout boards, which are currently being populated after all the horizontal tracks on one side were hand-wired following a problem at the PCB production stage which could not be rectified before Christmas.

* The 1802 computer is progressing well. The CPU, main I/O board, Digitalker speech synthesiser board and 4116 memory board are running well. 32kb of 4416 DRAM has been added to the 16kb of 4116 memory, enabling the computer to store more whole-orbit and experimental data. Software production has now begun, using an in-circuit emulator. Minor complications with some of the I/O ports when driven by the emulator have held up some of this development, but the fault was traced to a bug on the I/O board which has been corrected.

* The CCD camera analogue and digital PCBs have been laid out. Both analogue and digital sections have been tested separately and the two sections have now been connected. Minor problems with some of the very high speed circuitry have yet to be rectified and a suitable display device, specially constructed by G4GPQ has been added. This allows images to be offloaded at a 4MHz rate from the CCD directly to a video display thereby allowing interactive assesment of the image quality.

* The command system prototype testing is complete, comprising the demodulators, command decoder and output latches. Some 112 commands are available to control the rest of the spacecraft. The receivers are now awaited for full uplink simulation and test. The antenna hybrids are being prototyped.

* Layout of all 4 telemetry system boards is complete. All four have been populated and are working well. The initial two boards contain a basic telemetry system, with the third adding frame headers and the fourth a programmable channel dwell facility. The dwell facility allows total re-organisation of any part of the telemetry frame, for use either in specialised situations for rapidly scanning a number of channels or just to confuse the listening audience! Population of the flight telemetry boards has begun, with two now completed.

** UoSAT-1 QSL Cards and UoSAT-B Stickers **

At long last, the UoSAT-1 QSL cards have been received. We will attempt to send one to all individuals who have sent us a report over the past two years, however the clerical task at this time is somewhat daunting, so for a faster service, please send the UoSAT team a stamped, addressed envelope or an IRC.

A number of coloured UoSAT-2 vinyl stickers have also been produced. These will be sent to all individuals who are involved directly with the project. Others may request a sticker with their QSL card, although a second IRC or similar donation would be appreciated to cover the printing costs.

** Spacecraft operations schedule **

The following spacecraft operations schedule is now in use:

Saturday: - 1200 bulletin, telemetry, digitalker, (2.4GHz)
Sunday: - 1200 bulletin, telemetry, digitalker, (2.4GHz)
Monday: - Whole orbit fast-scan radiation data
Tuesday: - Check-summed telemetry data
Wednesday: - CCD imager data
Thursday: - Whole orbit telemetry data scan
Friday: - Load bulletin, digitalker & telemetry schedule

The current spacecraft power budget requires the radiation counters and scientific magnetometer loads to be shed in order to run the 2.4GHz beacon, currently scheduled every other weekend.

** Data transmitted last week **

The whole-orbit radiation data was recorded on Monday, 2/1/84 at 12:55:45.

The CCD transmission on Wednesday was blank, again, as have been the last few week's. It is not yet known whether this is due to an exposure level problem or to a pointing error caused by a seasonal change and less time to analyse the navigation data. Investigation will proceed as time allows.

The whole-orbit recorded telemetry transmitted on 5/1/84 was recorded starting at 14:52:10 GMT. The telemetry channels recorded were: 02, 22, 23, 30, 32, 43 and 54. We will change the channels next week. Let us know if you have any preferences.

** Thanks for reports **

DL1CF, G3OKS, ON7VQ, F6BVP, OB2OS, ZL1AOX, G4OCR, JA2GSD, ON6UG, JR7IMN, VK2AVH,aVK5HI, VK2WB, N5AHD.

QSL Cards are on their way.

We really appreciate the feedback which we receive, as well as the news of your experimental and groundstation activities. Initial technical information will be sent to all recent correspondents when this is ready.

** Orbital elements ** (from Phil Karn, KA9Q,
Bob Diersing, N5AHD,
Ron Dunbar, W0PN
)

Satellite: oscar-10
Catalog number: 14129
Epoch time: 84001.67617120
Sun Jan 1 16:13:41.192 1984 UTC
Element set: MH 1-3-84
Inclination: 25.8370 deg
RA of node: 222.8130 deg
Eccentricity: 0.6084848
Arg of perigee: 233.3550 deg
Mean anomaly: 54.0540 deg
Mean motion: 2.05854161 rev/day
Decay rate: 0 rev/day†2
Epoch rev: 416
Semi major axis: 26105.730 km
Anom period: 699.524359 min
Apogee: 35615.140 km
Perigee: 3845.260 km
Translate freq: 581.0047 mhz
Invert: 1
Beacon: 145.8100 mhz

Satellite: oscar-9
Catalog number: 12888
Element Set: 566
Reference Epoch: 83361.09110227
Drag Factor: 0.00002929
Inclination: 97.5703
RAAN: 328.4692
Eccentricity: 0.0003279
Argument of Perigee: 25.8845
Mean Anomaly: 334.2558
Mean Motion: 15.24023366
Revolution of Ref Epoch: 12316

Satellite:	RS-6	RS-7	RS-8
Catalog #:	13002	13001	12998
Epoch :	83355.25873695	83362.6895633	83361.06812312
Elmnt set:	70	137	256
Inclinatn:	82.9594	82.9555	82.9584
RAAN :	233.8584	233.5385	238.8709
Eccen :	0.0050948	0.0023499	0.0019230
Arg/Per :	19.7152	24.0756	144.2347
Mean Anom:	340.5866	336.1380	216.0067
Mean Motn:	12.13557947	12.08674765	12.02939248
Decay :	0.00000004	0.00000004	0.00000004
Orbit # :	8901	8955	8893

** Spacecraft orbital data **

Orbits for 6th January

	VoSAT	OSCAR-8	NOAA-8	
Orbit no :	12474	29762	4037	
Eqx time :	14:18:10	14:14:59	14:58:17	GMT
Eqx long :	341.1	290.4	297.2	deg.w
Mean hgt :	496.9	904.0	850.0	km
Period :	94.5366244	103.1638118	101.2883770	mins
P-drag :	3.926E-05	8.277E-07	9.000E-06	*N-ref
Long inc :	23.6330636	25.7899720	25.3298106	degs
L-drag :	9.880E-06	.000E+00	2.000E-07	*N-sef

Reception reports and VoSAT data is much appreciated
Send to: VoSAT team, University of Surrey, Guildford, Surrey,
England. Thank you

UoSAT Spacecraft Control Centre
University of Surrey, Guildford, Surrey, England
****

Frame counter : 0336 received by DB2OS

**** UoSAT Bulletin-59 02:00 14th January 1984 ****

** UoSAT-B Spacecraft status **

* Most time has been taken up again this week building flight PCBs and resolving interface problems between the prototype systems.

* Detailed specifications of the UoSAT-B spacecraft will not be posted until they have been finalised in flight versions; data on the primary systems will appear first sometime in January, followed by the experimental systems as our workload permits.

* We have received a small amount of criticism over the past few weeks that not enough information has been distributed about UoSAT-B. It is felt, however, that a correct set of data, released in a controlled manner at the end of this hectic construction phase, will be more useful than a piecemeal approach now. Please be patient!

* Harold Price, NK6K, arrived at Surrey on Thursday, 12/1/84 with the flight DCE (Digital Communications Experiment) which he collected in Ottawa, where it was integrated. Final minor hardware modifications were completed on Friday; the module will now be soak-tested prior to integration with the spacecraft structure. Much credit must be given to the US / Canadian team which has constructed this 3-PCB computer system to fit in a module box only 31mm high! This involved such techniques as sinking the CPU crystal into a cut-out in its circuit board. A full list of constructors will be posted when it is complete.

* 10 flight cells selected in Ottawa from an initial set of 50 have been potted into cylindrical holes in an aluminium block, ready for mounting in the central core of the spacecraft. A circuit board containing voltage sensors for each of the 10 cells will be mounted on top of this battery unit. The flight spares will be cycled after launch to simulate the cells on the spacecraft and to allow experimental measurements to be made. When the battery selection is complete, a report of their findings on Nickel-Cadmium battery selection and testing will be produced; this is likely to be of interest to a wide range of Ni-Cd users.

The Canadian group would like us to stress that they are also closely affiliated to the VITA (Volunteers in Technical Assistance) organisation, and that the work which they are doing for UoSAT-B and PACSAT is of great importance to that organisation as well as the radio amateur service.

* The UoSAT-B harness is being constructed on a 3-dimensional model as flight boards are produced and final wiring details confirmed, and inter-module connections are substantially complete. Connections to the experimental modules on the wings, the top and the central core await installation of the harness on the central core.

* The CCD and radiation / particle wave correlator memory system prototype is fully tested. Flight and flight spare boards are now under construction.

* The 1802 computer is progressing well. The CPU, main I/O board, Digitalker speech synthesiser board and 4116 memory board are running. 32kb of 4416 DRAM has been added to the 16kb of 4116 memory, enabling the computer to store more whole-orbit and experimental data. Two bootstraps, one of approx 77? bytes and one of 1019 (1024 max!) have been written and are being burnt into a 2kb CMOS PROM. The smaller loader is similar to the one on UOSAT-1 to load these bulletin programs, while the larger has extra features including switchable uplink and downlink speeds and sources/destinations, as well as more resilience against possible hardware vaults.

* The CCD camera analogue and digital PCBs have been tested separately and the two sections have now been connected. Minor problems with some of the very high speed circuitry have been rectified and a suitable display device, specially constructed by G4GPQ has been added. This allows images to be offloaded at a 4MHz rate from the CCD directly to a video display thereby allowing interactive assesment of the image quality. No lens has yet been used with the prototype boards, however the flight boards are under construction and will be mounted in the special module box as soon as possible so that the lens can be added.

* The command system prototype testing is complete, comprising the demodulators, command decoder and output latches. Some 112 commands are available to control the rest of the spacecraft. The flight spare telecommand system has been constructed for interface testing of the other modules, and the flight boards are under construction.

* Construction of all 4 telemetry system boards is complete. They are now fully functional, and under soak test. The initial two boards contain a basic telemetry system, with the third adding frame headers and the fourth a programmable channel dwell facility. The dwell facility allows total re-organisation of any part of the telemetry frame, for use either in specialised situations for rapidly scanning a number of channels or just to confuse the listening audience! A fault on the dwell command UART, persisting when the device was replaced and also demonstrated on the CCD / radiation memory system, nearly resulted in the scrapping of a whole batch of flight 6402s, since the prototypes (from another manufacturer) all worked. Fortunately, an identical design error made independently by the two module designers was traced as the real cause, the prototype parts being sufficiently tolerant to hide the problem!

** UoSAT-1 QSL Cards and UoSCT-B Stickers **

At long last, the UoSAT-1 QSL cards have been received. We will attempt to send one to all individuals who have sent us a report over the past two years, however the clerical task at this time is somewhat daunting, so for a faster service, please send the UoSAT team a stamped, addressed envelope or an IRC.

A number of coloured UoSAT-2 vinyl stickers have also been produced. These will be sent to all individuals who are involved directly with the project. Others may request a sticker with their QSL card, although a second IRC or similar donation would be appreciated to cover the printing costs.

** Spacecraft operations schedule **

The following spacecraft operations schedule is now in use:

Saturday: - 1200 bulletin, telemetry, digitalker, (21MHz)
Sunday: - 1200 bulletin, telemetry, digitalker, (21MHz)
Monday: - Whole orbit fast-scan radiation data
Tuesday: - Check-summed telemetry data
Wednesday: - Digitalker and 1200bd telemetry.
Thursday: - Whole orbit telemetry data scan
~~Friday: - Load bulletin, digitalker & telemetry schedule~~

The current spacecraft power budget requires the radiation counters and scientific magnetometer loads to be shed in order to run the 2.4GHz beacon, currently scheduled every other weekend.

** Data transmitted last week **

The whole-orbit radiation data was recorded on Monday, 9/1/84 at 15:00:40.

The CCD transmission on Wednesday was blank, again, as have been the last few week's. It is not yet known whether this is due to an exposure level problem or to a pointing error caused by a seasonal change and less time to analyse the navigation data. Investigation will proceed as time allows. For the time being, however, an 1802 program which cycles between Digitalker and 1200bd telemetry will be run each Wednesday. This is also in response to a number of requests from educators for Digitalker transmissions during school times on weekdays.

The whole-orbit recorded telemetry transmitted on 12/1/84 was recorded starting at 13:54:34 GMT. The telemetry channels recorded were: 02, 22, 23, 30, 32, 43 and 54. We ran out of time to change the channels this week, however the ones to look out for next Thursday will be 2,9,22,29,30,32,39. This is in response to observers requesting continuation of the battery voltages and charge currents and the addition of three of the solar array facet temperatures.

** Thanks for reports **

G3OKS, ON7VQ, F6BVP, DB2OS, ZL1AOX, G4OCR, JA2GSD, ON6UG, JR7IMN, VK2AVH, VK5HI, VK2WB, N5AHD, OZ1WN, G8TZJ, G3HMO.

QSL Cards are on their way.

We really appreciate the feedback which we receive, as well as the news of your experimental and groundstation activities. Initial UoSAT-B technical information will be sent to all recent correspondents when this is ready.

~~Technical articles on ground station features, computer applications and data analysis techniques for insertion on the bulletin to help other users of UoSAT or the other AMSAT satellites would also be appreciatud. Material of arounf 2btoM~~

~~Technical articles on ground station features, computer~~ applications and data analysis techniques for insertion on the bulletin to help other users of UoSAT or the other AMSAT satellites would also be appreciated. Material of around 2 to 3 kb could easily be included.

** Orbital elements ** (from Phil Karn, KA9Q,
Bob Diersing, N5AHD,
Ron Dunbaz, W0PN
)

Satellite: oscar-10
Catalog number: 14129
Epoch time: 84001.67617120
Sun Jan 1 16:13:41.192 1984 UTC
Element set: MH 1-3-84
Inclination: 25.8370 deg
RA of node: 222.8130 deg
Eccentricity: 0.6084848
Arg of perigee: 233.3550 deg
Mean anomaly: 54.0540 deg
Mean motion: 2.05854161 rev/day
Decay rate: 0 rev/day†2
Epoch rev: 416
Semi major axis: 26105.730 km
Anom period: 699.524359 min
Apogee: 35615.140 km
Perigee: 3845.260 km
Translate freq: 581.0047 mhz
Invert: 1
Beacon: 145.8100 mhz

Satellite: oscar-9
Catalog number: 12888
Element Set: 566
Reference Epoch: 83361.09110227
Drag Factor: 0.00002929
Inclination: 97.5703
RAAN: 328.4692
Eccentricity: 0.0003279
Argument of Perigee: 25.8845
Mean Anomaly: 334.2558
Mean Motion: 15.24023366
Revolution of Ref Epoch: 12316

Satellite:	RS-6	RS-7	RS-8
Catalog #:	13002	13001	12998
Epoch :	83355.25873695	83362.6895633	83361.06812312
Elmnt set:	70	137	256
Inclinatn:	82.9594	82.9555	82.9584
RAAN :	233.8584	233.5385	238.8709
Eccen :	0.0050948	0.0023499	0.0019230
Arg/Per :	19.7152	24.0756	144.2347
Mean Anom:	340.5866	336.1380	216.0067
Mean Motn:	12.13557947	12.08674765	12.02939248
Decay :	0.00000004	0.00000004	0.00000004
Orbit # :	8901	8955	8893

** Spacecraft orbital data **

Orbits for 14th January

	UoSAT	OSCAR-8	NOAA-7	
Orbit no :	12596	29874	13204	
Eqx time :	14:32:14	14:49:20	15:38:22	GMT
Eqx long :	344.6	298.9	3.1	deg.w
Mean hgt :	496.4	904.0	850.0	km
Period :	94.5381583	103.1637191	101.9628950	mins
P-drag :	3.073E-05	8.277E-07	7.500E-06	*N-ref
Long inc :	23.6334499	25.7899720	25.4897892	degs
L-drag :	7.732E-06	.000E+00	2.000E-07	*N-ref

UoSAT Spacecraft Control Centre
University of Surrey, Guildford, Surrey, England
****

Frame counter : 0169 received by DB2OS

**** UoSAT Bulletin-61 14:00 27th January 1984 ****

** UoSAT-B Spacecraft status **

* Apologies are due for the late writing and loading of last week's bulletin. The erratic schedule has been due to a combination of factors including lack of sleep, overwork and severe disruptions of service on our mainframe computer system. As can be imagined, the UoSAT-1 operational schedule will be liable to disruption as other tasks become more urgent.

* Action will be taken to maintain a UoSAT-1 service during the UoSAT-B launch campaign, however since all members of the operational team will be in the U.S., this will be of a reduced nature. UoSAT-B details will be transmitted continuously once we return during the last week of February.

* Detailed specifications of the UoSAT-B spacecraft will not be posted until they have been finalised in flight versions; data on the primary systems will appear first sometime in January, followed by the experimental systems as our workload permits. We hope to start the initial system specifications from next weekend.

* The following received from G3YJO:

The flight UOSAT-B spacecraft underwent spin balance tests at British Aerospace last weekend (20th) and was successfully balanced to within 2 gm.metres both static and dynamic. This yields a centre of gravity offset from the z-axis of around 0.002 inches compared to the maximum permissable for vehicle separation of 0.015 inches.

The spacecraft has been at Marconi Space & Defence Systems in vibration tests since Wednesday 25th and low-level resonance searches in all three axes have been completed - the first lateral resonance of the s/c is at 42 Hz. The full flight simulation vibration at 20 g's has been successfully completed in the z (thrust) axis after an initial problem with the tip-mass retention mechanism had been resolved. The major area of concern had been associated with the s/c wings - they see 60 g's at the tips, however both the Navigation Magnetometer and Space Dust experiments appear to have survived well. The lateral axes tests will continue over Friday & Saturday with Thermal Vacuum tests scheduled next week.

* Harold Price, NK6K, arrived at Surrey on Thursday, 12/1/84 with the flight DCE (Digital Communications Experiment) which he collected in Ottawa, where it was integrated. Final minor hardware modifications were completed over the following weekend, and the module has been soak-tested since whenever not in use on the spacecraft framework. Much credit must be given to the US / Canadian team which has constructed this 3-PCB computer system to fit in a module box only 31mm high! This involved such techniques as sinking the CPU crystal into a cut-out in its circuit board. A full list of constructors will be posted when it is complete.

* 10 flight cells selected in Ottawa from an initial set of 50 have been potted into cylindrical holes in an aluminium block, and mounted in the central core of the spacecraft. A circuit board containing voltage sensors for each of the 10 cells will be mounted on top of this battery unit. The flight spares will be cycled after launch to simulate the cells on the spacecraft and to allow experimental measurements to be made. When the battery selection is complete, a report of their findings on Nickel-Cadmium battery selection and testing will be produced; this is likely to be of interest to a wide range of Ni-Cd users.

The Canadian group would like us to stress that they are also closely affiliated to the VITA (Volunteers in Technical Assistance) organisation, and that the work which they are doing for UoSAT-B and PACSAT is of great importance to that organisation as well as the radio amateur service.

* The UoSAT-B harness has being constructed on a 3-dimensional model as flight boards were produced and final wiring details confirmed, and inter-module connections are complete. Connections to the experimental modules on the wings, the top and the central core are complete except for a few which will be installed this weekend.

* The 1802 computer is complete. Major problems compressing the inter- board wiring into the module boxes necessitate close inspection and possible re-wiring of some sections. The 4116 memory board flight model took some 36 hours to get working, due to the use of RCA and N.S. Components 4028 decoders in the prototypes (UoSAT-1 as well as UoB) and a National Semiconductor version in the flight board. The N.S. version decodes invalid BCD digits differently from the RCA version, and bootstrapping a computer without memory is very awkward!

* The CCD camera analogue and digital PCBs have been tested separately and the two sections have now been connected together with a suitable display device, specially constructed by G4GPQ . This allows images to be offloaded at a 4MHz rate from the CCD directly to a video display thereby allowing interactive assessment of the image quality. Preliminary experiments with the flight CCD and lens configuration, but not yet in a light-tight enclosure, have been most successful. Images of the onlooking experimenters have been displayed, as well as various test cards.

* The command system prototype testing is complete, comprising the demodulators, command decoder and output latches. Some 112 commands are available to control the rest of the spacecraft. The flight spare telecommand system has been constructed for interface testing of the other modules, and the flight boards are also complete.

* Construction of all 4 telemetry system boards is complete. They are now fully functional, and under soak test. The initial two boards contain a basic telemetry system, with the third adding frame headers and the fourth a programmable channel dwell facility. The dwell facility allows total re-organisation of any part of the telemetry frame, for use either in specialised situations for rapidly scanning a number of channels or just to confuse the listening audience! A fault on the dwell command UART, persisting when the device was replaced and also demonstrated on the CCD / radiation memory system, nearly resulted in the scrapping of a whole batch of flight 6402s, since the prototypes (from another manufacturer) all worked. Fortunately, an identical design error made independently by the two module designers was traced as the real cause, the prototype parts being sufficiently tolerant to hide the problem!

** Spacecraft operations schedule **

The following spacecraft operations schedule is now in use:

Saturday: - 1200 bulletin, telemetry, digitalker, (21MHz)
~~Sunday: - 1200 bulletin, telemetry, digitalker, (21MHz)~~
Monday: - Whole orbit fast-scan radiation data
Tuesday: - Check-summed telemetry data
Wednesday: - Digitalker and 1200bd telemetry.
Thursday: - Whole orbit telemetry data scan
Friday: - Load bulletin, digitalker & telemetry schedule

The current spacecraft power budget requires the radiation counters and scientific magnetometer loads to be shed in order to run the 2.4GHz beacon, currently scheduled every other weekend.

** Data transmitted last week **

The whole-order radiation data recorded on Monday, 23/01/84 started recording at 16:11:07.

Due to problems generating non-blank CCD images and the lack of time for diagnosis, an 1802 program which cycles between Digitalker and 1200bd telemetry will be run each Wednesday. This is also in response to a number of requests from educators for Digitalker transmissions during school times on weekdays.

The whole-orbit recorded telemetry normally transmitted on 26/1/84 was aborted due to the lack of a computer system. Sorry! The new telemetry channels which will be continued next week are: 02, 09, 22, 29, 30, 32 and 39. This is in response to observers requesting continuation of the battery voltages and charge currents and the addition of three of the solar array facet temperatures.

** Thanks for reports **

JA2GSD, G1CHB, I2KBD, ON7VQ, KDX1A, K1KSY & KA1FAD, VK2AVH, G3HMO, ZL1AOX, Milham Ford School, W2RS, F6BVP.

QSL Cards are on their way.

We really appreciate the feedback which we receive, as well as the news of your experimental and groundstation activities. Initial UoSAT-B technical information will be sent to all recent correspondents when this is ready.

Technical articles on ground station features, computer applications and data analysis techniques for insertion on the bulletin to help other users of UoSAT or the other AMSAT satellites would also be appreciated. Material of around 2 to 3 kb could easily be included.

The following is the first response to the above:

"Milham Ford School, Oxford, are using a Nascom computer at their ground station. The audio output from the receiver is fed straight into the cassette input, which is modified by the addition of one switch. Anyone interested in seeing how this is done, and in the associated software, should send an SAE to the Physics Department, Milham Ford School, Harberton Mead, Oxford OX3 0DF, England."

Note that, on UoSAT-B, the intention is that the digital data will be sent in the opposite sense to UoSAT-1, so that 1200Hz corresponds to a logic '0' and 2400Hz to a logic '1'. This will make the downlink directly compatible with the cassette interface on the BBC Microcomputer and the Nascom, amongst others. Apologies to users of Bell modems - we were only told last week that you are already compatible, so this time these will need to be inverted!

** Orbital elements ** (from Phil Karn, KA9Q)

```
Satellite: oscar-10
Catalog number: 14129
Epoch time:       84015.27200481
   Sun Jan 15 06:31:41.216 1984 ETC
Element set:      75
Inclination:        25.8148 deg
RA of node:        220.4854 deg
Eccentricity:    0.6087206
Arg of perigee:   237.1847 deg
Mean anomaly:      49.5265 deg
Mean motion:    2.05849943 rev/day
Decay rate:        9.2e-07 rev/day†2
Epoch rev:             444
Semi major axis: 26106.090 km
Anom period:    699.538693 min
Apogee:          35622.124 km
Perigee:          3839.494 km
```

```
Satellite: oscar-9
Catalog number: 12888
Epoch time:       84011.06058851
   Wed Jan 11 01:27:14.847 1984 UTC
Element set:      570
Inclination:        97.5754 deg
RA of node:        343.5850 deg
Eccentricity:    0.0001886
Arg of perigee:   338.3463 deg
Mean anomaly:      21.7675 deg
Mean motion:   15.24115646 rev/day
Decay rate:      2.766e-05 rev/day†2
Epoch rev:           12544
Semi major axis:  6868.546 km
Anom period:     94.481019 min
Apogee:            494.558 km
Perigee:           491.967 km
```

** Spacecraft orbital data **

Orbits for 27th January

	UoSAT	OSCAR-8	NOAA-7	
Orbit no :	12794	30055	13387	
Eqx time :	14:30:35	14:01:57	14:37:27	GMT
Eqx long :	343.9	286.9	347.7	deg.w
Mean hgt :	496.4	904.0	850.0	km
Period :	94.5320739	103.1635693	101.9615225	mins
P-drag :	3.073E-05	8.277E-07	7.500E-06	*N-ref
Long inc :	23.6319190	2=.7899720	25.4897526	degs
L-jrag :	7.732E-06	.000E+00	2.000E-07	*N-ref

Reception reports and UoSAT data is much appreciated
Send to: UoSAT team, University of Surrey, Guildford, Surrey, England - Thank you

UoSAT Spacecraft Control Centre
University of Surrey, Guildford, Surrey, England
****

Frame counter : 018E received by DB2OS

**** UoSAT Bulletin-64 13:00 29th February 1984 ****

** UoSAT-Oscar-9 Status **

Following major breakdowns in the Oscar-9 ground station at the University of Surrey shortly before the team left for the UoSAT-B launch campaign, it was impossible for any remaining members of the department to activate the spacecraft during our absence. We apologise for the disruption at this crucial time.

** Oscar-9 Schedule **

Wednesday 29th February	14:00	load bulletin-64
Friday 2nd March	14:00	load bulletin-65

The late loading of this bulletin (03:00) was caused by the power supply of our PET disc drive emitting smoke this afternoon. This is, however, only the second failure in this unit, which is a good record considering that it has been continuously powered up since UoSAT-1 testing over 2.5 years ago. These little problems always come at the most inconvenient times!

** UoSAT-B Spacecraft status **

The UoSAT-B spacecraft was shipped to the Goddard Space Flight Centre on Thursday 9th February for two days of magnetometer and magnetorquer tests and calibration. These tests were performed most successfully and the spacecraft left for Vandenburg Air Force Base, California, on Saturday, 11th February, arriving there late Sunday. After installation in the clean room, 10 days were spent on final tests and calibration, rectifying a few interface problems and generally getting to know the complete system. Two days were spent in this period shipping UoSAT-B to MacDonnell Douglas at Huntingdon Beach for a brief period of thermal vacuum testing following inconclusive tests which indicated an unacceptably high level of contamination following thermal vacuum in the U.K. These indications were proved unfounded and the spacecraft returned to Vandenburg with a clean bill of health. (Sorry!) Pre-mate on Thursday 23rd February and final mating with the Delta launcher on Friday were both long, worrying affairs with a number of problems which were eventually all overcome. The UoSAT team returnee, less all our freight, on Saturday and Sunday 25th & 26th February, to finalise the groundstation organisation. The lack of all microcomputers and calibrated modulators and demodulators is likely to cause problems, however we are confident that all will be ready in time for launch on 1st March at 18:00 GMT.

** UoSAT-B Telemetry **

The basic telemetry frame is shown below. Channels 0 to 59 are analogue, as in UoSAT-1, whilst channels 60 to 67 contain 12 status points each as hexadecimal numbers. e.g. channel 60 has status bits 1,2,3,4,5,6,7,8,9,10,11,12 in that order. Thus, 60400 means status point 2 is set, (1), and 3-12 are reset (0).

UOSAT-2 0000010040630

00515	01035	02010	03010	04023	05028	06025	07031	08032	09026
10515	11000	12004	13010	14000	15000	16000	17736	18736	19736
20515	21032	22667	23000	24001	25000	26077	27736	28736	29736
30515	31016	32284	33000	34000	35028	36000	37736	38353	39353
40763	41000	42688	43000	44000	45055	46000	47736	48353	49346
50561	51017	52661	53256	54111	55852	56000	57306	58736	59353
60210	617BC	62800	63004	64100	651C0	66140	67340	68000	69000

UOSAT-B STATUS POINTS - Subject to minor revisions. 29/02/84

1	145 MHZ GENERAL DOWNLINK POWER	OFF/ON
2	435 MHZ ENGINEERING DOWNLINK POWER	OFF/ON
3	2401 MHZ ENGINEERING DOWNLINK POWER	OFF/ON
4	TELEMETRY CHANNEL MODE SELECT	RUN/DWELL
5	TELEMETRY CHANNEL DWELL ADDRESS LOAD	OFF/ON
6	TELEMETRY CHANNEL DWELL ADDRESS SOURCE	GND/COMPUTER
7	PRIMARY SPACECRAFT COMPUTER POWER	OFF/ON
8	PRIMARY SPACECRAFT COMPUTER ERROR COUNT	BIT-1
9	PRIMARY SPACECRAFT COMPUTER ERROR COUNT	BIT-2
10	PRIMARY SPACECRAFT COMPUTER BOOTSTRAP	PROM/UART
11	PRIMARY SPACECRAFT COMPUTER ERROR COUNT	BIT-3
12	PRIMARY SPACECRAFT COMPUTER BOOTSTRAP	A/B
13	GRAVITY GRADIENT BOOM DEPLOYMENT PYROS	SAFE/ARM
14	GRAVITY GRADIENT BOOM DEPLOYMENT PYROS	HOLD/FIRE
15	GRAVITY GRADIENT BOOM DEPLOYMENT	SAFE/ARM
16	GRAVITY GRADIENT BOOM DEPLOYMENT	HOLD/DEPLOY
17	GRAVITY GRADIENT BOOM DEPLOYMENT	EXTEND/RETRACT
18	ATTITUDE CONTROL MAGNETORQUERS	SAFE/ARM
19	ATTITUDE CONTROL MAGNETORQUER -X	ON/OF
20	ATTITUDE CONTROL MAGNETORQUER -Y	ON/OFF
21	ATTITUDE CONTROL MAGNETORQUER -Z	ON/OFF
22	ATTITUDE CONTROL MAGNETORQUER	REVERSE/FORWARD
23	435 MHZ PSK MODE	NRZI/NRZIC
24	2401 MHZ PSK MODE	NRZI/NRZIC
25	ATTITUDE CONTROL MAGNETORQUERS	HIGH/LOW POWER
26	DIGITALKER EXPT. POWER	OFF/ON
27	CCD CAMERA EXPT. POWER	OFF/ON
28	CCD CAMERA EXPT. INTEGRATION PERIOD	BIT 0
29	CCD CAMERA EXPT. INTEGRATION PERIOD	BIT 1
30	CCD CAMERA EXPT. VIDEO AMP. GAIN	BIT 0
31	CCD CAMERA EXPT. VIDEO AMP. GAIN	BIT 1
32	DSR POWER	OFF/ON
33	DSR MODE	READ/WRITE
34	DSR MODE	RUN/RESET
35	RADIATION DETECTORS GEIGER-A EHT POWER	OFF/ON
36	RADIATION DETECTORS GEIGER-B EHT POWER	OFF/ON
37	RADIATION DETECTORS GEIGER-C EHT POWER	OFF/ON
38	ELECTRON SPECTROMETER SENSOR EHT POWER	OFF/ON
39	DCE EXPERIMENT POWER	OFF/ON
40	DCE EXPT.	RESET/RUN
41	DCE EXPT. PROM SELECT	A/B
42	DCE EXPT. CPU CLOCK RATE SELECT	0.9/1.8 MHZ
43	NAVIGATION MAGNETOMETER POWER	OFF/ON
44	SPACE DUST EXPERIMENT POWER	OFF/ON
45	SPACE DUST EXPERIMENT LEVEL SELECT	BIT 0
46	BCR STATUS	0/1
47	435 MHZ DOWNLINK MODULATION SELECT	AFSK/PSK
48	2401 MHZ DOWNLINK MODULATION SELECT	AFSK/PSK
49	ENGINEERING DATA	BIT 1
50	ENGINEERING DATA	BIT 2
51	ENGINEERING DATA	BIT 3
52	ENGINEERING DATA	BIT 4
53	ENGINEERING DATA	BIT 5
54	COMMAND WATCHDOG ENABLE	
55	COMMAND WATCHDOG RESET	

56	145 MHZ DOWNLINK DATA SELECT	A
57	145 MHZ DOWNLINK DATA SELECT	B
58	145 MHZ DOWNLINK DATA SELECT	C
59	145 MHZ DOWNLINK DATA SELECT	D
60	145 MHZ DOWNLINK DATA SELECT	E
61	145 MHZ DOWNLINK DATA SELECT	F
62	145 MHZ DOWNLINK DATA RATE	A
63	145 MHZ DOWNLINK DATA RATE	B
64	435 MHZ DOWNLINK DATA RATE	A
65	435 MHZ DOWNLINK DATA RATE	B
66	435 MHZ DOWNLINK DATA RATE	C
67	PARTICLE/WAVECOUNTER CONTROL	COUNT/RESET
68	DOWNLINK LOCKOUT	ENABLE/DISABLE
69	ENGINEERING DATA	BIT 6
70	ENGINEERING DATA	BIT 7
71	ENGINEERING DATA	BIT 8
72	ENGINEERING DATA	BIT 9
73	P/W channel plate control BIT 0	
74	P/W channel plate control BIT 1	
75	P/W channel plate control BIT 2	
76	SPACE DUST	
77	SPACE DUST	
78	SPACE DUST	
79	SPACE DUST	
80	SPACE DUST	
81	SPACE DUST	
82	SPACE DUST	
83	SPACE DUST	
84	DSR WRITE CYCLE COMPLETE	
85	1802 CWO OUTPUT	
86	1802 TLM PORT (MSB)	
87	1802 TLM PORT	
88	1802 TLM PORT	
89	1802 TLM PORT	
90	1802 TLM PORT	
91	1802 TLM PORT	
92	1802 TLM PORT	
93	1802 TLM PORT	
94	1802 TLM PORT	
95	1802 TLM PORT	
96	1802 TLM PORT (LSB)	

The tones are the same as for Oscar-9, but the sense of mark and space have been reversed, to ensure more general compatibility with many microprocessors, i.e. 1200Hz = lowic 0 and 2400Hz = logic 1. Serial data uses logic 1 as the idle level.

The deviation of the transmissions on 145.825MHz is greater than that on UoSAT-1, which should be beneficial to the majority of users. Special receivers optimised to receive the UoSAT-1 low-deviation signals may require wider filters for best effect on UoSAT-B.

** UoSAT-B Sub-systems (Part 1) **

The following starts a guide to the sub-systems on UoSAT-B:

Telecommand system

The telecommand system comprises three uplink receivers, three data demodulators, a command detector and sets of command latches which hold the status of the command specified. The receivers are located in the 144MHz, 438MHz and 1268MHz amateur bands and the demodulators are robust devices which do not command instructions, passing the data contained therein to the relevant latch. Some latches drive a set of multiplexer address inputs directly so that uplink and downlink path selection may be performed immediately on the command latch

The 112 command latches drive the Power Distribution System, the remaining spacecraft systems and experiment functions. There is a parallel i/o port to the spacecraft 1802 computer for autonomous control of spacecraft operations in addition to serial data links with the 1802 computer and the DCE for backup operations.

145.825 MHz Beacon

The 145 MHz beacon on UoSAT-B is nearly identical to the one flown most successfully on UoSAT-1. The modulation index has been increased in order to ensure more optimum reception on most radio amateur receivers. Modulation is by frequency-shift keying, as on UoSAT-1.

435.025 MHz Beacon

This beacon is a completely new design which generates its frequency standard from a phase-locked synthesiser system. As a result, the DC to RF efficiency is much improved. In addition to frequency-shift modulation, phase-shift modulation is a switchable option.

2401.5 MHz Beacon

When the original supplier of the 2.4GHz beacon was unable to meet his commitment, Colin Smithers, G4CWH, at the University of Surrey stepped in and designed and built the transmitter and power supply in under four weeks. The DC to RF efficiency has been improved by some 5 times over the UoSAT-1 implementation. Both FSK and PSK.

1802 Computer & Digitalker

The 1802 computer has been designed to support all the modules on the spacecraft, as well as to control the overall scheduling and be usable for specific communications experiments. To satisfy these requirements, the computer has access to many modules via parallel interfaces, and to some of the others and the receivers and transmitters via serial connections. In addition, there is a real-time clock and a total of 48kb of RAM for data storage. The Digitalker speech synthesiser is housed with the 1802 and has ROMs containing over 550 words. These will be used initially for 'speaking' telemetry.

** UoSAT-B Events **

The following events and keplerian orbital elements have been supplied by Phil Karn, KA9Q. The circular period / precession figures are from Jim Miller, G3RUH. The data is derived from different sources and is not directly comparable.

The liftoff time assumed is 17:59:00 GMT on 1st March, 1984.

Event	hh:mm:ss (relative to liftoff)	
1st stage main engine cutoff:	00:03:47	
Vernier engine cutoff:	00:03:53	
Stage 1 separation:	00:03:55	
Stage 2 ignition #1:	00:04:00	
Stage 2 cutoff #1:	00:10:50	
Stage 2 ignition #2:	00:54:04	
Stage 2 cutoff #2:	00:54:17	
Landsat separation:	00:59:10	
Stage 2 maneuver start:	00:59:15	
Stage 2 maneuver stop:	00:59:52	
Uosat-B separation:	01:11:40	
Stage 2 ignition #3:	01:30:53	distancing maneuver
Stage 2 cutoff #3:	01:30:58	
Stage 2 ignition #4:	01:36:43	depletion burn
Stage 2 cutoff #4:	01:37:05	

Satellite: uosat-b
Epoch time: 84061.79768519 (separation)
Thu Mar 1 19:08:40.000 1984 UTC

Element set:	prelaunch	
Inclination:	98.2596	deg
RA of node:	124.2426	deg
Eccentricity:	0.0004100	
Arg of perigee:	174.4207	deg
Mean anomaly:	226.7604	deg
Mean motion:	14.61025794	rev/day
Decay rate:	0	rev/day†2 (none given)
Epoch rev:	0	
Semi major axis:	7065.080	km
Anom period:	98.560888	min
Apogee:	690.030	km
Perigee:	684.236	km

Orbit No :	0	
Eqx date :	Mar 1st 1984	
Eqx time :	18:59:25	GMT
Eqx long :	320.38	deg.w
Mean hgt :	687	km
Period :	98.5045	mins
P-drag :	8.3E-6	*N-ref
Long inc :	24.6251	degs
L-drag :	2.1E-6	*N-ref
Inclination :	98.26	degs

** Spacecraft orbital data **

Orbits for 1st March

	UoSAT	OSCAR-8	NOAA-8	
Orbit no :	13297	30530	4819	
Eqx time :	14:56:39	04:44:33	15:03:02	GMT
Eqx long :	350.3	297.1	305.0	deg.w
Mean Hgt :	496.0	904.0	850.0	km
Period :	94.5227014	103.1631761	101.2813390	mins
P-drag :	2.477E-05	8.277E-07	9.000E-06	*N-ref
Long inc :	23.6295593	25.7899720	25.3296542	degs
L-drag :	6.233E-06	.000E+00	2.000E-07	*N-ref

Reception reports and UoSAT data is much appreciated
Send to: UoSAT team, University of Surrey, Guildford, Surrey, England - Thank you