Appendix A

HIRS/3 Channel Characteristics

Channel	Channel Frequency (cm^{-1})	micron	Half Power Bandwidth (cm^{-1})	Anticipated Max. Scene Temp (°)	Specified Sensitivity [1]	Design Goal
1	669	14.95	3	280	3.00	.75
2	680	14.71	10	265	0.67	.25
3	690	14.49	12	240	0.50	.25
4	703	14.22	16	250	0.31	.20
5	716	13.97	16	265	0.21	.20
6	733	13.64	16	280	0.24	.20
7	749	13.35	16	290	0.20	.20
8	900	11.11	35	330	0.10	.10
9	1,030	9.71	25	270	0.15	.15
10	802	12.47	16	300	0.15	.10
11	1,365	7.33	40	275	0.20	.20
12	1,533	6.52	55	255	0.20	.07
13	2,188	4.57	23	300	0.006	.002
14	2,210	4.52	23	290	0.003	.002
15	2,235	4.47	23	280	0.004	.002
16	2,245	4.45	23	270	0.004	.002
17	2,420	4.13	28	330	0.002	.002
18	2,515	4.00	35	340	0.002	.002
19	2,660	3.76	100	340	0.001	.001
20	14,500	0.69	1,000	100% A	0.10% A	———

[1] NEΔD in mW/m2 Sr cm^{-1}

AMSU-A Channel Characteristics

Ch. No.	Center Frequency	No. of Pass Bands	Bandwidth (MHz) (spec)	Center Frequency Stability (MHz)	Temperature Sensitivity (K) NEΔT (spec)	Calibration Accuracy (K) (spec)	Angle θp
1	23,800 MHz	1	270	10	0.30	2.0	V
2	31,400 MHz	1	180	10	0.30	2.0	V
3	50,300 MHz	1	180	10	0.40	1.5	V
4	52,800 MHz	1	400	5	0.25	1.5	V
5	53,596 MHz ±115 MHz	2	170	5	0.25	1.5	H
6	54,400 MHz	1	400	5	0.25	1.5	H
7	54,940 MHz	1	400	5	0.25	1.5	V
8	55,500 MHz	1	330	10	0.25	1.5	H
9	57,290.344 MHz = f_{LO}	1	330	0.5	0.25	1.5	H
10	f_{LO}±217 MHz	2	78	0.5	0.40	1.5	H
11	f_{LO}±322.2 ±48 MHz	4	36	1.2	0.40	1.5	H
12	f_{LO}±322.2 ±22 MHz	4	16	1.2	0.60	1.5	H
13	f_{LO}±322.2 ±10 MHz	4	8	0.5	0.80	1.5	H
14	f_{LO}±322.2 ±4.5 MHz	4	3	0.5	1.20	1.5	H
15	89.0 GHz	1	<6,000	50	0.50	2.0	V

AMSU-B Channel Characteristics

Channel Number	Centre Frequency GHz	Bandwidth MHz: Double Sided Maximum	Pass Band	IF Band	Stop Band
16	89.0	6,000	3000	≥ 1,000	±400
17	150.0	4,000	2000	≥ 1,000	±400
18	183.31±1.0	1,000	2 x 500	500	-
19	183.31±3.0	2,000	2 x 1,000	1,000	-
20	183.31±7.0	4,000	2 x 2,000	2,000	-

AVHRR/3 Channel Characteristics

Ch. No.	(50% Points) Max Spectral Band Micrometers	S/N	Res. SSP km	Albedo Range %	Counts Range
1	0.58 - 0.68	9:1 @ 0.5% Albedo	1.09	0 - 25 26 - 100	0 - 500 501 - 1000
2	0.725 - 1.00	9:1 @ 0.5% Albedo	1.09	0 - 25 26 - 100	0 - 500 501 - 1000
3A	1.58 - 1.64	20:1 @ 0.5% Albedo	1.09	0 - 12.5 12.6 - 100	0 - 500 501 - 1000
		NEΔT		Max Scene Temp K	
3B	3.55 - 3.93	0.12 @ 300K Scene	1.09	335	
4	10.30-11.30	0.12 @ 300K Scene	1.09	335	
5	11.50-12.50	0.12 @ 300K Scene	1.09	335	

SSP = Sub-Satellite Point
Temp = Temperature
NEΔT= Noise Equivalent Temperature Difference
S/N = Signal to Noise Ratio

SBUV Discrete Ozone Position

Channel	WL (NM)	Description	Channel	WL (NM)	Description
0	252.00	Discrete Pos. 0	6	301.97	Discrete Pos. 6
1	273.61	Discrete Pos. 1	7	305.87	Discrete Pos. 7
2	283.1	Discrete Pos. 2	8	312.57	Discrete Pos. 8
3	287.7	Discrete Pos. 3	9	317.56	Discrete Pos. 9
4	292.29	Discrete Pos. 4	10	331.26	Discrete Pos. 10
5	297.59	Discrete Pos. 5	11	339.89	Discrete Pos. 11

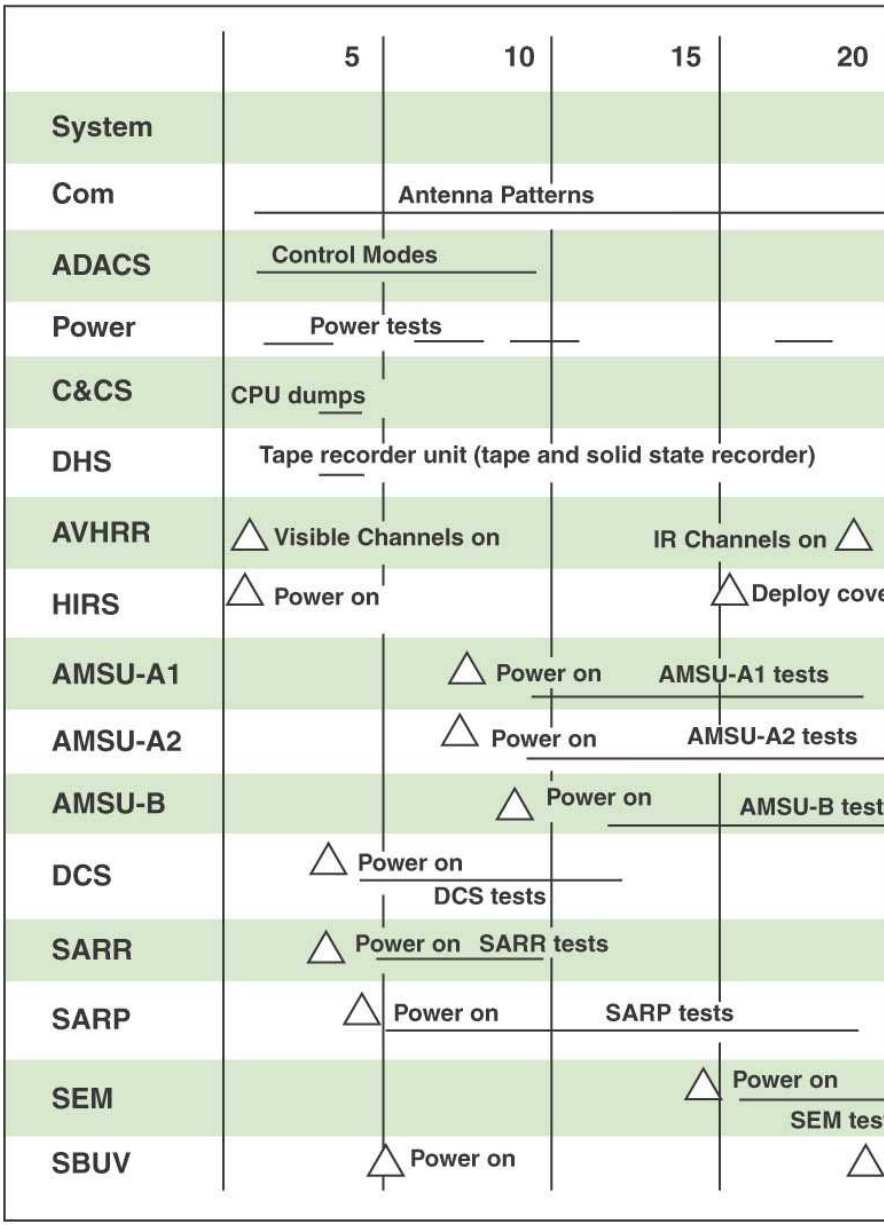
Appendix B

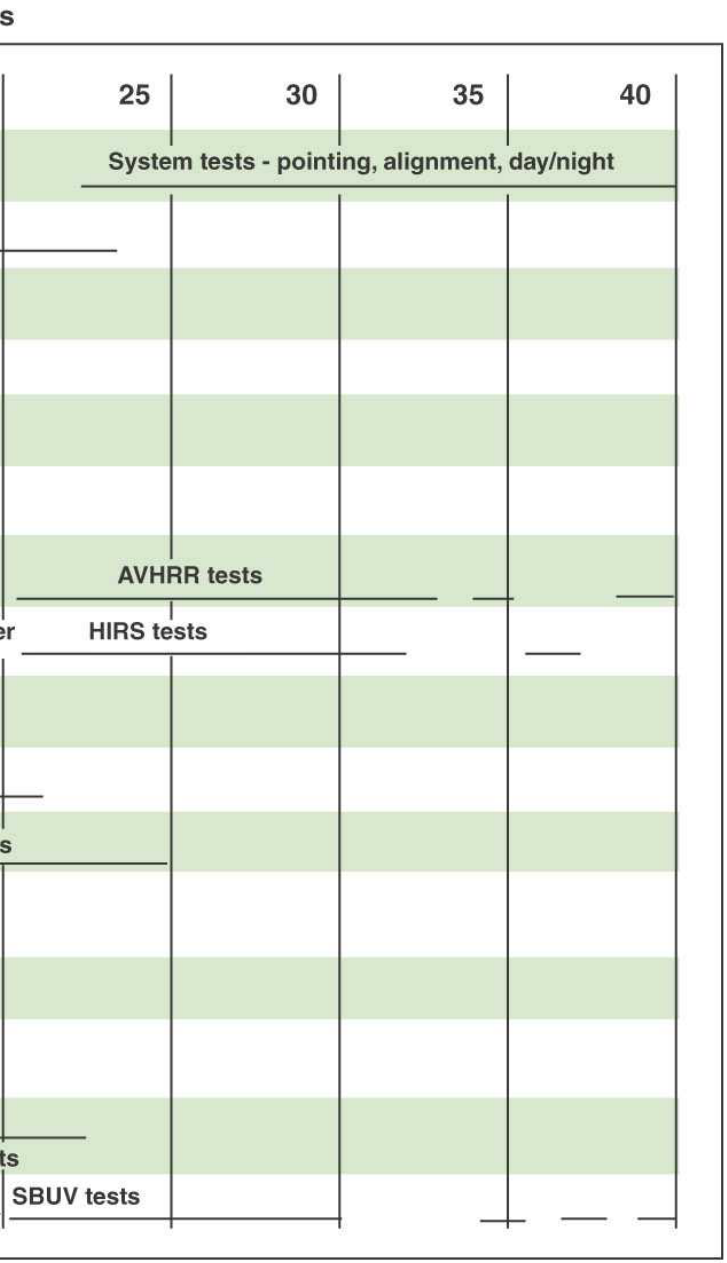
Communications and Data Handling

Link	Carrier Frequency	Information Signal	Data Rate and Baseband Modulation	RF Modulation	Subcarrier Frequency
Command	2026 MHz	Digital commands Clear or encrypted	2 kbps/NRZ-M	PM-carrier BPSK-subcarrier	16 kHz
Beacon	137.77 and 137.35 MHz	TIP data	8.320 kbps split phase	PM +/-67 deg.	
VHF real time (APT)	137.50 and 137.62 MHz	Medium-resolution video data from AVHRR	Analog	FM-carrier AM-subcarrier	2.4 kHz
S-band real time	1698 or 1707 MHz	HRPT	665.4 kbps split phase	PM +/-67 deg.	
S-band playback	1698, 1702.5, or 1707 MHz	High-resolution AVHRR data from MIRP; medium-resolution AVHRR data from MIRP; TIP and AIP outputs	2.66 Mbps NRZ-L	PM +/-67 deg.	
Data collection (uplink)	401.65 MHz	Earth-based platforms and balloons	400 bps split phase	PM +/-63 deg.	
S-band playback to European ground station	1698, 1702.5, or 1707 MHz	TIP or AIP data recovered from tape recorders as scheduled	332 kbps split phase	PM +/-67 deg.	
S-band contingency and launch	2247.5 MHz	Boost during ascent and real-time TIP in orbit	Boost 16.64 kbps/in orbit 8.32 kbps split phase	PM +/-67 deg.	
SAR L-band downlink	1544.5 MHz	Data transmission from SARR and SARP to ground LUTs	Less than or equal to 800 Hz	PM	
SAR uplinks	SARR 121.5/ 243/406.05 MHz SARP 406.05 MHz	From ground ELT/ EPIRBs/PLBs to spacecraft	25 kHz BW for 121.5 MHz 45 kHz BW for 243 MHz 400 bps for 406.05 MHz	AM for 121.5/ 243 MHz PM for 406.05 MHz	

Appendix C

NOAA-M Activation and Evaluation Timeline




s
25
30
35
40
System tests - pointing, alignment, day/night
AVHRR tests
er
HIRS tests
s
ts
SBUV tests

GLOSSARY

AIP	AMSU Information Processor
AKM	Apogee Kick Motor
AM	Amplitude Modulation
AMSU	Advanced Microwave Sounding Unit
APT	Automatic Picture Transmission
ATN	Advanced TIROS-N
AVHRR	Advanced Very High Resolution Radiometer
BDA	Beacon Transmitting Antenna
bps	Bits Per Second
CCR	Cloud Cover Radiometer
CDA	Command and Data Acquisition
CEMSCS	Central Environmental Satellite Computer System
cm	Centimeter(s)
CMS	Centre de Meteorologie Spatiales
CNES	Centre National d'Etudes Spatiales
COSPAS	Russian Space Systems for the Search of Vessels in Distress
CRD	Command Receiver and Demodulator
DCS	Data Collection System
DND	Department of National Defense
DPU	Data Processing Unit
DRAM	Dynamic Random Access Memory
DSB	Direct Sounder Broadcasting
DSN	Deep Space Network
DTR	Digital Tape Recorder
EDAC	Error Detection and Correction
ELT	Emergency Locator Transmitters
EPIRB	Emergency Position-Indicating Radio Beacons
ERBE	Earth Radiation Budget Experiment
ESA	Earth Sensor Assembly
FM	Frequency Modulation
ft	Feet
GAC	Global Area Coverage
Gbit	Gigabit
GHz	Gigahertz
GN_2	Gaseous Nitrogen
GSFC	Goddard Space Flight Center
HIRS	High Resolution Infrared Radiation Sounder
HRPT	High Resolution Picture Transmission
Hz	Hertz
IFOV	Instantaneous Field-of-View
IGS	Inertial Guidance System
IMP	Instrument Mounting Platform
IMU	Inertial Measurement Unit
in	Inch(es)
IR	Infrared
ITT	ITT Aerospace/Communications Division
JPL	Jet Propulsion Lab
K	Kelvin temperature in degrees
kbps	Thousand (kilo) bits per second
keV	Kiloelectron volts
kg	Kilogram(s)
kHz	Kilohertz
km	Kilometer(s)
kN	Kilonewton
LAC	Local Area Coverage
lb	Pound
LMSSC	Lockheed Martin Space Systems Company
LUT	Local User Terminal
mb	Millibar
Mbps	Million bits per second
MCC	Mission Control Center
MEPED	Medium-Energy Proton/Electron Detector
MeV	Million electron volt(s)
MGC	Missile Guidance Computer
MHz	Megahertz
mi	Mile

MIRP	Manipulated Information Rate Processor
mps	meters per second
ms	Millisecond(s)
MSU	Microwave Sounding Unit
N	Newton
NASA	National Aeronautics and Space Administration
NASCOM	NASA Communications
NDVI	Normalized Difference Vegetation Index
NEΔD	Noise Equivalent Radiance
NEΔT	Noise Equivalent Temperature Difference
NESDIS	National Environmental Satellite, Data, and Information Service
NISN	NASA Integrated Services Network
nm	Nanometer(s)
nmi	nautical mile
NOAA	National Oceanic and Atmospheric Administration
NORAD	North American Air Defense Command
NS	Nonscanner
OBP	On-Board Processor
OSC	Office of Space Communications
PDT	Pacific Daylight Time
PLB	Personal Locator Beacon
PM	Phase Modulated
POES	Polar Operational Environmental Satellites
PSK	Phase Shift Keyed
Q3	Quadrant 3
REA	Reaction Engine Assembly
RF	Radio Frequency
RXO	Redundant Crystal Oscillator
SAD	Solar Array Drive
SAR	Search and Rescue
SARP	Search and Rescue Processor
SARR	SAR Repeater
SARSAT	Search and Rescue Satellite Aided Tracking
SATCOM	Satellite Communications Network
SBUV	Solar Backscatter Ultraviolet Radiometer
sec	Second(s)
SEM	Space Environment Monitor
SLA	Search and Rescue Transmitting Antenna (L-Band)
SLV	Space Launch Vehicle
S/N	Signal to Noise Ratio
SOA	S-Band Omni Antenna
SOCC	Satellite Operations Control Center
SSP	Sub-Satellite Point
SSR	Solid State Recorder
SSU	Stratospheric Sounding Unit
STX	S-Band Transmitting Antenna
TED	Total Energy Detector
TEMP	Temperature
TIROS	Television Infrared Observation Satellite
TIP	TIROS Information Processor
UDA	Ultra High Frequency Data Collection System Antenna
UDMH	Unsymmetrical Dimethylhydrazine
VHF	Very High Frequency
VRA	Very High Frequency Real-time Antenna
W	Watt(s)
WMO	World Meteorological Organization