The NOAA series of satellites is a cooperative effort of the United States (NOAA and NASA), the United Kingdom, and France. The operational ground facilities including the Command and Data Acquisition (CDA) stations, the Satellite Control Center, and the data processing facilities (with the exception of the Data Collection System (DCS) processing facility) will be operated by NOAA. The United Kingdom provided a Stratospheric Sounding Unit (SSU), one of three sounding instruments for each satellite. The Centre National d'Etudes Spatiales (CNES) of France provided the DCS instrument for each satellite and will provide the facilities necessary to process and make available to users the data obtained from this system. The Centre d'Etudes de la Meteorologie Spatiale (CEMES) of France will provide ground facilities for receipt of sounder data during the blind orbit periods.

The NOAA-B satellite is an integrated spacecraft system designed to provide for, and control injection into, the required orbit after separation from the Atlas-F launch vehicle. The spacecraft, including the apogee kick motor (AKM), in the launch configuration is 371 cm high and 188 cm in diameter and weighs nominally 1405 kg. On-orbit, with the AKM and reaction-controlled equipment expendables consumed, the satellite has a nominal weight of 723 kg.

The primary environmental sensors are:

o A TIROS Operational Vertical Sounder (TOVS). The TOVS is a three instrument system consisting of:

  - The High Resolution Infrared Radiation Sounder (HIRS/2) - a 20 channel instrument making measurements primarily in the infrared region of the spectrum.

  - The Stratospheric Sounding Unit (SSU) - employing a selective absorption technique to make measurements in three channels.

  - The Microwave Sounding Unit (MSU) - a four-channel Dicke radiometer, making passive measurements in the 5.5 mm oxygen band.

  Data from the TOVS will be available locally as a part of the HRPT transmission and on the spacecraft beacon transmission.

o The Advanced Very High Resolution Radiometer (AVHRR). A four-channel (5 channels on later satellites of this series) scanning radiometer sensitive in the visible, near infrared, and infrared window regions.

o The Space Environment Monitor (SEM). The SEM consists of three separate instruments and a data processing unit. The components are:

  - The Total Energy Detector (TED) - measures a broad range of energetic particles from 0.3 keV to 20 keV in 11 bands.

- The Medium Energy Proton and Electron Detector (MEPED) - senses protons, electrons, and ions with energies from 30 keV to several tens of MeV.
- The High Energy Proton and Alpha Detector (HEPAD) - senses protons and alphas from a few hundred MeV up through relativistic particles above 840 MeV.

o The Data Collection System (DCS). The DCS is a random access system to acquire data from fixed and free-floating terrestrial and atmospheric platforms.

LAUNCH PECULIARS

NOAA-B will be launched from the Western Test Range (WTR) by an Atlas-F type launch vehicle. The second stage, which is integral to the spacecraft, is a TE-364-15 solid motor and will be used as an injection motor.

The Atlas-F/satellite ascent trajectory is a direct ascent, ballistic type trajectory from Pad SLC-3W. The booster state vector at satellite separation produces an apogee altitude of 470 nm at which time the apogee kick motor (AKM) circularizing burn is accomplished. After AKM burnout the orbit is trimmed, the satellite is oriented parallel to the orbit normal, and handover to satellite is accomplished.

FLIGHT SEQUENCE OF EVENTS
(seconds)

Liftoff	0
Booster Engine Cutoff	121.0
Jettison Booster Engines	124.1
Jettison Fairing	144.0
Sustainer Engine Cutoff	324.5
Vernier Engine Cutoff	343.5
Spacecraft Separation	349.5
Obtain Ignition Attitude	456.9
TE-M-364-15 Ignition	626.9
AKM Burnout	670.4
Velocity Trim	675.4
End ΔV Trim	698.2
90 Deg Yaw	703.0
Start Roll Rate	758.0
Hydrazine Blowdown Start	850.0
Hydrazine Blowdown Stop	990.0
Deploy Solar Array	1055.0
Boom Deployment	1260.0
Array Cant	1420.0
VRA Deployment	1690.0
UDA Deployment	1710.0
Handover	2040.0

MISSION SUPPORT

A principal operating feature of the NOAA-B system will be the centralized remote control of the satellite, through the CDA stations by the NOAA Environmental Satellite Service (NESS) Satellite Operation Control Center (SOCC).

The primary command and data acquisition stations are GFOM, located at Fairbanks, Alaska, and WOMS, located at Wallops Station, Virginia. In addition there will be a reduced capability (no command capability) station, located in Lannion, France, to receive tape recorded TIP data from the satellite.

The CDA stations will transmit command programs to the satellite, acquire and record meteorological and engineering data from the satellite. All data will be transmitted between CDA and Suitland via commercial communications links. Commands will be transmitted between SOCC and CDA via commercial communications links.

The ground communication links for NOAA-B are provided by SATCOM and NASCOM. NASCOM will provide any launch unique communications links for the NOAA-B launch.

SATCOM will provide all voice and data links between the SOCC and the CDA stations after launch. SATCOM is provided and operated by NESS.

The USAF Space and Missile Test Command at VAFB will provide telemetry, tracking, and discrete event times for the Atlas vehicle until Loss of Signal (LOS) and will provide radio commanded guidance to the Atlas.

ARIA aircraft have been requested to support telemetry from the integrated spacecraft after LOS from WTR.

Routine tracking and orbit determination support will be provided by the USAF. GSFC will be responsible for providing the orbital information to NOAA to satisfy NOAA requirements. All data acquisition will be performed through NOAA CDA stations and data links. During launch and early orbit limited Spacecraft Tracking and Data Network (STDN) support for telemetry reception will be required. After launch the NOAA CDA stations will handle all telemetry reception. There is no requirement for STDN to command the spacecraft. There is a requirement requested through the SIRD to have backup use of the ULASKA antenna by GILMORE, on a non-interference basis.

GSFC will be responsible for providing the orbital information, based on USAF information routinely supplied to the NOAA/SOCC. Prelaunch nominal orbital information and special support for initial orbit estimation will be required.

Lifetime trend development and performance monitoring will be a continuous operation during the life of the satellite. It will consist of automatic and manual monitoring of data, conditions, and operations together with data analysis, record keeping, and report generation. Data from these operations will be available for retrieval on demand as well as appearing in periodic reports. Occasionally NASA will request special retrieval or processing of this data by the NOAA operations personnel.

NOAA-A THROUGH G PROJECT COSTS

The funding for NOAA-A through G (including spacecraft, sensors, and ground support) is provided in the following table.

(Millions of Dollars)*

	FY 79 & P	FY 80	FY 81	T.C.	Total
Spacecraft (7 ea)	65.6	5.9	3.9	3.4	78.8
Instruments (7 sets)	22.4	.4	2.2	2.0	27.0
Ground Operations	.8	.3	.3	-	1.4
IMS	.5	.2	.2	.5	1.4
TOTALS	89.3	6.8	6.6	5.9	108.6

*NOAA Reimbursable

A more detailed description of the NOAA-B mission may be found in the Mission Operation Report, No. E-615-80-02.

NASA MISSION OBJECTIVES FOR NOAA-B

NASA's primary objectives for the NOAA-B Mission are to launch the spacecraft into a Sun-synchronous orbit of sufficient accuracy to enable the spacecraft to accomplish its operational mission requirements, conduct an in-orbit evaluation and checkout of the spacecraft and, upon completion of this evaluation, turn the operational control of the spacecraft over to NOAA/NESS. The orbit will have a local equator crossing time of approximately 2:30a.m. northbound and 2:30 p.m. southbound to permit regular and dependable daytime and nighttime meteorological observations in both direct readout and stored modes of operation in support of the national operational environmental satellite system and the GARP Global Experiment.

L. R. Greenwood, Director
Environmental Observations Div.,
Office of Space & Terrestrial Applications

Date: 5/9/80

Anthony J Calio

Anthony J. Calio,
Associate Administrator for
Space & Terrestrial Applications

Date: 5/12/80

A J Cervenka

A. J. Cervenka, Program Manager,
Operational Meteorological Satellites,
Office of Space & Terrestrial Applications

Date: 5/6/80