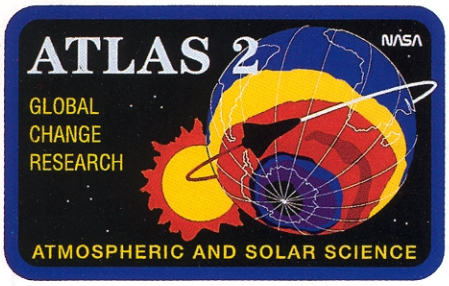
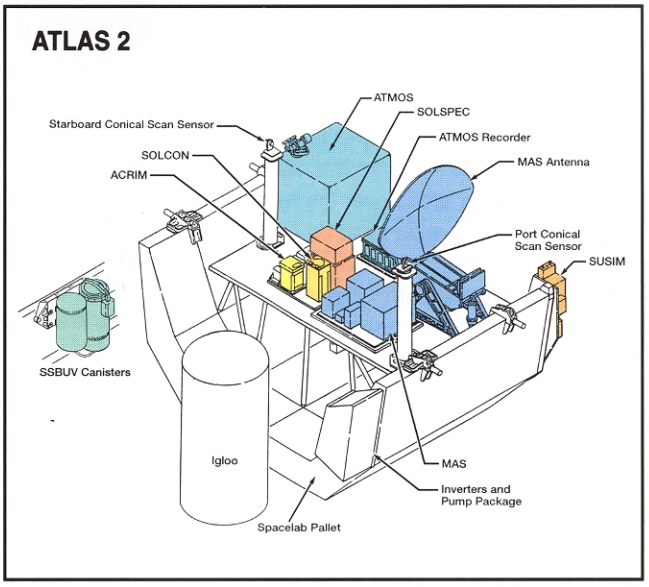
ATLAS 2 Mission



ATLAS 2, the second of the Atmospheric Laboratory for Applications and Science missions, is scheduled for launch in 1993. This mission characterizes the chemical and physical components of Earth's middle atmosphere and the solar energy injected into the atmosphere, studies that began on ATLAS 1. Like its predecessor, ATLAS 2 is an integral part of the Spacelab contribution to NASA's Mission to Planet Earth.

Seven instruments comprise the core payload. The Atmospheric Trace Molecule Spectroscopy (ATMOS) and Millimeter-wave Atmospheric Sounder (MAS) study atmospheric constituents. The Solar Spectrum Measurement from 180 to 3,200 Nanometers (SOLSPEC) and the Solar Ultraviolet Spectral Irradiance Monitor (SUSIM) characterize the solar radiation that drives chemical reactions in the middle atmosphere. The Shuttle Solar Backscatter Ultraviolet (SSBUV)* experiment measures both solar ultraviolet output and stratospheric ozone. Two other instruments — the Active Cavity Radiometer Irradiance Monitor (ACRIM) and the Measurement of the Solar Constant (SOLCON) — measure the total solar irradiance. The objectives of each ATLAS 2 experiment program and its instrument complement are described in detail in accompanying fact sheets.



Scientists from six nations are participating in the ATLAS 2 mission, underscoring the worldwide importance of atmospheric and solar research. In addition to the United States, investigators represent Belgium, Germany, France, The Netherlands, and Switzerland.

The mission will fly while the Upper Atmosphere Research Satellite is also gathering atmospheric and solar data. The orbits of the two spacecraft will allow instruments to make a number of independent measurements of the same regions of the atmosphere at the same time. Data gathered during these opportunities will be compared to ascertain satellite instrument calibration. *SSBUV is co-manifested with ATLAS 2.

Unique Science Opportunities

The ATLAS 2 mission is scheduled for a night launch in the Northern Hemisphere's spring. The Shuttle's path will then carry the payload over Earth's Northern Hemisphere during darkness on the ascending part of the orbit. This orbit will allow scientists to study daily variations in the chemistry of the middle atmosphere over high northern latitudes. (ATLAS 1 flew over the high southern latitudes at night and over the high northern latitudes during daylight, detailing those atmospheric conditions.) ATLAS 2 measurements are particularly crucial in light of recent data from the Upper Atmosphere Research Satellite and the Second Airborne Arctic Stratospheric Expedition, which indicate unprecedented levels of chlorine monoxide at high northern latitudes during the winter of 1991-1992. Given these high concentrations, atmospheric

Mission Facts

Flight Number:	**STS-56**
Launch:	**1993**
Launch Site:	**Kennedy Space Center**
Prime Landing Site:	**Kennedy Space Center**
Shuttle Altitude:	**296 km (160 nmi)**
Orbital Inclination:	**57 degrees to the equator**
Shuttle Attitudes:	**payload bay toward Sun payload bay toward Earth**
Number of Crewmembers:	**5**
Mission Duration:	**8 days**
Payload Operations:	**24 hours/day**
Configuration:	**igloo, 1 pallet, 2 Get-Away-Special canisters**

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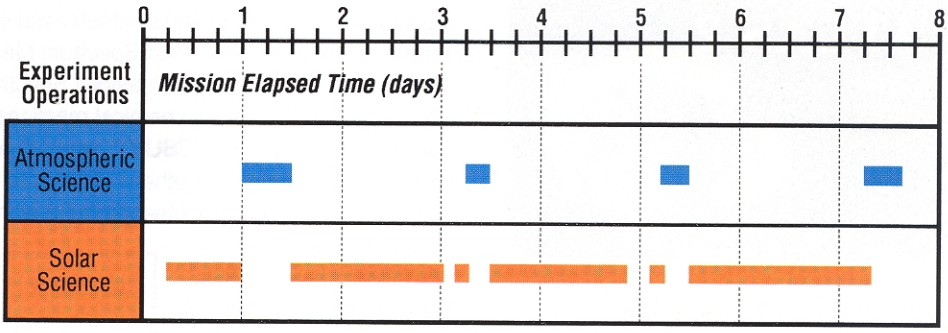
models suggest that, under appropriate meteorological conditions, significant ozone depletion over the Arctic is possible.

Many important chemicals involved in the photochemistry of ozone exhibit strong diurnal variations. For example, in sunlight, chlorine reservoir compounds break down and release chlorine, which destroys ozone; at night, the concentrations of the reservoir species increase, reducing the amount of chlorine available for chemical reactions. The best time to measure the effects of the nightly buildup is at sunrise; so, for scientists to measure the nighttime chemical concentrations over the Northern Hemisphere, the Shuttle must be entering orbital sunrise from a high northern latitude. The ATLAS 2 orbital path will permit measurement of these and other key species in the atmosphere over northern regions, and what is learned from measurements of the buildup of these concentrations will improve our understanding of ozone chemistry and our ability to test models of atmospheric behavior.

Science Operations Plan

The ATLAS 2 science operations plan calls for periods of atmospheric data gathering interspersed with orbits dedicated to solar observations. During the orbits designated for middle atmospheric measurements, the Shuttle will fly with its payload bay toward Earth, and the atmospheric instruments will operate almost continuously. ATMOS will take solar radiation absorption readings during orbital sunrises and sunsets, MAS will measure microwave emissions from Earth's limb throughout entire orbits, and SSBUV will make its measurements of backscattered ultraviolet radiation in orbital daylight. The ATMOS and MAS instruments will be inactive during solar observation periods.

For solar observations, the Shuttle's payload bay will point toward the Sun in the daylit portion of each orbit. At these times, ACRIM and SOLCON will measure total solar irradiance, SUSIM and SOLSPEC will make solar spectral measurements, and SSBUV will gather its data on solar ultraviolet radiation.



Simplified Timeline

MISSION MANAGEMENT TEAM

Mission Manager:
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Marshall Space Flight Center

Program Manager:
Mr. Earl Montoya
NASA HQ

Assistant Mission Manager:
Mr. Gerald Maxwell
Marshall Space Flight Center

Mission Scientist:
Dr. Timothy Miller
Marshall Space Flight Center

Program Scientist:
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NASA HQ

Assistant Mission Scientist:
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