



SATELLITE CHEMISTRY / ATMOSPHERE MISSIONS



SOUNDER	MISSION	ORBIT	MEASUREMENT APPROACH	SPECIES AND PARAMETERS	PROFILE (P) / COLUMN (C)	STATUS	INVESTIGATOR / CORE INSTITUTE
SAM II	Nimbus-7	955 km/99,15°	solar occultation	vertical distribution of stratospheric aerosols in the polar regions	P: 0-150 km	Oct. 1978 - Dec. 1993	M.Patrick McCormick, Hampton University, VA, USA
SAGE I	AEM-B	600km/55°	UV/VIS/NIR solar occultation	O3, NO2, aerosols	P: 8-65 km	Feb. 1979 - Nov. 1981	M.Patrick McCormick, Hampton University, VA, USA
SAGE II	ERBS	585 km/57°		O3, NO2, H2O, aerosols		Oct. 1984 - present	
SAGE III	METOR 3M	1000 km/99.7°	UV/VIS/NIR solar/lunar occultation	O3, H2O, NO2, NO3, OCIO, aerosols, clouds, T, P	P: 6-85 km	Dec. 2001 - present	
LITE	STS-64	260 km/57°	3-wavelength backscatter Lidar	topography, aerosols (strat. and trop.), clouds, T	P: 25-40 km	Sep. 9 - 20, 1994	M.Patrick McCormick, Hampton University, VA, USA
TOMS	Nimbus-7	955 km/99,15°	UV nadir scattering	O3, aerosol index, UVB index, SO2 index	C	Nov. 1978 - May 1993	Richard McPeters, NASA/Goddard Space Flight Center, USA
	METEOR 3	1202 km/ 82.5°				Aug. 1991 - Dec. 1994	
	ADEOS 1	800 km/98.6°				Aug. 1996-Jul. 1997	
	Earth Probe	740 km/98.4°				Jul. 1996 - present	
SBUV	Nimbus-7	955 km/99,15°	UV nadir scattering	O3 C; O3 P at Umkher resolution	C+P	Oct. 1978 -1994	Jay R. Herman, NASA/Goddard Space Flight Center, USA
SBUV/2 SSU/ AMSU (TOVS)	NOAA-9	850 km/99.2°	UV nadir scattering	O3, T	C: 0-45 km P: 25-65 km	Dec. 1984-Feb. 1998	Larry Flynn, NOAA/NESDIS, Washington, DC, USA
	NOAA-11	850 km/99°				Sep. 1988-Sept. 1994	
	NOAA-14					Dec. 1994-present	
	NOAA-15					Jun. 1998 - present	
	NOAA-16					Sep. 2000-present	
	NOAA-17					Jun. 2002-present	
	NOAA-N					May 2005 - present	
NOAA-N1		Planned for 2008					
SSBUV	8 Space Shuttle missions		UV nadir scattering	O3 C; O3 P at Umkher resolution		8 one-week flights between 1989 and 1996	Ernest Hilsenrath, NASA/Goddard Space Flight Center, USA
SOLSE/LORE	STS-87	296 km/28.45°	UV/VIS limb scattering	O3	P: 10-50 km	Nov. 19, 1997 - Dec. 5, 1997	Richard McPeters, NASA/Goddard Space Flight Center, USA
	STS-107	275 km /39°				Jan. 16, 2003 – Feb. 1, 2003	
OMPS	NPP	833 km, sun synchronous/98°	UV/Vis nadir/limb scattering	O3	C/P	The NPOESS Program is currently in the Acquisition and Operations phase, which started in August 2002	
CRIMSS	NPOESS		IR and mw sounders	pressure, temperature and moisture profiles	P	The NPOESS Program is currently in the Acquisition and Operations phase, which started in August 2002	
LIMS	Nimbus-7	955 km/99,15°	IR limb emission	O3, H2O, NO2, HNO3, T	P: 10-50 km	Oct. 1978 - Dec. 1993	James M. Russell III, Hampton University, VA, USA
SAMS	Nimbus-7	955 km/99,15°	IR limb sounder	H2O, N2O, CH4, CO, NO, T	P: 20-100km	Oct. 1978 - Dec. 1993	Frederick Taylor, Oxford University, Department of Atmospheric Oceanic and Planetary Physics, UK
CLAES	UARS	600km/57°	IR limb emission	O3, N2O, CFC13, CF2Cl2, CH4, H2O, NO, NO2, HNO3, ClONO2, HCl, N2O5, aerosols, T, p	P: 16-60 km	Oct. 1991/May 1993	Aidan Roche, Lockheed Martin Advanced Technology Center, CA, USA
HALOE			IR solar occultation	T, O3, HCl, HF, CH4, H2O, NO, NO2, aer.	P: 15-60/130 km	Oct. 1991 - present	James M. Russell III, Hampton University, VA, USA
ISAMS			IR limb emission	CO, H2O, CH4, O3, HNO3, N2O5, NO2, N2O, aerosols, T	P: 16-60 km	Sep. 1991 - Jul. 1992	Frederick Taylor, Oxford University, Department of Atmospheric Oceanic and Planetary Physics, UK
MLS			MW limb emission	O3, ClO, HNO3, H2O, SO2, T, P	P: 16-80 km	Oct. 1991 - present	Joe Waters, Jet Propulsion Laboratory, CA, USA
MOPITT	EOS Terra	670 km/98,2°	IR nadir	CH4, CO	C	Mar. 2000 - present	James R. Drummond, University of Toronto, Department of Physics, ON, Canada
SABER	TIMED	627 km/74,1°	IR limb emission	CO2, O3, O2, OH, NO, H2O	P: 60-180 km	Dec. 2001 - present	James M. Russell III, Hampton University, VA, USA
MLS	EOS Aura	685 km, polar sun-synchronous/98,2°	MW limb emission	O3, ClO, H2O, HNO3, HCl, N2O, OH, HO2, CO, HCN, HOCl, BrO, SO2, Cloud ice, T	P: 8-90 km	Jul. 2004 - present	Joe Waters, Jet Propulsion Laboratory, CA, USA
HIRDLS			IR limb emission	O3, H2O, CH4, N2O, NO2, HNO3, N2O5, ClONO2, CFC-12, CFC-13, aerosols, T	P: 8-80 km	Jul. 2004 - present	John Barnett, University of Oxford, Department of Physics, UK John C. Gille, NCAR, Boulder, CO, USA
OMI			UV/VIS nadir	O3, NO2, BrO, OCIO, HCHO, SO2, H2O, aer.	C	Jul. 2004 - present	Pietermel Levelt, KNMI, the Netherlands
TES			IR nadir/limb emission	O3, NO, NO2, CO, H2O, SO2, CH4, HNO3, T, P	P	Jul. 2004 - present	Rheinhard Beer, Jet Propulsion Laboratory, CA, USA

OCO	OCO	Sun synchronous orbit, 1:15 pm	nadir/sunglint/target sounding	CO2		scheduled in October 2007	David Crisp, Jet Propulsion Laboratory, CA, USA
ORA	EURECA	508 km/28°	VIS / NIR solar occultation	O3, NO2, H2O, aerosols	P: 20-100km	Aug. 1992-May 1993	Etienne Arijs, Belgian Institute for Space Aeronomy, Belgium
GOME-1	ERS-2	785km, sun-synchronous, near polar orbit	UV / VIS / NIR nadir	O3, NO2, BrO, OClO, HCHO, SO2, H2O, clouds, aerosols	C	Apr. 1995 - present	Core Resp. Tobias Wehr, European Space Agency/ESTEC PI: John P. Burrows, University of Bremen, Germany
				O3 P at Umkher resolution; tropospheric O3, NO2, BrO	O3 P: 0-50 km		
SCIAMACHY	ENVISAT-1	790 km/ 98.6°; circular, sun-synchronous polar	UV / VIS / NIR nadir / limb / occultation	UV / VIS: O3, NO2, NO3, BrO, OClO, HCHO, SO2, H2O NIR: CH4, CO, N2O, CO2, O2, clouds, aerosols O3, NO2, BrO, NO, PSC, PMC, NLC	C P	Jul. 2002 - present	PI: John P. Burrows, University of Bremen, Institute of Environmental Physics and Remote Sensing, Germany; Co-PI: Albert Goede, KNMI, the Netherlands; Co-PI: Christian Muller, Belgian Inst. for Space Aeronomy, Belgium
GOMOS			UV / VIS stellar occultation	O3, aerosols T, H2O, NO2, NO3, OClO, O2	P: 15-90 km P: 15-50 km	Jun. 2002 - present	Core Resp. Tobias Wehr, European Space Agency/ESTEC
MIPAS			IR limb emission	O3, H2O, CH4, N2O, HNO3, CH4, CFC, T etc.	P: 12-68 km	May 2002 - present	Core Resp. Jörg Langen, European Space Agency/ESTEC
GOME-2	METOP 1/2/3	800-850km / 98.7°	UV/VIS/NIR nadir	O3, NO2, BrO, OClO, HCHO, SO2, H2O, clouds, aerosol O3 P at Umkher resolution; tropospheric O3, NO2, BrO	C P	METOP-1 launch planned for 2Q 2006;	Core Resp. Tobias Wehr, European Space Agency/ESTEC Core Resp. Rose Munro, EUMETSAT, Darmstadt, Germany
IASI			IR nadir (3.62-15.5 µm)	O3, CO, CH4, N2O, SO2 O3, H2O, T	C P	METOP-2/3 flights foreseen	Core Resp. Dorothy Diebel, EUMETSAT, Darmstadt, Germany
ATMOS	Spacelab-3	370km/57°	IR solar occultation	30 IR species including O3, N2O, CH4, H2O, the entire NOy family, and much of the chlorine and fluorine families, including HCl, HF, and ClONO2.	P: 20-80 km	Apr. 1985	Michael R. Gunson, Jet Propulsion Laboratory, CA, USA
	Atlas-1					Mar. 1992	
	Atlas-2	300km/57°				Apr. 1993	
	Atlas-3	300km/57°				Nov. 1994	
CRISTA	Atlas-3	300km/57°	IR limb emission	20 IR species	P: 15-90 km	Nov. 1994	Dick Offermann, University of Wuppertal, Department of Physics, Germany
	SPS 85	300km/57°				Aug. 1997	
MAHRSI	Atlas-3	300km/57°	UV resonance fluorescent limb scattering 53° S - 63° N	OH, NO	38 – 90 km for OH; 48-160 km for NO	CRISTA-SPAS (STS-66, Atlantis): 3-14 Nov 1994; CRISTA-SPAS (STS-85, Discovery): 7-19 Aug 1997	Michael H. Stevens, Naval Research Laboratory, Washington, DC, USA
IMG	ADEOS-1	800 km, sun-synchronous sub-recurrent orbit/ 98.6°	IR nadir	CO, CO2, CH4, N2O, H2O, O3 and T	P	Sep. 1996-Jun. 1997	Toshihiro Ogawa, EORC JAXA, Tokyo, Japan
ILAS			IR/VIS solar occultation	O3, H2O, NO2, HNO3, N2O, CH4, CFC-11, aerosols, T, P	P: 15-70 km	Sep. 1996-Jun. 1997	Yasuhiro Sasano, NIES, Tsukuba, Japan
ILAS-II	ADEOS-2		IR/VIS solar occultation	O3, H2O, NO2, HNO3, N2O, CH4, CFC-11, ClONO2, aerosols, T, P	P: 10-60 km	Dec. 2002- 2003	
GOSAT	GOSAT	666km/98°		CO2, CH4	P	Planned for 2008	Takashi Hamazaki, JAXA, Tokyo, Japan
OZONE	MIR/Priroda	280 km/51.7°	UV/VIS/NIR occultation	O3, N2O, CH4, CF2Cl2	P: 5-75 km	May 1996-1999	Yuriy Timofeyev, Saint Petersburg University, Atmospheric Physics Department, Russia
STOK			IR emission/occultation				
POAM II	SPOT 3	830km, sun synchronous polar orbit/98.6°	UV/VIS/NIR solar occultation	O3, NO2, H2O, aerosols, T	P: 10-40 km	Oct. 1993-Nov. 1996	Karl Hopper, NRL, Remote Sensing Division, Washington, DC, USA
POAM III	SPOT 4	800km, sun synchronous polar orbit/98.8°		O3, NO2, H2O, aerosols, T, O2		Mar. 1998 - present	Richard Michael Bevilacqua, NRL, Remote Sensing Division, Washington, DC, USA
SMR	Odin	600km, sun-synchronous polar/98°	passive microwave limb sounder	ClO, N2O, HNO3, O3, H2O, H2O2, and CO	P: 7-70 km	Feb. 2001 - present	Donal Murtagh, Chalmers University, Institute for Radio and Space Science, Sweden
OSIRIS			UV/VIS/IR limb sounder	O3, NO2, OClO, BrO, O2, aerosols	P: 15-80 km		E.J. (Ted) Llewellyn, Department of Physics and Engineering, University of Saskatchewan, Canada
ACE FTS	SCISAT-1	650km/74°	IR solar occultation	* O3, CO2, CO, H2O, and CH4. * Nitrogens: NH3, NO, NO2, N2O, N2O5, HNO2, HNO3, HO2NO2, ClONO2, HCN * Halogens: CCl3F (F11), CCl2F2 (F12), CH3CCl3, CHClF2 (F22), CH3Cl, CCl4, SF6, HF, HCl, CF2O, HOCl. * Sulfur oxides: OCS, SO2. * Others: C2H2, C2H4, C2H6, CH3D, aerosols and PSC IR spectra	P: 4-100 km	Aug. 2003-present	Peter Bernath, Department of Chemistry, University of Waterloo, Canada
MAESTRO			UV/VIS/NIR solar occultation	primarily O3, NO2 and aerosol/cloud extinction, (BrO, OClO), T, P			T. McElroy, Meteorological Service of Canada, Canada
AIRS	EOS Aqua	705 km, polar orbit/98°	IR sectoradiometer	T and H2O, CH4 (P) and ozone, CO, CO2 (C)	C; P	May 2002 - present	Thomas S. Pagano, Jet Propulsion Laboratory, California Institute of Technology, USA

GRACE/GPS	GRACE	500 km/98°	occultation	P, T, humidity	P	March 2002	Byron Tapley, University of Texas at Austin, Center for Space Research, USA; Christoph Reigber, GeoForschungsZentrum Potsdam, Germany
BUV	EXOS-C (OHZORA)	600 km/75°	backscatter UV	O3 P at Umkehr resolution	P	Feb. 84 - Dec. 88	
LAS			occultation IR instrument		P		
CALIPSO	CloudSat		IR nadir	aerosols, PSCs and clouds	P	Fall 2005	David M. Winker, NASA Langley Research Center, USA
GRILLE	Spacelab-1 Atlas-1	248km/57°	IR solar occultation	CO, CO2, CH4, NO, NO2, H2O, HCl, HF, O3	P	Nov. 28 - Dec. 8, 1983 Mar. 1992	Martine De Mazière, Belgian Institute for Space Aeronomy, Belgium
MAPS	STS-2 STS-41G SRL		IR nadir radiometry	CO in the middle troposphere	P: 2-12 km	Nov. 1981 Oct. 1984 Apr. 1994	Henry G. Reichle, JR, Atmospheric Science Division, NASA Langley Research Center, Hampton, USA
MAS	ATLAS-1 and ATLAS-2	300 km/latitude range between +/- 72° for an orbit inclination of the Shuttle of 57°.	limb sounding instrument	H2O, O3, ClO, T and P	P	ATLAS-1: Mar 24- Apr 2, 1992; ATLAS-2: Apr 8-17, 1993	G.K. Hartmann, Max-Planck-Institut für Aeronomie, Germany
SHIMMER	STS-112		limb scattered sunlight	OH, T	P	Oct. 7-18, 2002	
UV + NIR spectr.	SME		UV + NIR limb scattering	O3	P: 48-65 km (UV) + 50-90 km (NIR)	Oct. 1981 - Apr. 1989	Charles Barth and Gary Rottman, Laboratory for Atmospheric and Space Physics, University of Colorado, Boulder, CO, USA
VIS NO2 spectr.			VIS limb scattering	NO2	P: 24-40 km	(Data: Dec 1981 - Dec. 1986)	
SOFIE	AIM		IR/UV solar occultation	PMCs, O3, NO, N2O, CH4, CO2, aerosols, T	P: tropop-105 km	Sept. 2006	James M. Russell III, Hampton University, USA
STEAM			limb-sounding microwave instrument	global distributions of UT/LS key species such as H2O, O3, and CO	P: 30-50 km	Planned for 2008	
JVSI	MSX spacecraft	908 km, nominal circular orbit/99.6°	IR/UV/Vis limb and disk observations of aurora; star pointing	O3 P from stellar occultation; spatial and energy characteristics of electron and proton/hydrogen precipitation		Apr. 1996 - present	Robert O'Neil, Phillips Laboratory, MA, USA

Status October 2005

For further details, follow satellite links on <http://www.ndsc.ws>

Prepared by P. Skarlas (IASB) and the NDSC Satellite WG