Nominal Observation Mode

(V3.2, January 2002)

No.	Scientific Objectives	Primary Target Parameters/Gases	Altitude Range	Vertical Spacing	Horizontal Spacing	Azimuth Mode	Coverage	Frequency of Observations (prelimin.)
N	• Stratospheric Chemistry and Dynamics • Applications in Climatology • Applications in Medium Range Forecasts	p,T, O3, N2O, CH4, H2O, HNO3, NO, NO2, N2O5, ClONO2, CFCs, CO, aerosol, PSCs	68 - 6 km	68, 60, 52, 47km, 42 to 6 km in 3 km steps	~510 km (17 angles per limb sequence)	RW[1]	global	90% within the first full seasonal cycle, at least 50% afterwards

[1] rearward view, azimuth angle dependent on orbit position to permit full global coverage

Special Observation Modes

(V3.8, June 2002)

No.	Scientific Objectives	Primary Target Parameters/Gases	Altitude Range	Vertical Spacing	Horizontal Spacing	Azimuth Mode	Coverage	Frequency of Observations (prelim.)/ Remarks
S1	Polar Chemistry and Dynamics (perturbed chemistry at increased spatial resolution, denitrification, vortex erosion, transport of vortex air)	p,T, O3, N2O, CH4, H2O, HNO3, NO, NO2, N2O5, ClO, HOCl, ClONO2, aerosol, PSCs	55 – 7 km	55, 45, 35, 30, then 27 to 13 km in 2km steps, 10, 7	~420 km (14 angles per limb sequence)	RW[1]	global	regularly from 2nd year on. Latitude dependent altitude offset following: Minimum tangent altitude = 8km + 2km* cos(2*tangent point latitude)
S2	• Troposph./Stratosph. Exchange Processes (upward/downward transport, altitude of hygropause/tropop.) • Tropospheric Chemistry;	p,T, O3, N2O, CH4, H2O, CO, CFCs, SF6, C2H2, C2H6, HNO3, (NO2), (NO), others (tbd), cirrus clouds	40 – 5 km	40, 30, 25 km, then 20 to 5 km in 1.5 km steps	~420 km (14 angles per limb sequence)	RW[1]	global	Several days every other month over one year
S3	Impact of Aircraft Emissions	p,T, O3, H2O, HNO3, NO, NO2, ClONO2, N2O, CH4, aerosol, PSCs	40 -6 km	40, 30, 23, 18 km, then 15 to 6 km in 1.5 km steps	~330 km (RW option) (11 angles per limb sequence)	RW[1] or CT[2] (tbd)	primarily north of 25° N latitude	a few days in summer and winter sideways option preferred

Special Observation Modes (cont.)

(V3.8, June 2002)

No.	Scientific Objectives	Primary Target Parameters/Gases	Altitude Range	Vertical Spacing	Horizontal Spacing	Azimuth Mode	Coverage	Frequency of Observations (preliminary)/ Remarks
S4	Stratospheric Dynamics, Transport Processes (medium scale structures, ozone laminae, …)	p, T, O3, N2O, CH4, H2O, HNO3, CFC-11	53, 47 - 8 km	3 km (3 x 15 angles)	along track: ~390 km cross track: ~550 km	RW 3 ‘parallel’ swaths at 170, 180, and 190° azimuth	global	each one week per season; spectral resolution reduced by a factor of 4
S5	Diurnal Changes	short-lived species like NO, NO2, N2O5	60 - 15 km	3 km	~480 km (16 angles per limb sequence)	CT[2] adjusting of azimuth angle during limb scanning sequence	near the terminator	each one week per season
S6	Upper Troposphere / Lower Stratosphere	H2O, O3	35 – 6km	35, 28, then 24 to 6km in 2km steps	~120 km (12 angles per limb sequence)	RW	global	2 test periods, 1-2 days each spectral resolution reduced by a factor of 4 Latitude dependent altitude offset following: Minimum tangent altitude = 8km + 2km* cos(2*tangent point latitude)

[2] cross track (side view)

Upper Atmosphere Observational Scenarios (V1.5 April 2001)

No.	Scientific Objectives	Primary Target Parameters/Gases	Altitude Range	Vertical Spacing	Horizontal Spacing	Azimuth Mode	Coverage	Frequency of Observations (prelim.)
UA1	Validation (Confirmation of predicted non-LTE effects on the retrieval of p-T and target species)	p,T, O3, N2O, CH4, H2O, HNO3	102-18 km	3 km in stratosphere (42-18km), 5 km above (102-47km)	~630[(1)] km	-	Global	Commissioning phase. At least 1/2 week each in solstice and equinox.
UA2	• Upper polar vortex dynamics • Stratosphere mesosphere exchange and dynamics	CO, NO, NO2, H2O, O3	90-30 km	3 km in stratosphere (51-30km), 4 km in mesosphere (90-54km).	~540[(1)] km		Global	2 days/month (mid month) + 3 days at end March-early April + 3 days at end Spet.-early Oct. During 1 year.
UA3	• Radiative energy budget of the mesosphere and lower thermosphere • Hydrogen, nitrogen and carbon budgets in the upper atmosphere. • Mesospheric dynamic • Non-LTE studies	• CO2 (4.3 and 15µm) NO, O3 • CO2 , CO, NO, NO2, N2O, H2O, CH4, OH? • All above	130-40 km	5 km	~570[(1)] km		Global (Day and Night, different SZAs)	Each one week during equinox and solstice per year (alternating for summer and winter)
UA4	• Non-LTE studies of NO • Radiative cooling of the thermosphere	NO vibrational and rotational.	170-42 km	170 to 90km in 5km steps, 82 to 42km in 8km steps	~450[(1)] km		Global	Each one week during equinox and solstice per year.
Special Event	Auroral effects	NO, NO+, CO2 , O3, OH	160-40 km	5 km	~750[(1)] km		Polar winter regions	Several days/year (preferably following to aurora alerts).

[1]Reduced in a factor of ~1.8 if spectral resolution reduced in a factor of 2.