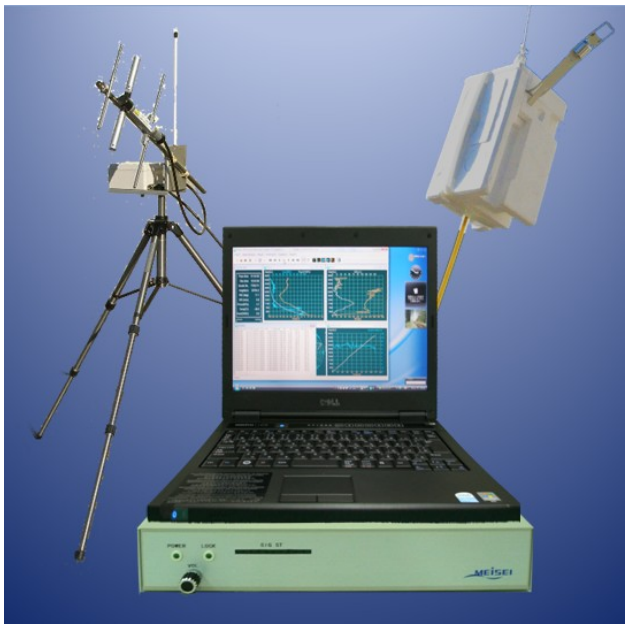
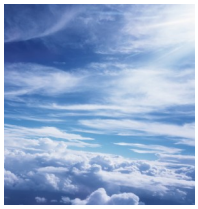
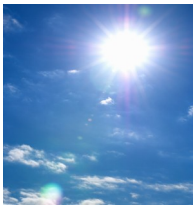
GPS Sonde System

Supporting various kinds of research for Academic Users
RD-08AC + RS-06G(S)







Outline

GPS Sonde System RD-08AC has been developed based on upper air sounding system used by Japanese Meteorological Agency and other member or of WMO. It is strictly focused on researchers and professional use.
Its function has been redefined and re-evaluated, which resulted in cost savings and increased portability.
Your sounding experiences will be expanded more than ever.
The corresponding GPS radiosonde, RS-06G(S) enables 240-minutes sounding operation, allowing arious kinds of sounding, such as CFH,CO2 Sonde, and ECC, due to expansive I/F.
It also supports latest GPS radiosonde, RS-11G.

Radiosonde sounding system RD-08AC

"Focused on" Research Purposes
- Selected design intended for specific research purposes and cost reduction
- Sounding software MGPS_R offers data filtering OFF

Sounding Anytime, Anywhere!
- Near Letter size receiver with 2 kg weight, LIGHT*!*
- From 100 to 240 VAC for global use
- 30-minutes setting time, which enables much easier radiosonde sounding

Sounding Emergency Safe Proof
- Safety function for sudden shutdown of PC: audio data reproduction function enables data restoration

GPS radiosonde RS-06G(S)

Stand-alone positioning
- Same sensor is used for temperature and humidity measurement, as GPS RS-06G of Japanese Meteorological Agency.

A lot of Expansive I/F
- Such as A/D x 6ch, Serial Report, etc., supporting different sensors.

Light weight*!*
- Less than 150g including batteries. Light and low density design lessens accidents when the radiosonde falls on ground.

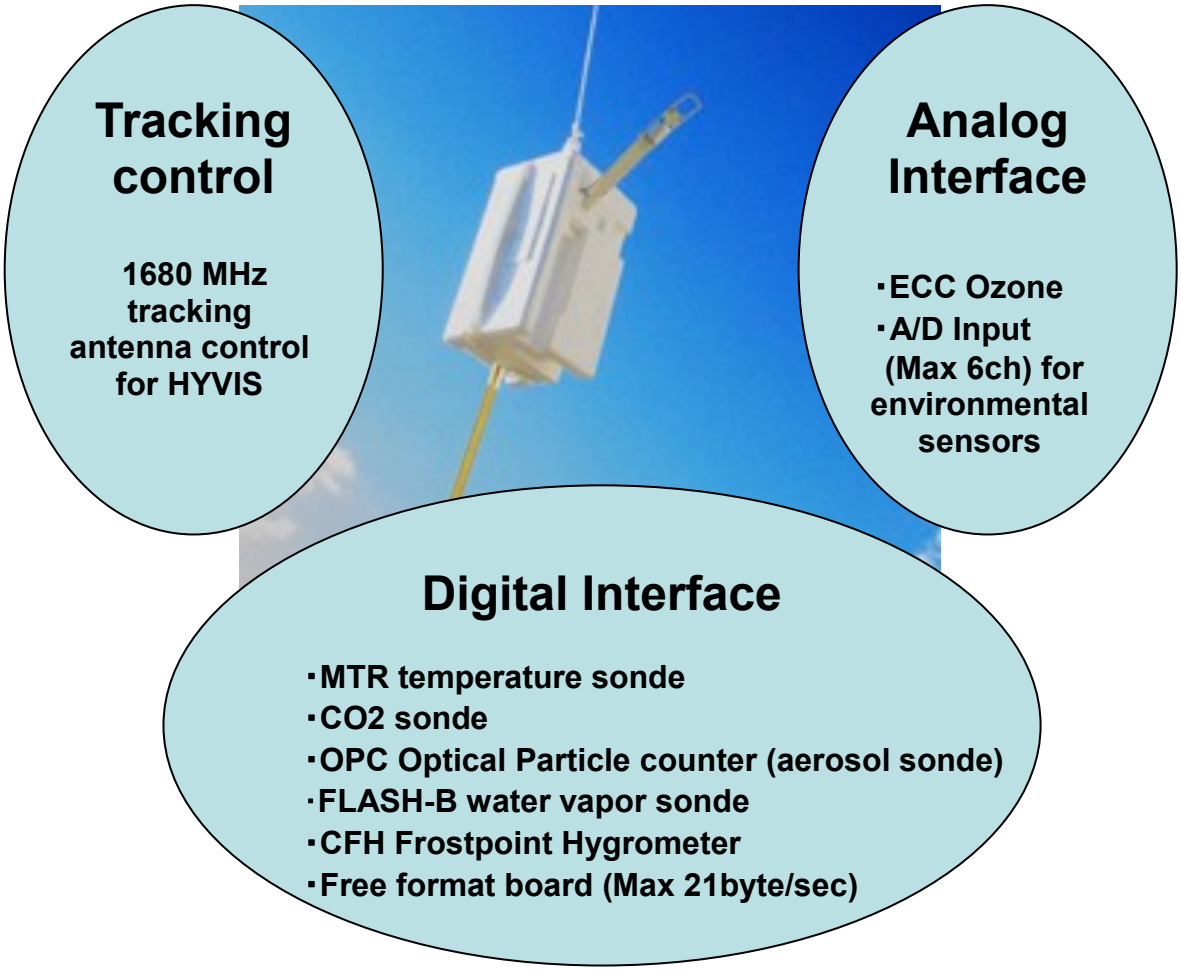
Lessens cumbersome launching work
- Lithium battery has been adopted.
  A radiosonde-preparation time of 5 minutes for 240 minutes use .

GPS radiosonde RS-11G

Supports latest model RS-11G
- The sounding by RS-11G is possible without any software upgrade.

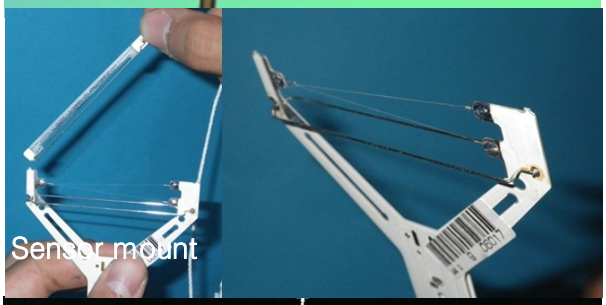
INTERFACE TO SPECIAL SENSORS

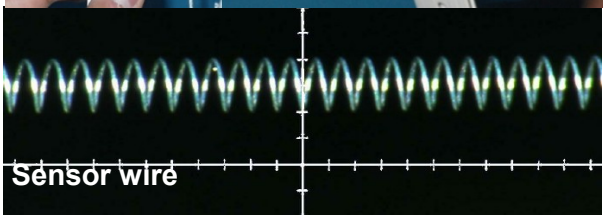
GPS RADIOSONDE MODEL RS-06G and RS-11G have interface for special sensors to cope with various requirements for atmospheric observation. The digital interface to send data with 21byte/sec and analog interface with 6ch 16bit A/D converter is available. The tracking control feature which is newly available by connecting HYVIS receiving antenna (optional) enables the observation by HYVIS , which can transmit pictures of cloud particles. By combining these digital/analog interfaces and tracking control systems, RS-06G can meet various observation purposes. For example, ECC ozone sensor and OPC aerosol sensor as well as HYVIS (cloud particle sonde) can be combined to RS-06G.



RD-08AC sounding system will be enhanced to meet all sort of research's requirements. Meisei will develop interface for unique sensors, and will support interface connection to the client's sensors.

MTR temperature sensor + RS06G





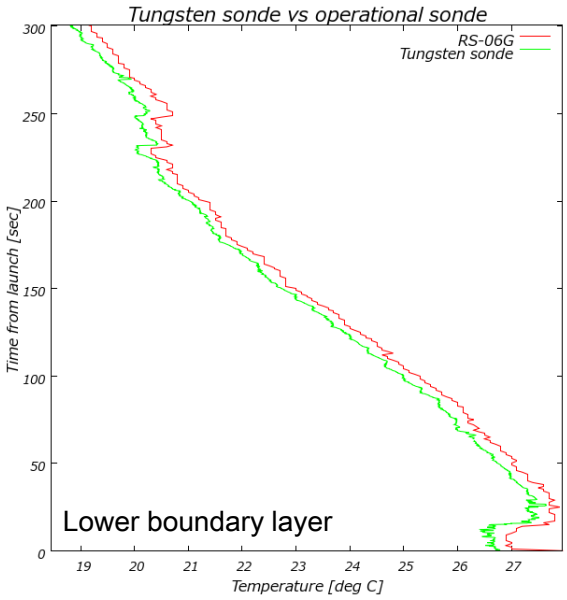
MTR use the temperature dependence of electric resistance of the fine tungsten wire (10 um diameter) that was once used for the rocket sonde. The response time of MTR is quite fast and fine temperature profile by using 16 Hz sampling is possible. Also, solar radiation error is smaller than the conventional radiosonde due to the aluminum coating of fine lines.

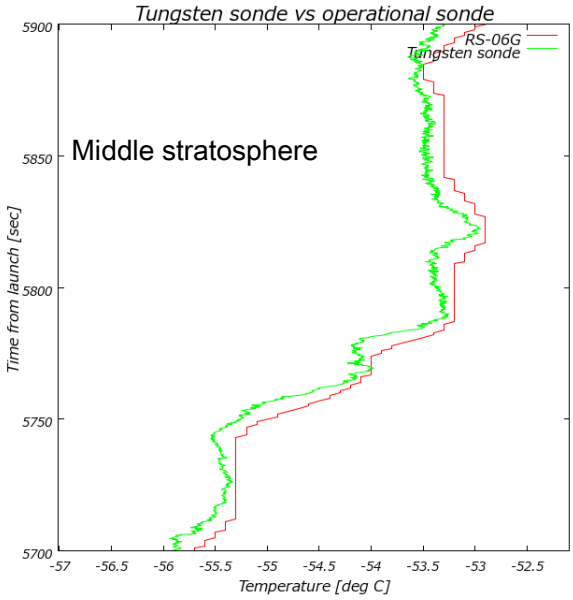
To obtain accurate temperature profiles, not only fast response but also consideration for self-contamination is essential.

To avoid self contamination from sonde package box and sensor rig, MTR has long sensor probe and independent top sensor rig to avoid this problem.

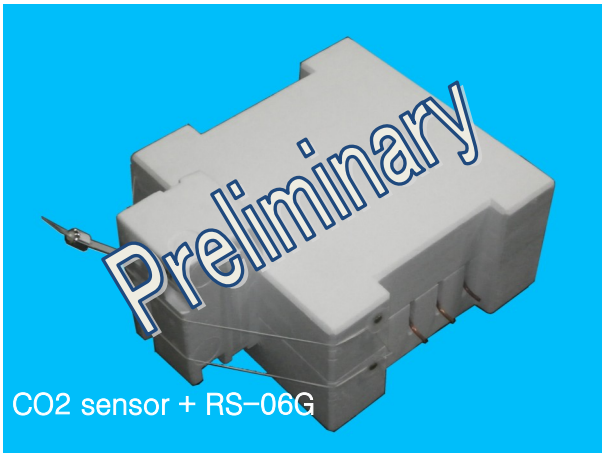
Specification

Temperature	Measurement range	-100 to +50 ℃
	Resolution	0.01 K
	Precision	±0.2 K (σ)
	Radiation error	< 0.5 K (10 hPa,5 m/s)
	Response time	0.007 sec (1000 hPa 5 m/s) 0.040 sec (10 hPa 5 m/s)
	Measurement cycle	6 Hz
Size	Dimension	16H x 9W x 16D (incl. RS-06G)
	Weight	300 g (incl. RS-06G and battery)





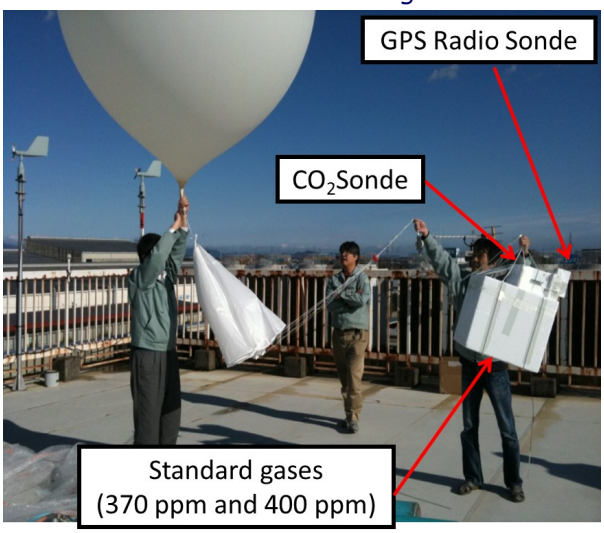
CO2 sensor + RS-06G (Sales will start on end of 2012)



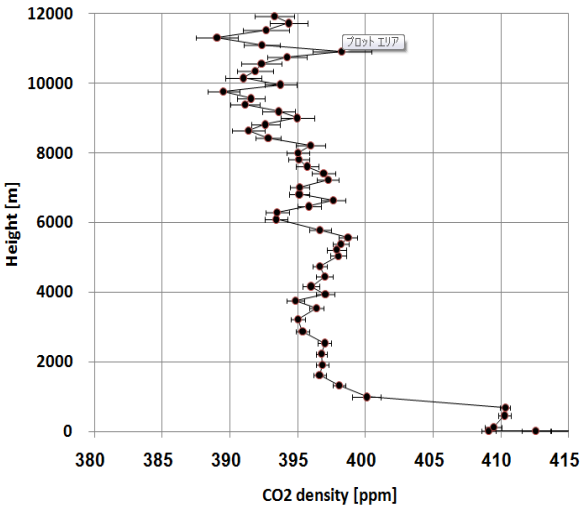
Specification

CO2	Measurement range	0 to 1000 ppm
	Altitude	0 to 10000 m
	Accuracy	< 1 ppmv (σ)
	Time resolution	< 40 sec
	Vertical resolution	200 m
	Standard gases	370 and 400 ppm
Power	Battery	4.5 V and 18 V
Size	Dimension	19H x 34W x 28D cm (incl. RS-06G)
	Weight	< 2 kg (incl. RS-06G and battery)

Scene of CO2 sonde launching

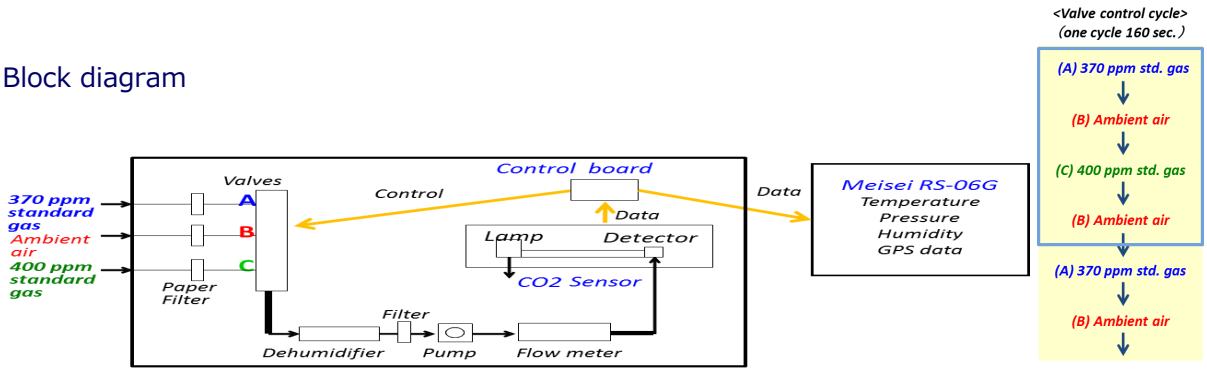


Sample profile

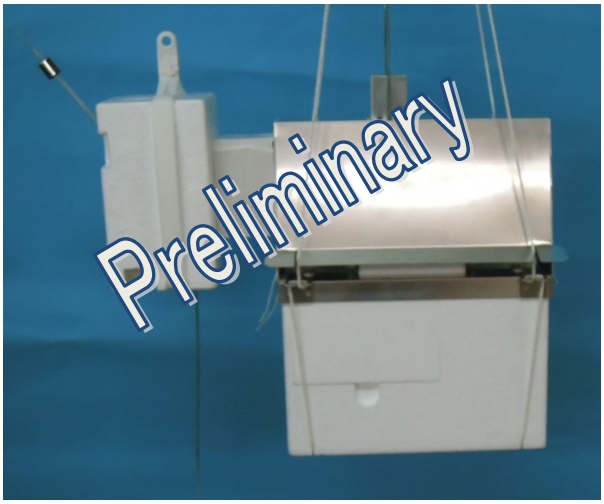


World-first Balloon-born CO2 sensor was developed to measure the vertical profile of CO2 in any place in the world under any weather conditions. The precision of NDIR type CO2 sensor is less than 1 ppm from ground to 10 km height by using two reference gases. The ambient air and reference gas alternate every 40 seconds and CO2 sensor continuously proofreads during observation. Although CO2 sonde with reference gas is of large size, the weight is less than 2 kg. Therefore, it is operable by conventional weather observation balloon, suitable for isolated areas or remote islands, where remote-sensing equipment is not always operative.

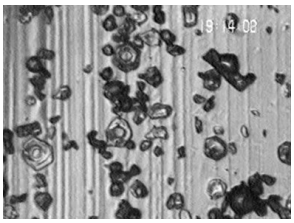
Block diagram

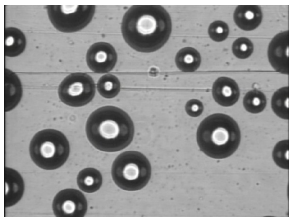


HYVIS



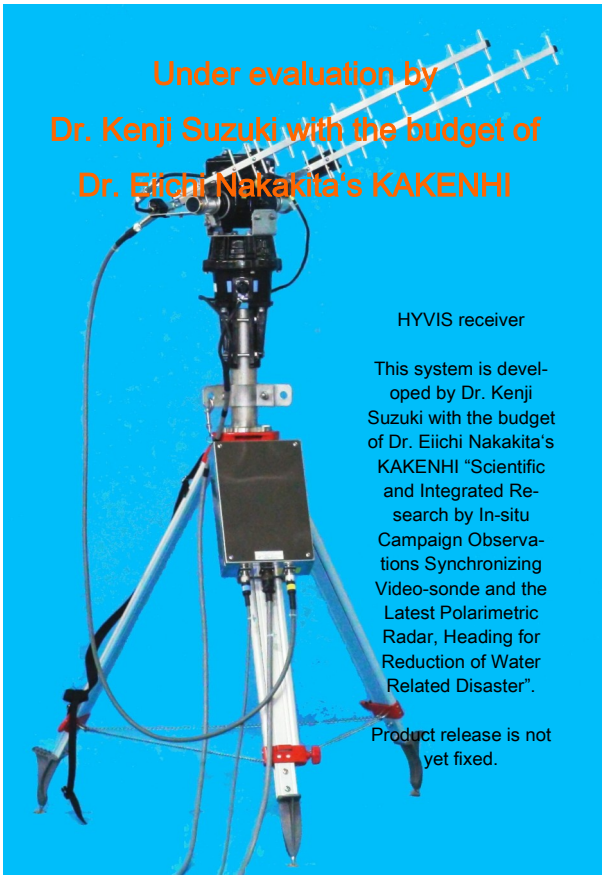
Picture field	Close-up	15 to 20 mm (Approx. 30 um resolution)
	Microscope	1.5 to 2.0 mm (Approx. 3 um resolution)
Picture switching	Close-up	7 sec.
	Microscope	3 sec.
Video picture		Monochrome NTSC
Transmitter	Frequency	1673, 1680, 1687
	Modulation	FM
Observation		60 min
Size & Weight	Size	280× 220× 150mm
	weight	1200 g
Type	Standard	Microscopic camera & Close up camera
	Night use	Microscopic camera & Close up camera with LED
	Forced suction	Microscopic camera & Close up camera with fan





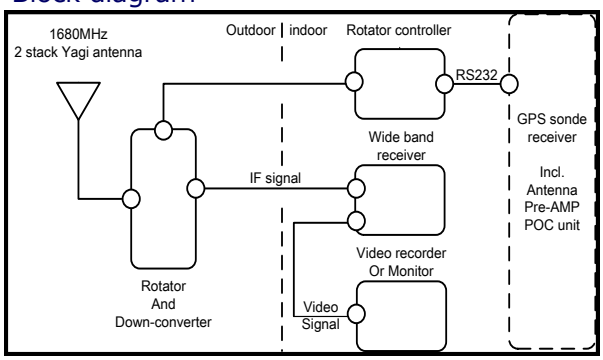
HYVIS(HYdrometer VIdeoSonde) can observe real cloud particles by using video camera and wide band transmitter. Two cameras (microscope and close-up) are switched alternately, and is possible to calculate the density of particles. It will support validation for classification of precipitation and cloud particles by Polari metric radar as well as for cloud resolving numerical simulation.

HYVIS receiver

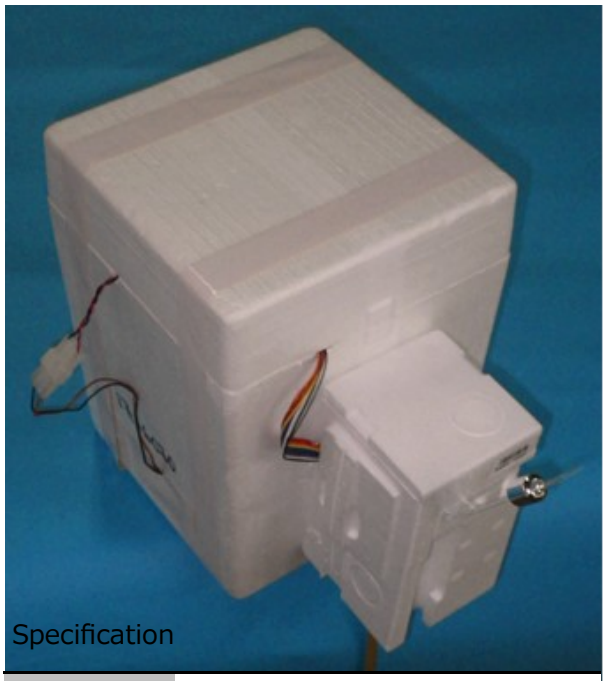


HYVIS receiver has capability to control antenna by GPS positioning data from GPS radiosonde, resulting in down-sizing. Cloud particles and droplet video signals that are transmitted from HYVIS by 1680MHz , are received, down-converted and demodulated on this system. And it outputs NTSC video signal. Information regarding atmospheric pressure, temperature, humidity and wind can be measured by RD-08AC connected to the system.

Block diagram



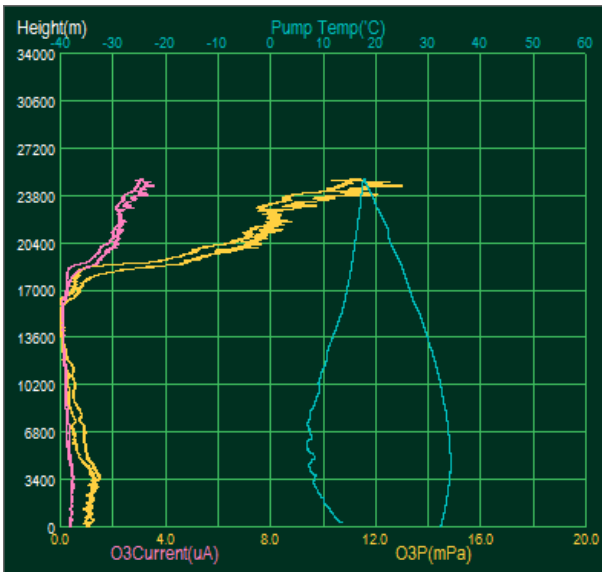
ECC Ozone + RS-06G



Specification

Ozone	Ozone current	0 to 20 um
	Pump temperature	-40 to 60 deg. C
Size	Dimension	25H x 30W x 20D cm (incl. RS-06G)
	Weight	< 800 g (incl. RS-06G and battery)

The 6ch analog input installed in RS-06G(S) can be used as an interface for ECC ozonesondes. RD-08AC system supports special soundings using digital interface sensors in addition to ECC ozonesonde.



FLASH-B + RS06G

FLASH + RS-06G + ECC ozone

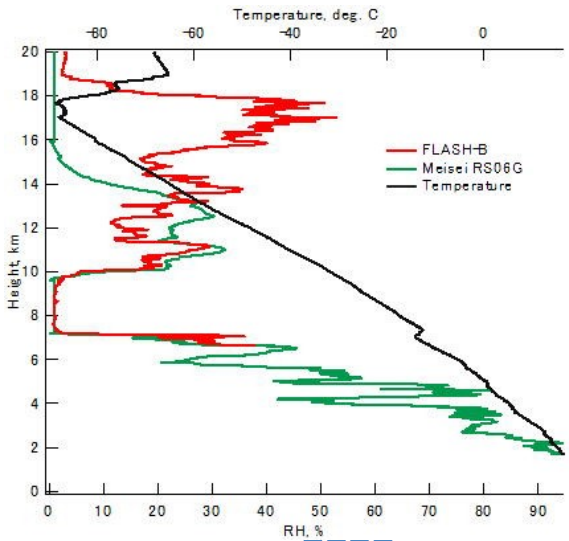
The FLASH-B instrument was developed by Central Agrological Observatory in Russia for balloon borne water vapor measurements in upper troposphere and stratosphere.

To avoid contamination effect, the measurement is performed at descent. Optical in nature, delay in time constant is negligible.

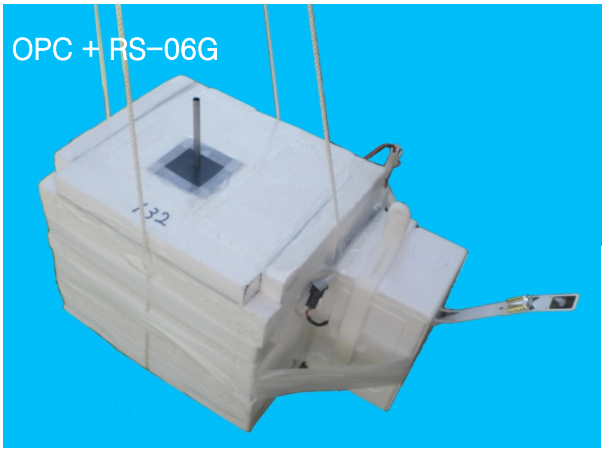
High temporal resolution even in stratosphere is possible.

Specification

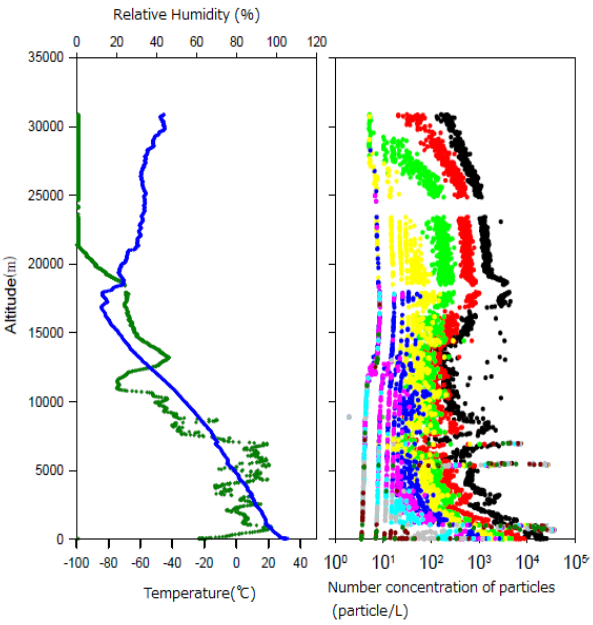
Water Vapor	Measurement range	0.5 to 700 ppmv
	Resolution	0.1 ppmv
	Measurement cycle	1 sec
	Recommended integration time	4 sec
	Precision	5.5 %
	Uncertainty	< 10 %
	Pressure range	300 to 5 hPa
Size	Dimension	< 25H x 15W x 10D cm (excl. RS-06G)
	Weight	900 g (incl. RS-06G and battery)



OPC Aerosol sensor + RS-06G



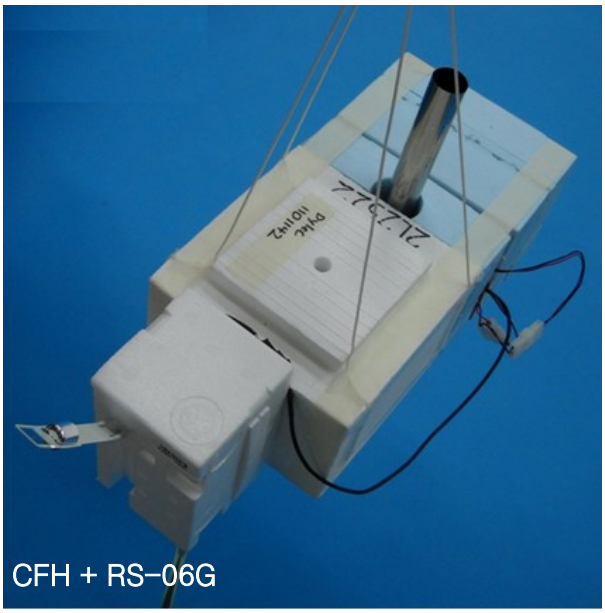
OPC (Optical Particle Counter) was developed by YGK Corporation. 10 units of built-in optical counters count particles with diameters from 0.3 to 10.0 micro meter.



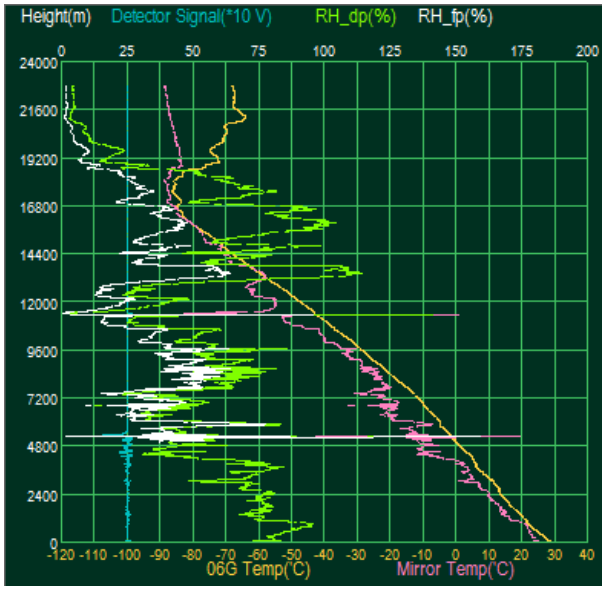
Specification

Aerosol	Particle channel	10 channels (0.3, 0.4, 0.5, 0.66, 0.8, 1.2, 2.0, 3.4, 7.0, 10.0 um)
	Measurement particle number	0 to 50000 PCS/little
	Measurement range	1040 to 5 hPa
	Measurement cycle	4 sec
Size	Dimension	19H x 18W x22D cm (excl. RS-06G)
	Weight	1.2 Kg (incl. RS-06G and battery)

CFH Hygrometer + RS06G



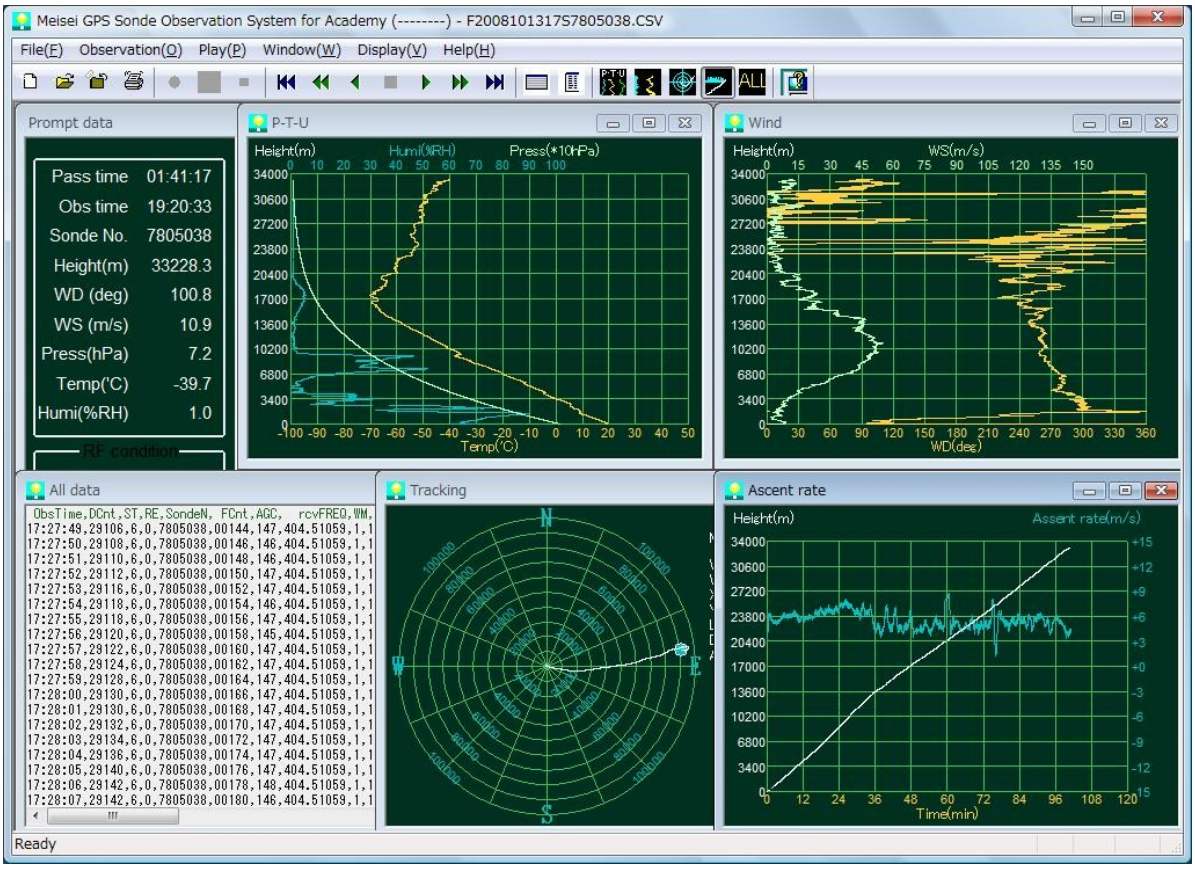
CFH is the chilled mirror type hygrometer that has been developed by the University of Colorado. Cryogen (CHF3) and electric heater are used for control of mirror temperature, and humidity can be accurately measured from the surface to the stratosphere.



Specification

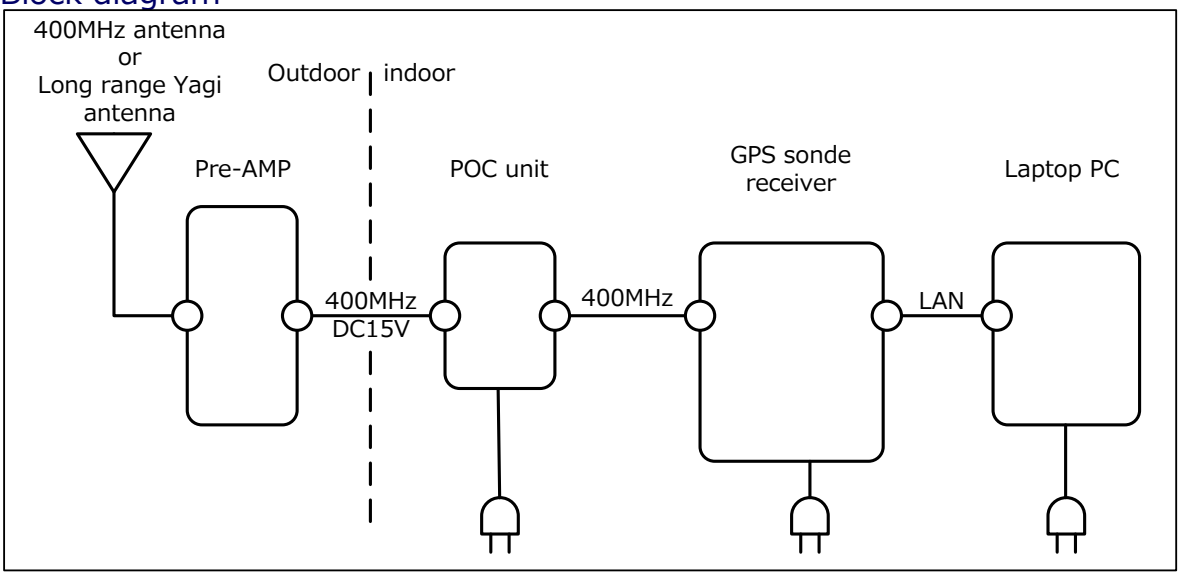
Dew/Frost Point	Measurement range	-100 to +50 ℃
	Resolution	0.01 K
	Precision	±0.5 K (σ)
Size	Dimension	16H x 9W x 16D (incl. RS-06G)
	Weight	1 kg (incl. RS-06G and battery)

Sounding software : MGPS_R

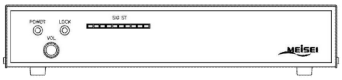
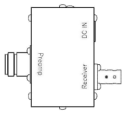
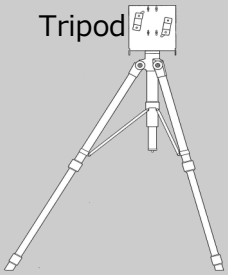
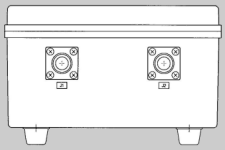
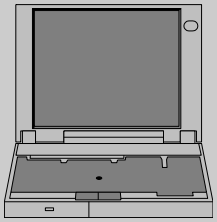
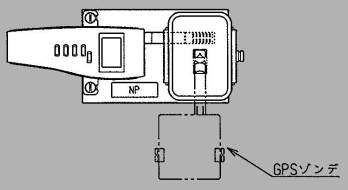
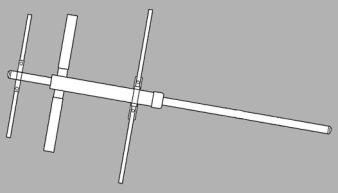


Sounding software MGPS_R manages pre-flight test to filing of data after sounding termination. The monitor during sounding indicates real time data, PTU data, wind speed & direction data, sonde tracking chart and ascent rate, which avails real time data during sounding. The data prior to and posterior to sounding can be logged and can be stored by CSV format. The correction and filter to temperature and GPS data can be removed by programing for analysis of row data .

Block diagram



System components of RD-08AC

Receiver 	POC unit 	Accessory Sonde I/F cable LAN cable Obs. software（CD-R） 15m coaxial cable* (*:Only standard and full package)
Tripod 	400 MHz antenna 	Pre-AMP 
Laptop PC 	Sonde checker 	Long range antenna 

Minimum package : □

Standard package : □ + ▒

Full package : □ + ▒ + ■

3 types of system composition are offered.

- Minimum package for user who has 400MHz Antenna and Pre amplifier
- Standard package includes items for Radiosonde observations.
- Full package includes long range antenna and sonde checker in addition to standard package

Other products information

- RS-06G(S) GPS radiosonde
- Parachute and unwinder
- Balloon (0-10km=100g: 0-20km =350g: 0-30km=600g)
- Aluminum carrying case
- Balloon buoyancy measure
- HYVIS receiver (Product release is not yet fixed.)

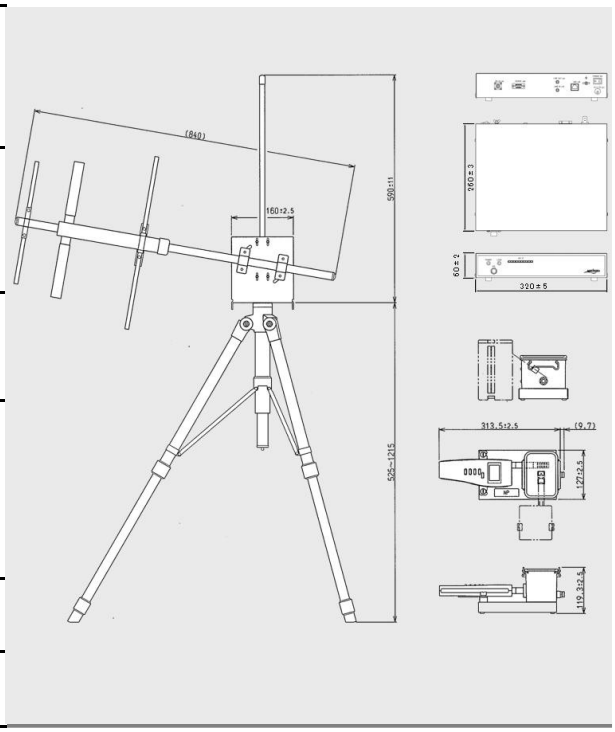
Specifications : RD-08AC

Receiver	Tuning range	400.0MH z ~406.0MHz	Data Processor (Laptop PC)	OS	Windows 7 (32bit)
	Channel	100 kHz steps (60ch)		CPU	> 1GHz (32bit)
	Sensitivity	< -107[dBm]		memory	> 1GB
	Indicator	Signal strength, Lock lamp		Communication	> LAN× 1
	Functions	AFC、Limiter AMP、ATT		Language	English only
Demodulator	Type	PCM-FM、Biφ	Omni Antenna	Absolute gain	> 2.15[dBi]
	Baud rate	1200bit/sec		Center frequency	403MHz
	Error correcting	BCH, 1 bit error correction		Input impedance	50Ω
Communications	Data Processor	LAN (10/100BASE-T)		Transmission range	< 100 km horizontal
	Sonde port	D-sub connector	Long range Antenna	Absolute gain	> 7.65[dBi]
	Audio port	Output x 1, Input x 1		Directionality	E=±35°, H=±45°
Size	Dimensions	320(W)×60(H)×260(D)mm		Center frequency	403 MHz
	Weight	Approx. 2.0kg		Input impedance	50Ω
Power	Voltage	100 to 240 VAC		Transmission range	< 250 km horizontal
		(or 12 VDC)	Pre-AMP	Amp gain	> 20[dB]
	Wattage	36 W		Filter	Fc=403MHz

Specifications : RS-06G(S)

Temperature	Measurement range	-90 to +50℃
	Resolution	0.1℃
	Accuracy	±0.5 ℃ (2σ)
	Response Time	< 0.5 sec (1000 hPa,6m/s)
Humidity	Measurement range	1 to 100 %RH
	Resolution	0.1%RH
	Accuracy	±7.0 %RH (2σ)
	Response time	< 0.5 sec (1000 hPa,25℃)
Geo-potential Height	Measurement range	-200 to 40000 m
	Resolution	0.1 m
	Accuracy	±15m (RMS)
Pressure	Measurement range	1050 to 3 hPa
	Resolution	0.1 hPa
	Accuracy	± 2 hPa (Ground to 300 hPa)
		± 1 hPa (300 to 3 hPa)
Wind Direction	Measurement range	0 to 360 deg
	Resolution	0.1 deg
Wind Speed	Measurement range	0 to 200 m/s
	Resolution	0.1 m/s

Appearances & Dimensions



Caution

- Before using products in this catalog, please read the user manual/operating instructions carefully. Please follow the operating instructions and do not remodel products. This will avoid problems and accidents. Please note that problems or accidents arising from incorrect usage occur at your own risk.
- Specifications, standards and/or designs shown in this catalog are subject to change without prior notice for improvement.
- For products which fall under the provisions of Foreign Exchange and Foreign Trade Control Law of Japan as strategic goods or services, permission must be obtained from Japanese Government before exporting them for Japan.
- We cannot accept responsibility for any direct or indirect financial damage or loss of profit that might occur when using the supplied software.
- Colors change to different colors when printing.

The specifications this catalog are current as of Feb. 2012.

http://www.meisei.co.jp

Registered Head Office and Tokyo Sales & Marketing Div.
2-5-7, Koishikawa, Bunkyo-Ku, Tokyo 112-8511, Japan
Tel: +81-3-3814-5129 Fax: +81-3-3814-5004