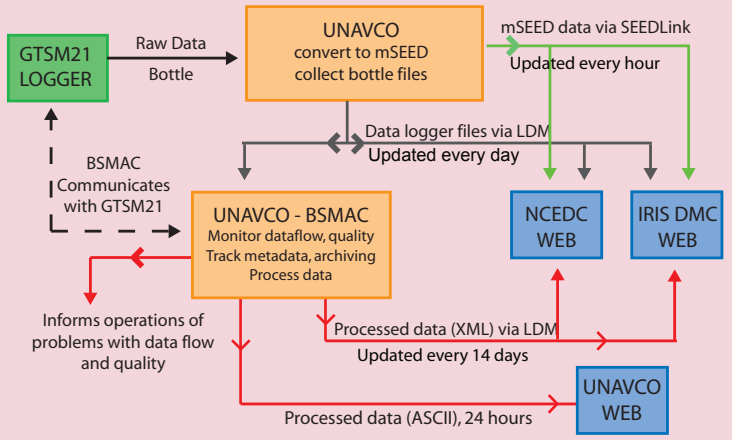
PBO STRAINMETER PRODUCTS

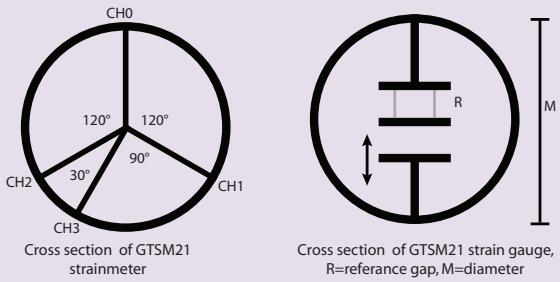
Data Rates and Formats

Type	Rate	Format	Frequency
Strain	1, 20 sps	Bottle SEED	Hourly
	1/600 sps	Bottle SEED ASCII	Daily
Environmental	1/300 sps	Bottle SEED ASCII	Daily
Barometer	1 sps	SEED	Streaming
Seismic	1, 100 sps	SEED	Streaming
Pore pressure	1/300 sps	ASCII	Daily
Tiltmeter	1 sps	ASCII	Daily

Data Flow



GTSM21 Strainmeter



Cross section of GTSM21 strainmeter

Cross section of GTSM21 strain gauge, R=reference gap, M=diameter

The linear gauge strain, u, at time t, is calculated with respect to a fixed raw data point (d_o) .

$$u_t = \left(\frac{d_t/(1e+8)}{1-(d_t/1e+8)} - \frac{d_o/(1e+8)}{1-(d_o/1e+8)} \right) * \frac{R}{M}$$

d_t , raw value at time t, R reference gap (0.01 or 0.02 cm), M diameter (0.087 m)

Web Pages

PBO Web Page	http://pbo.unavco.org/
PBO Strainmeter Page	http://pbo.unavco.org/data/bsm
PBO Status Maps	http://pbo.unavco.org/network/bsm
Plotting Tools	http://pbosoftware.unavco.org/plotting/src/bsm_plots/plot_page.php
BSM Home Pages	http://pbo.unavco.org/station/overview/B001
BSM Documentation	http://pboweb.unavco.org/?pageid=101
PBO Seismic Pages	http://pbo.unavco.org/data/seismic
UNAVCO Web Page	http://www.unavco.org/

SEED Codes

Network Code:	PB
Station Code:	4 character B-number, e.g, B004
Channel code:	
1. Rate	R<= 600 s interval , L=1 sps, B=20 sps
2. Measurement	S=strain, K=temperature, E=voltage, D=pressure, R=rainfall
3. Orientation or location	1=CH0, 2=CH1, 3=CH2, 4=CH3, O=Outside, D=Downhole
Location Code:	
T0	measurement made at strainmeter
TS	measurement made at surface
TP	measurement made at pore pressure sensor
T[1-8]	SOH checks at each gauge at different gains

Bottle Filename Convention

Abreviations,

BBBB= B-number , YYYY = year, DDD = day of year

NN= 2 digit year, HH = hour, MM = min, CHX = channel (CH0, CH1, CH2 or CH3)

Contents of Archived GTSM21 Bottle Tars

BBBB.YYYYDDD.Day tar	10-min strain for each gauge 8 environmental channels 30 state of health channels
BBBB.YYYYDDD_01.tar	24 1-hour long files of 1-sps data per gauge
BBBB.YYYYDDD_20.tar	1440 1-min long files of 20-sps data per gauge

Bottle filename format

BBBBNNDDDCH0	10 minute CH0 strain file, 24 hours long
BBBBNNDDDHHCH0	1 sps CH0 strain file, 1 hour long
BBBBNNDDDHHMMCH0_20	20-sps CH0 strain file, 60 seconds long

Level 2 Strainmeter Processing Steps