Pierre Auger Observatory

Specification for the SD RF and GPS Pigtail Cables

Version 1.1 14th May 2003 - PDJ Clark

**General** - A pair of short, flexible, co-axial RF cables are required to connect the radio and electronics enclosure within each surface detector to the main external RF feeder bracket and feeders. A fully assembled cable is required. Whilst individual test certificates are not required for each cable, it is noted that the Auger project will be performing 100% testing on these cables and will reject any that fail mechanical inspection and RF attenuation and return loss testing. Target attenuation for complete cable $\leq 0.2$dB.

**Quantity** - The anticipated final quantity required, including spares is 3,300 cables. It is likely that these will be procured in batches of 500 to 1000.

**Mating Cycles** - The cables will be subjected to few mating cycles during their normal lifetime (i.e. usually 10 or less).

**Environment** - The cables will be used in a sheltered location that is protected from direct sunlight and rain but is exposed to a full outdoor temperature range of -15 deg C to +45 deg C.

**Lifetime** - A target lifetime of 20 years is desired; hence good quality cable and connectors must be used.

**Safety** - The cables will not be used in a location that poses any safety issues; i.e. low smoke or plenum-rated cables are NOT required.

**Cable Type** - RG58 A/U or RG58 C/U may be used with the following specifications:-
- Impedance: 50 ohms.
- RF attenuation: less than 15dB/100ft at 1GHz.
- Central conductor: tinned copper - either stranded or solid core.
- Dielectric: low-loss type, e.g. foamed polyethylene.
- Shielding: 95% coverage tinned copper braid.
- Jacket: Black PVC.
- Minimum bend radius: 30mm.

A suitable example cable is Coleman Cable P/N 991049 (type RG58 A/U) though many other manufacturers offer suitable alternatives.

**Cable Length** - Total cable length to the outer edges of the RF connectors : $28\text{cm} +/- 0.5\text{cm}$

**Connector #1** - SMA straight plug connector (male). Crimped connector with VSWR better than 1.15 (at 1GHz). An example connector is M/A COM type 2013-5055-00 (other manufacturers offer suitable alternatives).

**Connector #2** - N-type straight bulkhead jack (female). Crimped connector, circular 'flatted-D' type mounting hole required (NOT square flange type). An example connector is M/A COM type 3034-7358-10 (other manufacturers offer suitable alternatives).

**Heat-shrink sleeving** - The portions off the cable where the RG58 leaves the crimped sections of the connectors is to be protected by heatshrink sleeving of approx 2.5cm length but ensuring in every case that the heatshrink sleeving extends at least 1cm past the end of the crimping lug.

**Example**
The pigtail cable being held in the photograph illustrates the type of cable required.

Note that this photograph is for illustrative purposes only and the cables supplied must conform to the written specifications in this document.