The GCOS Upper Air Network
Considered Baseline Calibration Network
Permits calibration of other data i.e. satellite, AMDAR
Should be the best stations
Long History, good operation
Climate Monitoring Principles
PR has Agreed
GCOS Upper Air Network

About 150 Stations
Uniform Global Distribution (5-10 Deg)
Minimum Requirement (Draft)
  At least 25 soundings/month to 30HPa
  Temp, Humidity, Wind Speed and Direction
Target requirement (Draft)
  Temp, Wind, Humidity as High as Possible
CLIMAT TEMP

Biggest problems:
  Operating Costs
  Old Equipment
Things We Have Done to Improve GUAN

Direct Renovations

CBS Lead Centers for GCOS

Technical Support projects
Early Initiatives

Corrected Errors in Station Lists

Some Stations Closed, misidentified, GTS Routing Problems

Revised Reports:

Additional Reports established

Reporting Centers Using same Lists

Improved Distribution of network Stations:

Additional Stations Added in Sparse Areas
Revitalization Activities

Equipment Replacement

Hydrogen Generators and Upper Air Systems
- Gan, Maldives
- Windhoek, Namibia
- Yerevan, Armenia
- Douala, Cameroon
- Dakar, Senegal
- Nairobi, Kenya
- Honiara, Solomon Islands
- Galapagos, Ecuador
- Dar es Salaam, Tanzania
- Harare, Zimbabwe
- Penrhyn, Cook Islands
- Antananarivo, Madagascar
- Addis Ababa, Ethiopia
- Bauerfield, Vanuatu
- Laoag, Philippines

Radiosondes and Balloons To Many
New GUAN Station at Gan, Maldives
New GUAN Station at Dar es Salaam
How Did We Do Them?

Bi lateral Agreements

UKMO, New Zealand, South Africa

Works Good But……..

GCOS Managed, WMO Procurement

Works Good But…..

Employed many Different Systems
CBS Lead Centers for GCOS
Have Authority to Contact Country Directly
WMO Very Formal About Contact with Members
Japanese Met Service First for GSN
Then NCDC for GSN and GUAN
Recently IRAN for GSN and GUAN
Now Australia and Morocco for GSN and GUAN
Lead Center Representatives

Hiroshi Nakamigawa  JMA
Larry Nicodemus     US
Mina Jabbari        Iran
Phil Alford         Australia
Rachid Sebbari      Morocco
CBS Lead Centers

Training Session Last month

Good Progress Already

Iran has contacted >12 Countries

Retrieved Historic Data

See Results Already

Language, Cultural, & Regional Differences
GCOS Technical Support
Projects

Three One Year Projects Established

Pacific Islands (New Zealand Met Service)

Caribbean (Private Company)

SADC Africa (Botswana Met Service)

Visit Each GUAN Station 2 Times per Year

Visit as Many GSN as Possible

Monitor reports from all Stations
Technical Support Projects

Site Visits:

Better Meta Data
Including Photos Around Sensor Suite

Actual Location of Many are Wrong
Many are no Longer Good Sites

Calibration and Training
Reference Network Assumptions

Global Coverage is needed
So Some will be in Poor Areas
Will be operated by Met Services
Reference Network Considerations

Developing Areas

Operational Cost

Cost will be Higher

Coordination

Flight Times Not Fixed

Communication

Need Near Real Time Management
Higher Cost

Radiosondes will Cost More
Balloons Will cost More
More of Both will be Needed
Staffing Needs will be Higher
Need a Long Term Commitment
Coordination

Satellite Over flight Times Must be Known

Burden on Operations Staff

Training Will be Needed

Different Sondes at Different Times
Communications

Must Communicate Flight Times

Telecommunications Changes Needed

An Operational Manager Will be Needed

Could be TSP, Lead Centers, GCOS Secretariat???
Keep Expectations Reasonable!

Upper Air Not Important to Developing Met Services

Even Then, They are Met Services not Climate Services

Need to Establish Importance of Climate Obs

Everything is Keyed to Met Operations