Spirit vs Opportunity: Deciding between S-band and UHF communication strategies

*Decision Points:*

1. Cost
   * Licenses/application
     + Higher cost with S-band
   * Equipment
     + Missing ground-station transceiver
   * Long-term plans for future CubeSat missions
2. Downlink Capabilities
   * 1 image per F.N. (UHF) vs. 1.8 images per F.N. (Spirit)
3. Risk/Reliability
   * S-band license bandwidth
   * ADCS S-band requirements
     + Pointing accuracy during “comms” mode
     + Multiple attitude maneuvers. Needed between “comms” mode and “sun-facing” mode for Spirit
   * Capabilities for distributed ground station network (UHF) vs. singular ground station (S-band)
     + Single point of failure for S-band
   * Encryption
     + S-band can more easily encrypt data; is part of transmitting process of space transceiver
4. Power Requirements
   * Strict requirements on S-band, UHF is never power negative.

*Notes:*

* From my understanding, pointing accuracy needed during comms mode for Spirit should not be impossible, but the frequent maneuvers needed between “comms” and “sun-facing” may not be realistic for our system.