

Long Term Solutions For CubeSats

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Long Term Goal: Allocated or Designated Band(s) for CubeSat operations (command, control and data relay)

Conditions:

- **Sufficient bandwidth to accommodate current and future use**
- **Minimum of International Regulatory Obligations**
- **Uplink (Command and Control) and Downlink (Data Relay) in the same band or separate uplink and downlink bands**



Roadmap

Two possible ways to approach the problem:

- Place Issue on the Agenda of World Radiocommunication Conference 2016 (WRC-16) (preferred by CubeSat community?)
 - > Needs action at WRC-12 (January, 2012) that elaborates draft Agenda of WRC-16
- Introduce a Study Question in ITU-R Study Group 7. Studies could eventually lead to an ITU-R Recommendation

These two routes are NOT mutually exclusive. In fact, the first one would also require ITU-R studies, and the second could lead to an Agenda Item at WRC-(20?)



The Study Question Route

- NSF did prepare a “Study Question”, ready to be introduced in the appropriate Study Group(s) (SGs) at any time; however
- the timing is not good. The SGs operate in cycles that run from one WRC to the next. Questions need to be carried over or reintroduced at each cycle
- Current cycle expires next year. There is no time for a successful study
- Next cycle begins after WRC-12; ends at WRC-15/16
- A successful study during the next cycle may lead to a proposal (in 2016) for an Agenda Item at the following WRC (2020?)



The Future Agenda Proposal Route

- **NSF submitted a proposal to the Radioconference Subcommittee (RCS) of the Interdepartment Radio Advisory Committee (IRAC). The next steps/hurdles:**
 1. **Approval by the RCS, (where government agency preparations for the WRC are conducted). This is by no means certain (timeline: next couple of weeks). If the proposal is approved by the RCS,**
 2. **It goes to coordination with the FCC/private sector. If approved (beginning of March) at this stage, it becomes a**
 3. **US proposal, to be sent (June, 2011) to WRC-12 (Jan 2012), where it competes with all other future agenda proposals,**
 4. **Support may be sought at CITEL (the Interamerican Telecommunication Group) (March-June, 2011). If supported by 6 or more countries, it would become an Interamerican Proposal (IAP). (Carries more weight than a single country proposal**



The NSF proposal

- ❑ Seeks up to 10 MHz of spectrum designated for use by picosatellite and nanosatellite operations, based on studies described in a
- ❑ Resolution, that urges (mandates) the ITU-R to conduct studies to identify up to 10 MHz of spectrum for pico and nanosatellite operations,
 - ✓ In the 200 – 3 000 MHz range
 - ✓ while protecting existing services
 - ✓ on a worldwide basis
 - ✓ with minimum regulatory requirements



(Some) Difficulties

- No definition of pico or nanosatellites in the ITU. Not a trivial issue: CubeSats need to be differentiated from other satellites, so the appropriate regulations (or lack of them) can be applied to them and ONLY to them
- No adequate explanation why they cannot operate in Space Research, Space Ops or Meteorological Satellite Bands
- No reliable estimate of required bandwidth (worldwide)
- In the view of some, the issue is not mature for WRC action



Where Do We Stand and How You Can Help?

- The NSF proposal has been repeatedly revised (and improved) based on NASA, FAA and DoD inputs
- Some objections remain, mostly from the DoD. The DoD believes that the Study Question route is the appropriate one to take. The issue may be decided as soon as next Monday, at a telecon of interested government agencies
- You may:
 - > Talk to agency representatives sponsoring CubeSat projects regarding the proposal
 - > Provide NSF with technical advice (thanks to Charles Swenson!) and input on details of the proposal or any other issue that you believe is relevant



If the CubeSat proposal progresses beyond the RCS, you may want to consider participating in the work of the FCC's WRC advisory committee (WAC-12 ; membership is yours for the asking).

Information on the WAC may be found at the FCC's website, at:

<http://www.fcc.gov/ib/wrc-12/>

The relevant working group is IWG-1 (even though its title reads "Maritime, Aeronautical and Radar Services")

Let me know if I can help or if you need more info!

