From Barry Clark to ANATAC, July 15 2004, on Cloudsat burnout risk on ALMA receivers:

The burnout risk calculation goes about as follows:

Say the radar paints two 5km wide stripes down the earth every 90 minutes. This is 1/4000 of the near-equitorial earth every orbit, .004 of the earth every day. If these are random (the calculation is much the same if they aren't, but it sounds more convincing this way), a randomly located antenna expects 1.5 illuminations per year. The motion of the satellite while it is illuminating the antenna will be about 25 arcminutes as viewed from the antenna. So if the antenna is looking within half an arcminute of that 25' track at that time, the receiver will be toast. If we assume that an antenna has a uniform probability of pointing anywhere in the 10000 sq degrees above 30d el (rather a worst case; people will tend to avoid the zenith because of gimbal lock problems), there is a 7*10^-7 chance of burnout per illumination. So the expected lifetime due to radar burnout is just under a million years, and the expected time before the first burnout for the 64 element ALMA is 15,000 years.

If this were going to kill somebody, this would be a serious matter. For mere property damage, amortizing the cost of the destroyed receivers over 1,000,000 years would indicate that we should spend about $0.15 per year worrying about the problem. The do-nothing option is quite supportable. But I'd incline to be a little more aggressive, and request an e-mail notification, a few days in advance, anytime we are going to be illuminated, and consider later whether we would do anything about it.

From Barry Clark to ANATAC on July 15, on the practicality of ALMA actively avoiding pointing its main beam at the active radar satellite:

I don't think Harvey's goal of not pointing the main beam at the satellite is very practical for ALMA. The 10km uncertainty will mean the zone of avoidance would be a streak right across the sky a degree and a half wide for any antenna, twice that wide if you are in a big array. That's enough solid angle that it's a pain to avoid. In the big arrays, the effect is further mitigated by the fact that the thing is only in the main beam of one or two antennas at a time.

I don't think ALMA real-time software will get well enough organized to avoid this swath before the scheduled Feb 2007 end of mission.

If the three seconds of data clobbered by Cloudsat in beam is really going to affect things, it shouldn't be too hard to find and flag it,
either by hand or automatically. (ALMA in Cloudsat beam could be done
the same way, but it could also be handled by saying "flag these ten
seconds", all antennas, without much effort.)

I'm inclined to worry only about the damage scenario, which is really
easily handled by saying "keep the antennas away from zenith at 1:40
local time". (Anybody remember what the stow position is for VLBA? if
it's 90d exactly, we should change it.)