

## ***Interactive comment on “Airborne polarimetric Doppler weather radar: Trade-offs between various engineering specifications” by Jothiram Vivekanandan and Eric Loew***

### **Anonymous Referee #2**

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The paper presents a potential configuration of the next Generation of an APAR. A lot of nice technical details were written, the paper is nice to read and understood. I recommend to publish this paper after some modifications: 1- First of all, I think this paper should be in a series of 3 papers, the first is this one, the second will be to verify all the parametrization for a test period and studying the stability, and the third one for the results which will be more scientific than technic. Here are other remarks: L9: microphysical characteristics of clouds at C-band!! It is too ambitious... Maybe dual-pol characteristics for precipitations but not for clouds!! L55 – L56: I believe you mean CETP: Centre d'étude des Environnements Terrestre et planétaires. By the way, this lab was mixed with another laboratory and the current name is LATMOS (Laboratoire

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Atmospheres, Milieux, Observations Spatiales). L87-L90 (and in the entire paper): Units, It would be better to use standard units (International systems), but if authors prefer to use the American units (inch, pounds, lb, ...) it would be better to put also the classic units (cm, m, Kg, ...) between brackets maybe! L109-L110 (and in the entire paper): abbreviations, it is recommendable to user abbreviations one the authors define them. L117 – L122 (Major remark): Sensitivity loss (in fig 8 too) is not been considered for Pulse compression mode and short pulse mode! The transition area (in range) must be carefully filtered and weighted! L132: Antenna is one of the most important parts and it is not really detailed. L126 (in the table): AZ and EL scan range should be shown. L189-L190: Agree, but the authors are talking about dual-pol radar, so the attenuation can be considered! Section 3: I am not really convinced by the C-band. Anyway, it is a choice but: figure 3 is not the good way to show the attenuation. It is known that S is better than C and X, same for C and X but why comparing until 100km or more, for X-band we are talking about 30 to 50 km and is the intention is to go more than 100km? For what? And on which direction? Additionally, a vertical cut through clouds by APAR shows usually less attenuation compared to a classic PPI scan from stationary radar! By the way, I believe X-band is better for microphysics! L230-L234: it is better to add a reference. L246-L248: can the authors add numerical values? L253-256: different font type. L268 and L300: 20° and 0°(typo error). L439: -100 dBm? For the polarization, authors should not only consider the polarization change of the co-polar pattern during beam steering-they should also consider the fact that the pol pattern rises when the beam is steered. To avoid that differential feeding should be applied for the phase excitation of the array must be used. I invite the authors to read these 2 references for more details: - Vollbracht, D.: Understanding and optimizing microstrip patch antenna cross polarization radiation of element level for demanding phased array antennas in weather radar applications, Adv. Radio Sci., 13, 251-268, doi:10.5194/ars-13-251-2015, 2015.

- Vollbracht D.: “Optimum phase excitations and probe- feed positions inside antenna arrays for the reduction of Cross Polarization radiation in demanding phased array

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