

Interactive comment on “The MetNet vehicle: A lander to deploy environmental stations for local and global investigations of Mars” by A.-M. Harri et al.

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This paper is a useful and interesting summary of the MetNet vehicle design. With a few additional details and minor clarifications it should be suitable for publication. line 75 it would be appropriate to cite here Lorenz, R., Planetary Penetrators : Their Origin, History and Future, Advances in Space Research, 48, 403-431, 2011 which gives many pertinent details.

line 85 – since no real definition (g-threshold ?) of semi-hard landers is given, was Mars Pathfinder (which was after all, a Pathfinder for the MESUR mission, which was a network much as intended here) a 'semi-hard lander' ?

C1

Table 1 – should identify where in this classification (if anywhere) the Mars-96 penetrators sit..

line 150 - what is the spin rate required for stability ? How is it effected (spin carrier? spin-eject mechanism? post-separation spin rocket?)

line 164 – seems to be a typo (+18 degrees would be flying away from Mars) – please check the range, and indicate for which altitude the flight path angle is defined .It would be nice here to indicate what the heat fluxes expected at this speed/angle might be line 210, 219 and following. I am not familiar with the alloy designations (Russian, perhaps). Can you indicate the composition or Western equivalents?

Fig 3. – please provide a list of components to go with the numbered labels

line 228 what is TPM-8 fabric (polyimide? polyester?) What is the inflation gas?

Fig 5 – what does label E indicate?

line 304 – please indicate what microcontroller is used, or at least give some specifications (e.g. clock rate, instruction set, memory etc.)

line 311 – please follow your own instructions and define JTAG

line 382 – indicate how accurately Phobos eclipse timings need to be to refine location (e.g. timing to 1 second is a constraint to 1 km??). What kind of on-board clock is used, and how accurate is it (assuming temperature history is known, since most quartz oscillators are strongly temperature-dependent)

406 – what kind of material is KT-11 cloth ?

414 'radiolucent' – not sure if this is a word. 'radio-transparent' is clear.

420 et seq. The shape of the inflatable entry system is novel, so any additional details on aerodynamic coefficients (especially stability derivatives) would be welcome additions to the paper

C2

435 – the planetary protection section is very important, but not very explicit. The considerations given here are worthwhile, but if (as one might hope) the MetNet vehicle and/or some of its components have been qualified for specific planetary protection procedures (e.g. ethylene oxide, DHMR, etc.) that would be well worth stating in detail here – presumably part of the goal of this paper is to indicate mission-readiness !

line 505 - the Lorenz paper mentioned above discusses the 'N of M' survival problem in the context of hard landers and network missions. Some of the considerations there might usefully be raised in this section.

line 545 et seq. The payload mass fraction really needs to be defined better – for small vehicles the level of integration is very high (one reason the DS-2 number is not really given in the literature – the instruments were not boxes that were weighed and bolted on, but integral parts of the vehicle). This confusion is evident from the fact that the numbers in the text ('17%' – including thermal insulation and container) are discrepant with Table 4 immediately above (does this include these other items?) Clarify/check, please.

You may release my name to the authors Ralph Lorenz

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