

Re: Messenger – long way to Mercury?

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I wrote:

>>...*would it be a better tradeoff to spend more money
>>on having a larger mass budget, than to spend money on squeezing
>>everything into a (much) smaller amount of mass?*
>
>*Yes, sometimes -- perhaps even fairly often -- it would be worth at least
>considering such tradeoffs; the cost cap should really be on total mission
>cost, rather than having separate caps on development and launch. Such
>moves to bigger launchers to simplify spacecraft development have been
>done a few times in the past. But the Discovery rules, alas, pretty much
>forbid it.*

An afterthought: such tradeoffs could be done **within** Discovery rules if Discovery proposal evaluation gave more weight to margins and development flexibility. There's no law of nature that says a Mercury orbiter, for example, **has** to be right at the maximum weight a top–end Delta II can lift. But after a promising early start, I think Discovery has at least partially fallen back into the old trap of loading up the proposals to barely fit within the cost and mass caps, so everything is pushed to the limit from the beginning.

Indeed, I see a common thread going back all the way to Vanguard (!) of proposal evaluation over–valuing promises of massive science return and under–valuing easy, quick engineering with large margins. It's easy to slip into this trap when:

- (a) decision processes are often dominated by scientist input, with feasible engineering seen as a constraint rather than easy engineering seen as a major objective;
- (b) institutional memories tend to be dominated by spectacular successes at difficult engineering challenges, with failures pushed into the dim background;
- (c) the program is a random grab–bag of missions, with no continuity in targets or engineering, so the incentive is to get maximum return out of a unique flight opportunity, rather than to ensure that the first one works so the experience can be used to improve the second and third.

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"Think outside the box -- the box isn't our friend." | Henry Spencer
-- George Herbert | henry@spsystems.net