# Re: Ares vs DIRECT

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- *From*: Ross B Tierney <kraisee@xxxxxxxxxxxxx>
- *Date*: Wed, 21 Nov 2007 00:10:29 −0500


Jorge R. Frank wrote:

> ohara5.0@xxxxxxxxxxxxxx wrote:
>
> > On Nov 18, 2:50 pm, "Jorge R. Frank" <jrfr...@xxxxxxxxxxx> wrote:
> >
> > > Brian Thorn wrote:
> > >
> > > > On Sun, 18 Nov 2007 13:30:11 −0500,
> > > > Michael Gallagher
> > > > <mikejo...@xxxxxxxxx> wrote:
> > > >
> > > > > .... NASA
> > > > > would
> > > > > simply have
> > > > > to rename
> > > > > the
> > > > > DIRECT
> > > > > vehicles
> > > > > "Ares II"
> > > > > and
> > > > > "Ares III"
> > > > > and the
> > > > > general
> > > > > public will
> > > > > hardly
> > > > > notice. Ares
> > > > > V would
> > > > > still be a
> > > > > possibility
> > > > > for Mars
> > > > > farther
> > > > > down the
> > > > > road.
> > > >
> > > > Well, direct wouldn't be
> > > > totally "direct."
> > >
> > > The name "Direct" comes from "Direct

> > Descendant of the Shuttle" (same
> > SRBs, same ET diameter, as opposed to FSB
> > and 33 ft core Ares), not
> > the mode of reaching the moon.
>
> A strong point of confusion, nevertheless, and one that I've argued (to
> no avail) to the DIRECT team that they should fix. It's not a bad
> architecture, if the objective is to minimize transition costs from the
> shuttle, but it is being sold so ineptly that they've pretty much
> ensured they'll never get a fair hearing until at least 2009, by which
> time it will be too late. If their prime objective is to make themselves
> public martyrs, they are succeeding beyond their wildest dreams.

Jorge:

You may have discussed this previously but i missed it so please expound on how you think it should be sold vs how they are trying.

I have not discussed this previously.

To understand why I think DIRECT is being sold ineptly, one must first:

1) Know Your Product. You may know already but for the benefit of the rest, DIRECT is not a concept that originated outside of NASA. It is a straightforward evolution of one of the concepts studied in NASA's ESAS report, called "LV−24" (crew launch vehicle) and "LV−25" (cargo launch vehicle). The key elements (4−segment SRBs, ET−derived 8.3 m core stage) were all there. The principal difference is the substitution of RS−68 engines for SSMEs on the core stage (as NASA eventually did with the Ares V). The other principal difference is that the ESAS report concluded that LV−24/25 was incapable of carrying out a manned lunar mission with two launches or less while DIRECT has found a way to do it with two. But the key here is that all the real analysis behind DIRECT comes from NASA, specifically a small group of engineers and managers, primarily (but not solely) from MSFC.

2) Know Your Customer. NASA is far from a monolithic entity but to generalize, NASA has high confidence in its own design capabilities (justified or not), which results in a strong "Not Invented Here" bias against external concepts. NASA is also politically vulnerable which results in a strong "circle the wagons" response to perceived external attacks.

So given the above, how did the DIRECT team choose to sell their concept?

1) Stay anonymous and get a bunch of internet frontmen outside NASA to push the concept. Probably the single biggest mistake. It creates the perception that LV−24/25 came from outside NASA, provokes the circle−the−wagons response, and makes it virtually impossible

> for Griffin to embrace the concept without losing face.
>
> 2) Name the architecture "DIRECT". Betrays an extreme ignorance of history (namely, the Direct vs EOR vs LOR debates of the 1960s), leads to confusion.
>
> 3) Name the launch vehicle "Jupiter". Nice and catchy but the name has been used before, also leads to confusion, and it blurs the vehicle's actual origins as ESAS LV−24/25. They should have kept it as LV−24a and 25a internally, allowing it to smoothly transition into the Ares family.
>
> 4) Insult and belittle the customer. Not directly the fault of the managers/engineers who originated the concept, but sadly inevitable given the choice of internet frontmen.
>
> 5) Comparing oneself to John Houbolt. Again not the direct fault of those behind LV−24/25, but when one of your internet frontmen quotes Houbolt in his .sig, it's also kinda inevitable.
>
> For my opinion on how LV−24/25 *should* have been sold, one need look no further than Houbolt. He pushed the concept strongly internally, but not anonymously. He signed his own name to everything he wrote, he put his own career on the line, he never went public while the debate was going on, he never invented his own names for concepts being debated internally, never even dreamed of having outside frontmen sell his concept for him, and he let Von Braun take credit for the decision. Of course, history vindicated him and now we all know Houbolt as the father of LOR.
>
> LV−24/25 is a good concept, one that strongly deserves a second look now that Ares I/V are running into development problems, but the guys developing and selling it aren't worthy to shine Houbolt's shoes.

Jorge,
Your post was forwarded to me yesterday. I am one of the "internet front−men", as you termed us, for the DIRECT proposal. Perhaps I'm thus in a good position to reply. I haven't spent much time on usenet for about ten years, so please forgive me if I'm a little rusty with the local netiquette these days :) This is going to be a *LONG* read, sorry.

I appreciate your comments, and actually agree with some. There are a few points which need clarification too. I think it would be beneficial if I walk you through the entire process from my personal perspective.

IN THE BEGINNING

I'm a self−confessed amateur rocket scientist myself, with no professional background in this industry, nor with any qualifications in the advertising/promoting world. I've never claimed to be more than I am − an outsider who got into something a lot bigger than himself.

I have a passion and deep interest in the works of NASA, and spent a lot of time following the release of the ESAS Report chasing details. "Something" never quite added up with that document for me though. I couldn't identify it, but it niggled me like a dull toothache until I was able to discover it. I initially supported NASA's choices though, even going so far as to write a three−part article supporting Ares−I. However, I eventually discovered a set of the ACI Draft version of the ESAS Report which included the cost figures behind ESAS

which was the first crack in the proposal which I found. The real revelation came when I found the NASA costings for the pair of launchers ESAS had promoted − the LV−13.1 CLV and LC−27.3 CaLV (before they were named Ares) and realized that although we were deleting the complicated and very costly "Orbiter" element from the whole equation, the new launcher choice was still going to match the cost of the retiring system.

That simple fact just didn't make sense to me so I started investigating alternatives on my own − purely for fun at the time.

The argument I heard was that the new LV costs needed to match Shuttle thereby providing sufficient work for the existing workforce. This just didn't hold water for me because the EDS, LSAM, the Lunar Base elements and Science hardware are all going to be additional elements which have no correlation today. I was convinced that they would, together, be more than large enough programs to take up any slack created by reducing the launcher costs.

The ACI Draft ESAS Report showed very clearly that two vehicles would cost roughly double the cost of any individual one. It seems obvious now of course, but it was a revelation to actually see it in NASA's own documentation. From that point, it isn't a big leap to work out that one small launcher (CLV) and one very large launcher (CaLV) could likely be replaced by a single vehicle somewhere in the performance region in between. It seemed logical enough to me at the "broad strokes" level anyway so I decided to look around for alternatives.

Coincidentally with all this, I had just completed a fairly detailed study of the STS infrastructure, performance and costs at the time. It occurred to me that the standard Shuttle Stack was actually in precisely that middle−ground if only the system were re−configured by not making the payload carrier so heavy (99mT Orbiter) compared to the payload (16mT to ISS). An in−line solution (LV−24/25 in ESAS) seemed to back up this conclusion quite well, being only 25mT lower performance than the ESAS LV−27.3 CaLV without an EDS.

ESAS never published a figure for LV−24/25 performance with an EDS, which I found very 'curious' from the first moment. Also the explanation that LV−24/25 was a three launch solution requiring an LV−13.1 "Stick" launcher to loft the crew didn't hold water either given NASA's own Report showed that the LV−24 CLV variant exceeded NASA's minimum LOC requirement of 1:1000, yet was never included in the running for CLV use.

## PEER REVIEW

Armed with this − and LOTS of questions − I put a brief summary together and put the idea on a public forum (nasaspaceflight.com − NSF) for peer review.

That was when things snowballed in a direction I had never considered. Within 48 hours I was contacted privately by about twenty different NASA & contractor engineers and managers who all said roughly the same thing: "well done, this is what we should be doing, need any help?".

While I had another hundred contacts who just expressed support, those 20 offered their time and expertise to refine the idea into something a lot more serious than I had ever planned. I was game if they were.

Most made it very clear though, that they wanted anonymity because they had serious concerns about speaking out against management's plans in any way. At this time there were already a lot of "stories" floating about regarding staff persecutions following Lockheed−Martin's attempts to convince NASA to look at

Atlas−V again as an alternative for the CLV because they felt so very unfairly treated by ESAS. Reading ESAS closely shows a lot of what appears to be somewhat "artificial stacking" against Atlas−V, which I think lends a degree of support to their claims, but is really a topic for a different discussion than this, so I'll let it pass.

Internal investigations, demotions and sackings have happened when people *have* previously tried to act like Houbolt did internally. I know individuals involved in some of these situations personally and the results have not been pleasant. Nobody offering assistance to me wanted to risk their mortgages and kids college funds by "doing a Houbolt" after those events, so I quickly decided to have a flat policy that I keep everyone's identity in the strictest of confidence. They can reveal themselves if they wish, but I never will. Since starting DIRECT, I have heard literally dozens of tales from inside the program of staff being either shouted out of Griffin's office, or being demoted or even fired for proposing DIRECT to management through regular channels. I feel very sad whenever I hear of such a situation, but thankfully they appear to have stopped in the last 6 months. I don't know whether this is because nobody is willing to try any more, or if management has changed their response to such efforts. But I'm not surprised that tales like those make people want to stay quiet and stay behind the scenes. But my salary was never at risk because I don't work for NASA or any of its contractors. I'm free to speak and I have ended−up becoming a channel for folk inside who want to say things.

## DIRECT IS ACTUALLY CALLED THE "DIRECT SHUTTLE DERIVATIVE"

The work originally became known as the "Direct Shuttle Derivative" and we tried to use the acronym DSD for a while because it looked like it would be an easy swap from STS to DSD. But folk on NSF continued to use "Direct" instead and so the name just stuck. When the name Ares was announced, we figured sticking with DIRECT (by then all capitals to specifically differentiate it from "Direct Ascent" or "Mars Direct" as you point out) was 'safe enough' because we already had a degree of recognition with the name (more than 12,000 hits or so on our directlauncher.com website) and it would allow NASA to easily pick their own name (Ares−II or whatever) as part of the process if they should ever try to "claim" the idea − which has *always* been our ultimate hope.

Anyway, the number of team members continued to grow (today we have a team of 54 plus the 5 regular "internet front−men") as we began the process of refining the concept in the public eye over on NSF. The team brought together my admittedly "amateur" initial concept, our refinements from NSF and the work which NASA had previously created for both NLS and ESAS LV−24/25. Interestingly this was the first time I ever saw anything to do with NLS, and the similarities were extraordinary to me.

## EARLY PROPOSALS

Around this same time the NSF discussions convinced us that the SSME was too expensive to use as a disposable unit and that we needed to look at solutions using RS−68 instead. This was mostly a reaction to NASA changing its specification for the CaLV version which become known later as Ares−V. The change lowered Core performance due to lower efficiency engines, but our contacts within PWR and NASA indicated that the engine could be upgraded. They provided us with suitable specifications for a 435s Isp variant.

We got preliminary structural analysis done, basic aero, thermal and acoustic environments followed. The engineers who volunteered their time performed POST analysis and a rough Monte Carlo for trajectories which confirmed all our previous figures and indicated we had actually low−balled our performance slightly to that point − it sure is nice to have extra margin! We also optimized specifications for the EDS too − which was the only previously missing element until then.

During this period I was pretty much the only 'face' for the brand − a position which I frankly loath, but haven't been able to find a better replacement yet. I was joined by two other "front−men", Chuck Longton and Matt Hays who helped take some of the load off my shoulders. I also encouraged an excellent 3D rendering artist to help too, António Maia, who had already produced some artwork and simulations for the free−ware "Orbiter" simulator software. He was able to produce some really wonderful imagery for us and could also run some additional simulations while we were waiting for the professional POST analysis to be done.

So the most early of DIRECT work did originate outside NASA − in an amateur way − but very quickly became more of an internal effort than an external one. I'm really just along for the ride! But the engineers have never advised how to sell this plan − that's just the "front−men" trying their best under difficult circumstances.

Anyhow, mid−way through 2006 we tried proposing it through internal channels with zero luck. All attempts to approach Griffin, Horowitz or Cook − or representatives from their departments − were simply rebuffed and totally rejected. Bottom line was that they "had a plan and were pressing forward". It became very clear that there was simply no interest at all in any alternatives, no matter how much extra performance, lower cost, quicker schedule or any other factors might be involved. Fair enough from their perspective, but it was a closed & solidly locked door for us.

A DIFFERENT APPROACH AND NASA'S RESPONSE

At this point we either needed to give up, or try something different. We utilized the NSF forum to continue the peer review process and put together a sort of "open letter" to the whole of NASA. We put v1.0 of our proposal online and started making moves to get any engineers within NASA who liked the idea to push the proposal from all directions. It actually worked pretty well too. Within a few weeks we had literally thousands of copies in the organization being promoted internally at all sorts of levels from engineering through middle management, in both NASA and the Contractor network.

Perhaps that was might be perceived to be mistake, but I don't believe there were any other options available to us. That's when we were perceived to be a threat and a push was made to destroy us. V1.0 of our proposal included information about some of the problems Ares−I was suffering from in the perspective of demonstrating how DIRECT would be able to solve those issues. It was supposed to be a comparative piece which would serve as a benefit − but wasn't perceived that way.

What resulted was the Doug Stanley (chief of ESAS) incident on NSF at the end of last year and the Mythbusters entry on ATK's "safe, simple, soon" website.

No effort was made to actually analyze our data, to investigate the idea for potential. Even the briefest look at Stanley's response to DIRECT shows that there was zero attempt to see if the idea might work, or could possibly be 'tweaked' here or there to get around any of his issues − no, the entire diatribe from start to finish was mostly a defense of the issues we raised about Ares−I in documentation − which still mostly plague the program today − and the remaining part of Stanley's comments were a vitriolic attempt to discredit and destroy the work we had done.

The key issue Stanley focussed upon was the 435s Isp variant of RS−68 which we had baselined. While this specification has since been proven to be valid, Stanley used this as a can−opener to tear the whole proposal apart.

He did not accept our figures and made an assumption that the 414s Isp engine USAF were planning for

upgrading Delta−IV was the best that could ever be gotten out of the RS−68. In private e−mail he ignored our points that our Regenerative Nozzle would be higher expansion ratio than Delta−IV's because it would have to be re−optimized for low−pressure use in the environment after SRB separation − not Sea Level. He also didn't care that we planned to fix the existing RS−68's design problem with the hydrogen injection temperatures being too low currently, which detract from the current specification's performance. These two issues, combined with an operational Mission Power Level increase to 109% would actually enable our engine to perform as described and PWR have confirmed that it is achievable, although costly.

I still believe to this day that Stanley was ordered from above to take the gloves right off with that "Fear, Uncertainty and Doubt" (FUD) attack. While our criticism of Ares−I may have been perceived to be harmful comments, that was NEVER the objective we actually had in mind. Jorge, you are right that none of us are professionals in the advertising / sales / promotion world, but we are simply doing the best we can. We pointed out the sets of existing flaws in a context where the different design usually removed the concern entirely or provided simpler means to mitigate them. If the perception was different from our intent, I don't believe there was a lot we could have done at the time.

Either way, the FUD attack was a totally disproportional no−holds−barred vicious bloodletting in comparison. I don't feel we started a fight, but we sure found ourselves in one. Jorge, you accuse us of "attacking our customer" − I agree, we have since done that. But I don't believe it hasn't been without warrant given the specific situation we are in. We'd love to be able to solve it, but we're not sure how.

The FUD attack spurred a LOT of our NASA guys, and a whole host more, to come to our defense. They felt the attack was unjustified and I'll be polite by saying they were rather "miffed" by Stanley's work and they responded by feeding LOTS of ammunition to us to demonstrate how Ares−I has turned into, well, lets just say a "problem" program.

Stanley's attack somehow turned us into a "clearing−house" for all things Constellation. We've sat on the vast majority of things we've learned because, irony of ironies, we're actually trying not to damage the agency. But NASA hasn't been able to stop some of the really bizarre and frankly stupid issues from coming to light regarding Ares−I. We often find our selves commenting on these issues, usually in the context of how DIRECT can get around those problems. I suspect that because of this whole situation, we're currently one of the best informed groups outside of NASA on the real status of Ares−I.

## CONSOLIDATION AND REGROUPING

After the FUD attack I took a sabbatical for a few months while Chuck and António continued to hold down the fort. Matt took leave of the team at that point − he was feeling just personally as hurts as I did.

It was during this time that Stephen Metschan brought Team Vision, one of NASA's contractor companies who had been involved in new LV concepts from 2001 all the way through the ESAS Study, in to back−up the DIRECT effort. He brought a list of his own NASA contacts and fellow team−members Philip & Michael Metschan too. Their company had independently come up with an almost identical concept for a Shuttle Stack without Orbiter and a pair of RS−68's under it and payload on top. It is, after all, the most logical evolution of the existing Shuttle hardware, so is no surprise that many different people have thought of it. This joint effort now stands stronger than ever.

With Team Vision's help, we licked our wounds and got to work in the spring of this year addressing all of Stanley's comments.

Team Vision's "Jupiter" name was applied (bigger than Saturn with more than 4 decades between the

"Jupiter−C" and our work) to the launch vehicles and the by−then familiar term DIRECT was re−aligned to cover the overall architecture instead. This approach deliberately still leaves room for NASA to grab the ball and call it whatever they like.

The Jupiter vehicles were re−baselined to the existing RS−68's performance as flown on Delta−IV today in order to avoid any future FUD on such issues. We baselined to the lower specification J−2X at 273,000lb thrust, 448s Isp which NASA was already pursuing for Ares−I rather than the higher spec 293,000lb thrust, 448s Isp. We continued to use the existing specification of the Shuttle 4−seg SRB's and we decided to protect our butts by also including an *additional* 10% performance margin in all our published performance numbers − above and beyond the margins usually dictated by the Ground Rules & Assumptions from ESAS. This is a safety margin we continue to keep and our AIAA performance numbers are 10% lower than our internal analysis actually show.

The Team used Stanley's comments to improve our concept. Every single comment Stanley made pushed us to change the design so that criticism could never be leveled at us again in the future. In the end, I could actually thank Stanley for his attack − he actually helped us strengthen our proposal by an order of magnitude. But I won't let me guard down ever again.

DIRECT Version 2.0 was released to show the initial improvements in the launcher's designs. It was followed by the AIAA paper which took the whole proposal and demonstrated precisely how it could fit into context of a robust program of exploration.

WHERE WE ARE TODAY

Our 2007 AIAA paper has gotten some serious interest from policy makers and also NASA. Within the last two months we know of 6 different internal studies into the concept which all concluded with positive results. Ares−I continues to have concerns which seem to have been discussed here previously. The recent Ares−I IS−TIM indicates that there are some even more serious issues awaiting them now.

We have a possible solution. We want NASA to give it a fair hearing and consider it. But Jorge, you have correctly pointed out that we find ourselves in a singularly difficult position with our "sell". I make no bones about the fact that any mistakes in terms of the sell would be ours − the "front−men", and not the engineers who actually worked on this within NASA. They have never offered advice on how to sell the concept beyond a few "increase the pressure now" or "decrease the pressure now" comments from a few key managers within CxP.

But the key question now, is not how we spend our time reminiscing on the past, but to work out what needs to be done in the *FUTURE* to try to make this happen.

I believe NASA quite possibly wants to change Ares−I currently. Perhaps the recent studies show an interest in DIRECT − perhaps not.

Assuming they are interested, they obviously feel concern about the perception of such a change after all this water has passed under the bridge. They probably have serious and valid reservations about dealing with us now. All perfectly understandable IMHO.

But we know NASA must save face. We understand that if NASA ever does grab this ball to runs with it, we will need to disappear − and that's actually perfectly okay with us! We even have a "plan of inaction" already prepared for just such an occasion − it involves a bottle of champaign, one conference call and some two−week holidays :)

The only question remaining is: *What else needs to happen before this can occur?*

Jorge, you seem to have a keen eye for past mistakes and some knowledge of advertising − certainly more than I do. More important to us than a critique though, is do you actually have any potential *solutions*?

We're open to ideas.

Ross B Tierney.
www.directlauncher.com
−−
"The future is all around us, waiting in moments of transition, to be
born in moments of revelation. No one knows the shape of that future,
or where it will take us. We know only, that it is always born...
...In pain".
−G'Kar
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