PEAK OF FLIGHT NEWSLETTER

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SUGGESTIONS FOR HIGH RATE OF LAUNCHES AT BIG EVENTS - PART 2 OF 2



PEAK OF FLIGHT 550TH ISSUE

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PEAK OF FLIGHT

Suggestions for Big Launch Events - pt. 2

By Tim Van Milligan

In our last newsletter, we started the discussion on those situations that slow down a launch range. They are the things that frustrate modelers, because they are avoidable. We'll conclude this article with even more slowing events, and what you can do about them.



Rockets floating down into the crowd

Launch operations will slow to a crawl if a lot of rockets start drifting down into the spectator area. Why? Because the RSO has to keep his eyes on the rocket until they know it is descending safely to the ground in a location where no one is in harm's way. A rocket takes only a few seconds to get up to altitude, but it could be several minutes before it comes down. And if you're standing in a queue line to launch your rocket, every second is agonizing. But the RSO has no choice.

Preventing this can be done by angling every pad away from the crowds. At a big event with lots of spectators, NOTHING should be shot straight up! There is just more opportunity for those to come back down over the spectators. This goes even for those rockets trying for a new altitude record. Angle everything away from the crowd.

And from the perspective of having speedy launch operations, this pays huge benefits too. As soon as the RSO knows that the rocket will be coming down in a safe area, even if it is still very high up, they can move on to launching the next flight.

Small Rockets

If you're holding a large event, let's be brutally honest: you're holding it to fly larger (high-power) rockets. People aren't going to drive in from out-of-state, hundreds of miles, in order to fly a few A-B-C type rocket motors.

Those people that do drive in are bringing their bigger rockets, and they want to fly them. They don't want to wait in a long queue line while the RSO is futzing with a bunch of newbie modelers flying Alpha rockets that are suffering from a series of misfires.

The solution: Have a separate rocket range for low power rockets (up to C-size engines). That way, all the kids and the newbie modelers that are just getting started can have their fun, without interfering with the pace of high power rockets.

"Well, wait a minute…" you argue, "you can't have two launch ranges going on at the same time. That would be a safety issue." I say: "Yes you can!" It is being done every year by the NAR at their NARAM event. They have the competition range, where mostly little rockets are launched, and then the sport range where everything else is put into the sky.

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And this works just fine, and is totally safe.

But it takes planning, and extra volunteer staff to pull it off. First and obviously, you have to position the two ranges far enough apart so that the little rockets won't fly into the range head of the bigger rockets.

The priority of course is the big rockets. So the PA system on the field is for the high power rockets. On the smaller launch range, you either have to use a hand-held megaphone/bull horn style speaker (which have limited range), or just shout loud enough when launching rockets. Since you can get people closer to the launch pad, shouting is an acceptable solution for announcing the low-power launches.

But there should also be radio communication between the high power and the low power ranges though. Usually, the LCO's for each range have the radios and can communicate directly to each other. The LCO's are stationed right next to the RSO's, so they can quickly get the attention of the appropriate RSO to send alerts and halt the firing of rockets until the situation is resolved.

The benefit of having a low-power range separate is well worth the effort to set it up. It greatly speeds up the flow of launches for both low power and high power models. And it keeps the kids occupied so the parents are also happy.

M-Motor Flights

On the other end of the spectrum, those really big rockets (M-size and larger) also really slow down the range. Usually, the pads are so far out of the range head that there



isn't a direct wire connection between them. So they have their own wireless launch system, or the modeler who is partway out to the M-pad has the controller and contacts the LCO and RSO by cell-phone.

Unfortunately, figuring this system of communication and launch control is always a new experience every time a new shift of personnel reports for duty on their stations. They just get the hang of the current launch control system for Level 1 and Level 2 size rockets, and all of a sudden they have to stop and figure out how to communicate to the M-power pad and how to launch it. The launch controller is usually completely different from the main range system, so it has its own quirks on how it is selected, armed and finally launched. The LCO's job always seems to get frustrated by the level of confusion with the "different" launch system.

Some advice here for this situation. First of all, don't let the owner of the rocket take control of the PA system to give the countdown. Why? The rocket is their baby, and

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they are going to get talkative about the project they are launching. Before they give the countdown, they'll want to tell the crowd all about their rocket and how special it is. Remember the talkative RSO problem? This compounds the problem of the slow pace of launching when the modeler is in control of the PA system. They could go on for several minutes before they actually do the countdown. And of course… they'll suffer a misfire too -- because the wireless control system wasn't properly armed or the wireless signal was too weak or there was radio interference. And then the entire range will get a second dose of the pontificating verbage the next time they attempt to launch.

As the event organizer, you need to establish a crystal-clear step-by-step process for launching those Level-3 size rockets prior to the day of the event. And use only one launch control system. In other words, don't allow the modeler to use their own launch control system. Multiple systems mean a whole host of complications - meaning "time-delays."

The Ultimate Solution for Fast Paced Launches

I really suggest having a third person on the launch team (let's call him "the scheduler") that controls which bank of pads is to be launched next. This person should be separate from either the RSO or the LCO. This incidentally, was the role that I played when I was at the launch that I talked about previously. "The scheduler" feeds the stack of flight cards to the RSO and tells them which bank of pads go next. So when the M-pad is ready to launch, the modeler, way out in the range, would call up the range head and talk to "the scheduler" and get into the launch queue. The scheduler would then give the LCO a heads-up to get ready to switch over to the different launch system. A little advanced notice allows the LCO to shift their mind with some time to get prepared (without getting flustered by a last-second switch-over).

In my opinion, "the scheduler" is the one person that can really make a huge difference in the flow of rockets into the air.

I'll tell you a little story about how this is exactly like what happens at Cape Canaveral. My first job out of college was as a launch operations engineer - which is a fancy title for the role of "the scheduler." The launch operations department, of which I was a part, was in charge of making sure our company launched the satellites on time. The launch contracts from the satellite owners had penalties in them for launching late. We got paid to "be on time," so we took it dead seriously.

Except for the RSO, everyone on the launch team worked for Launch Operations. That included the event organizer (the guy that signed the contract)!! What we said was the law. We made sure that the personnel on the range

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knew exactly what the priority was. The priority was the "schedule." The customer should not be inconvenienced because the range was not ready.

How does this relate to your club's event?

When your club is hosting a large launch -- make no mistake about it -- there is a customer. That customer is the modeler that is coming from a long distance away. They aren't paying you for the privilege of looking at the pretty scenery on the range. They are paying you money in range fees to launch their rockets. That is plural: "rockets!" And if you have many people from out of town, you have an obligation to run a quick and efficient range so that they all feel satisfied that they launched all of the rockets they intended to.

If you aren't efficient at getting them off quickly, trust me… word gets around. They will tell all of their buddies at how inefficient the range was run -- as evidenced by how long the lines were to launch rockets. They won't be back for the next event you hold.

Slow modelers at the launch pads

Do you ever notice that some modelers seem to take forever setting up their rocket on the launch pad? A bank of 10 launch pads will be filled with rockets... but there is always that last guy out there that is peering under his rocket, while fiddling with the igniter clips. What are they looking at?

The range can't be closed until that last person leaves. If it takes them a long time to hook up their rocket and turn on all the electronics, then range operations will slow to a crawl.



What can we do to make this a faster event?

Most clubs already have pad-control personnel to help assist modelers as they bring their rockets onto the pads. This group of volunteers can be a big help. They often provide that extra assistance for the modeler, such as helping them lower the rails so the rocket can be loaded, or checking continuity at the pad.

I do think this person should be given some authority to tell the modeler that they'll have to "go-the-next-round" if they are taking too long to hook up their rocket. For example, I've seen it many times that the modeler will forget something, and either cell phone call someone back at the car to bring them out the item they need, or run back to their car to get it themselves. That modeler is holding up the range and everyone else that is still standing in line. The pad control should have the right to tell them to just leave the rocket and fix it the next go-around. On an efficiently run range, the next go-around won't be all that long of a wait anyway.

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The pad controllers should have 2-way radios so that they can communicate directly to "the scheduler" at the range head. So if a modeler is told to hold-til-the-next-round, the scheduler at the range head can be told to pull the flight card from the queue so that there isn't any confusion when that bank of rockets is being sent skyward. Eliminating that confusion of which rockets are ready and which aren't helps the RSO to keep up the flow of rockets.

And for us modelers, we play a part too. We have to make a personal decision to design and build rockets that can be set up quicker. Why do you need a ladder with you at the pad to turn on your rocket's electronics? Can't it be turned on with a switch mounted lower down on the rocket? Simplify your rockets at every opportunity. Bring your simple rockets to the big events - leave the complex ones at home until they can be made simplified.

Personal story again… My job at Cape Canaveral in the early 1990's was as the "Pad Controller." I worked on the launch pad, and my duty was to make sure that my pad, and everything sitting on it, was ready to go for an on-time launch. Everyone that came out to "My Pad" knew that if there was a problem, that they had to report it to me first. That even included the customer (satellite owner). Why? Because there were always other customers waiting in the queue to launch their payloads. No matter what the problem was, I would then find the person to fix it, and schedule them the time to get it done in keeping with the launch schedule. If I couldn't get it done, I'd report it to my boss - "the MASTER scheduler" - who would bring in additional resources and people to solve the problem quicker.

The pad controllers are an important element in your range operations. Don't just assume that high power fliers



are skilled enough to fix their own issues. Your range needs to have pad controllers to not only help the customers fix their issues, but to do it quickly. Give the Pad Controllers the authority to keep a tight and quick launch pace.

Inadequate Supply of Launch Pads, Rods and Rails

Like having back-up launch controllers and PA system, your site also needs back-up launch rods and rails. You never know what the mix ratio of rails-to-rods you're going to need. It depends on what the modelers require when they get to your launch site.

What I'm saying is that it is unforgivable to have too few ¼-inch launch rods, or 15-15 rails on the range. Have them sitting next to the launch pads, so that if a rocketeer needs one, they can quickly ask the pad controller person to swap it out for them.

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This also builds some versatility into the range to speed it along. You may not need two separate queue lines for ¼-inch rods, 10-10 or 15-15 launch rails. They can be combined into one single lane if the rods/rails can be swapped out at the pad. If you do that, then you've just reduced the number of people you need to handle the lines of modelers waiting to launch.

Pad Assignment Problems

I talked about this previously, but having two modelers assigned to the same launch pad is going to cause confusion. Who should go first? Regardless, whenever there is confusion, you will have a slower operating launch range.

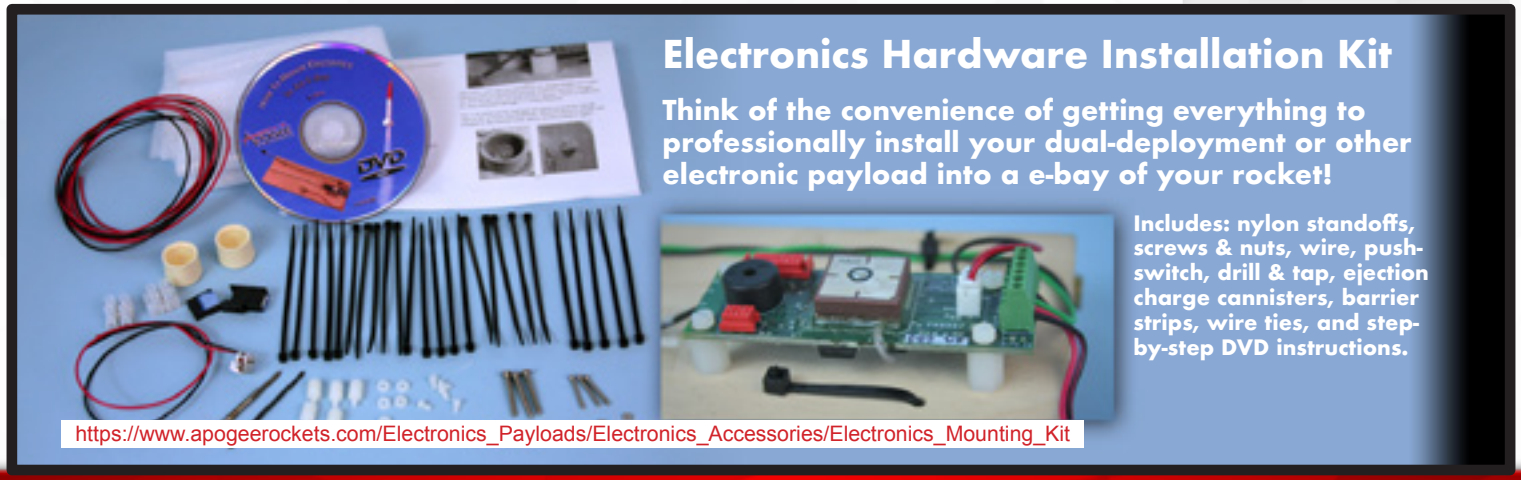
The solution was mentioned previously: queue lines based on launch rod/rail size.



But at this point, I want to describe for you the way the flow of flight cards should proceed. Because keeping the flight cards sorted properly is key to the flow of information to the range head. So here is my suggested process for the flow of the flight cards:

1. The modeler takes his flight card to safety check.
2. The safety check returns the flight card to the modeler, who takes the card and then gets into the queue line based on what size launch rod/rail they need.
3. There should be a volunteer at the back of the queue lines to help the modeler get into the correct line. Nothing is more frustrating than finding out you're in the wrong line, and then having to start over again in the correct line. This is easily possible if the line is so long that you can't see the sign at the front telling you which size pads the line is for.
4. At the front of the queue line is the "pad controller" for a specific bank of launch pads. While everyone is waiting for the previous bank of rockets to fly, the Pad Controller can brief the next group of modelers of the process of loading the rockets on the pads. And more importantly, he can tell the modelers that there is a time limit for hooking things up. The modelers need to be informed that there is a schedule to keep, so that they all can get more rockets up in the day.
5. He should also tell the rocketeers to stay near the range head during the launch, so the RSO can recognize that they are ready to launch. More on this later...

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6. When the RSO authorizes that the range is open, the pad controller can walk his group of modelers out to the pads. He controls the number of people at the pad based on his knowledge of the number of available rods. There will always be some misfires, so not all the pads will be available. So he would take only the next correct number of modelers based on what is open on the range. At this point, the modeler still has his flight card in their possession.

7. The Pad Controller should also limit the number of non-modelers coming out to the pad. Some modelers may need extra help, so they can use their best judgement on who to allow out to the launch pads. Just remember, the more people out there, the more chaotic the situation will be. They are in charge, and that authority should be given to them to control the situation as they feel comfortable. For a high power range, because of insurance issues, only NAR or Tripoli members are allowed. I would suggest that everyone stays together - they go out as a group, and they return as a group. This would help prevent people from wandering off from where they shouldn't be roaming.

8. As they are walking out, the pad controller should inform the group that they must give the pad controller the flight card after the modeler has loaded their rocket on the launch pad. If the rocketeer is told to finish up hooking in the "next round" because they are a bit slow, that modeler should retain their flight card.

9. He can remind them all that they are "on-the-clock" and that the range will be closed in X-number of minutes. That's a gentle reminder to hurry up and get the rockets loaded without delay.

10. After all the rockets are on the pads, the pad controller has the flight cards of the rockets ready to go (minus the flight cards of the models that had misfires in the previous round and any stragglers told to go-the-next-round).

11. The Pad Controller can then write down the pad number on the cards.

12. It would be a good idea to give the Pad Controller a clipboard, pen and a stack of sticky notes to write down the pads where the rockets have new igniters in them, with the name of the owner of said rockets. They can also include a note about any pads that they are to skip over (because the modeler has been told to wait until the next round of rockets because they were holding things up because they were a bit slow).



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13. The sticky note(s) can be given with the rest of the flight cards to "the scheduler" at the range head. The extra sticky note(s) will let the scheduler know to find the flight card of the previous misfired rocket at the range head. It keeps everything tidy - one slip of paper for every launch pad.

14. This is where the assistant at the range head can search and find the flight cards of those previous misfired rockets, and add them to the stack for that bank of pads. The goal is to get all the cards in sequence, with no holes except for the rockets that are being held over for the next round. For that particular case, I'd suggest leaving the sticky note in with the stack of flight cards for that particular pad, so the RSO and LCO know to ignore that one and keep moving to the next model. You don't want to confuse them, because they will always ask about a stack of cards that are missing a flight card - especially when they can see the whole bank of pads has rockets on them. Eight pads… but only 7 flight cards? Where is the eighth card?

15. When the stack of cards is ready, they are transferred over to "the scheduler", who can give the RSO a heads up to verify and then close the range for launch.

16. The stack of flight cards is given to the RSO at that point. Now the rockets can be launched.

17. If there are any misfires during the queue, that flight card is handed back to the assistant in charge of the cards to put it into the appropriate pile to be recycled in the next round.

18. When all the rockets have been given their shot, the range can be opened when conditions are safe, and the whole process can be started over.



Rocket Recovery

In a perfect world, all rockets would descend into a predictable landing area. But Murphy's Law says that even with angling them away, that rockets will most likely drift into the crowd, or land in the middle of an active range. And invariably, someone will run out in the middle of the field to retrieve their rocket.

What this does is to stop all launch operations until that person is clear of the range.

Planning a good field set-up is important here. Having plastic fences that people can't climb over or under is a good idea. It reduces the number of times the range has to be stopped for people to clear the area. Again, the pad con-

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trollers can also be brought to bear and enforce the "range is closed" order from the RSO.

Events Beyond the Control of the Launch Organizers

Unfortunately, there are some things that slow down the pace of launch operations that are beyond the control of the club that is organizing the event. So this is a list of things that I've seen, but that I hope we can all improve on.

Is the Modeler Ready?

If the modeler is not ready when his rocket is launched, it probably won't be sent skyward. The RSO will typically make a call to the modeler to ask them if they are ready for launch. If the modeler doesn't acknowledge that they are ready, the RSO will repeat the call - maybe several times. It is a courtesy to give the modeler a chance to see their rocket take off, and where it lands. What a poor experience it would be if you drove to a far-away rocket launch and didn't get to see your rocket take off?

Ideally, modelers would stay close to the range head so that they were close enough that the RSO could hear them shout "ready" when it was their turn to be launched. But they may drift further up the flight line in order to be in a better position to view the rocket at launch, or where it might come down so they can more easily recover it.

Or maybe the modeler wants to have someone with a good camera take video or photos of their rocket taking off. The modeler will sometimes shout out to hold a second while they get the photographer looking in the direction of their model.

It is a similar situation with Certification Flights. Yep… Certification flights do slow down range operations. Like the situation with the photographer, now you have to get two people to watch the rocket instead of just one. The RSO will typically ask the modeler if they have their witness watching the rocket.

All these little delays waiting for people to get into position add up and slow down operations.

If you're reading this, I hope that you will take it upon yourself to be in a position where the RSO can find you, and to also have your witness and photographers ready when your rocket is next in the launch queue. It is not the responsibility of the RSO to make sure you're ready - they are there to make sure the event is conducted safely.

The solution to this dilemma is to have a time limit for the modeler to respond to the "ready?" call. Maybe 15 sec-

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onds. If they don't respond, or they aren't ready, then just skip over them and treat it like a misfire. They can go in the next round of rockets off of that bank of launch pads. After a few rockets getting skipped over, word will get around that you're not messing around and people WILL be ready when the RSO is making the call.

Conclusion

Running a fast launch operation has more to do with planning than it does with having experienced personnel on the field. And I personally feel that there should be a person on the organizing committee that should be assigned to "Speed." This person should be given the authority to make the important decisions. They should be able to yank an LCO or any other person that is dragging their feet. I know that is tough, because everyone on the range is a volunteer. But if the customers (the rocketeers) are not kept happy, there won't be a "next time."

Having a speedy range and safety are not incompatible. It just takes a commitment to designing speedy operations into the system before you get out to the launch field and set up the range. You're going to need a lot of volunteers, and they want to launch their own rockets too. So you owe it to them to have a FAST system designed, and you're ready for contingencies.

About Tim's Philosophy on Customer Service

As I was writing this article, it reminded me of how Apogee Components operates. Our customers are what drives our business, and it is important to keep them happy. Like on the launch range, they want a consistent experience that makes sense and where they know what is happening. And just as important, they want a speedy service. Our guarantee is "same day shipping." You can learn more about his on my YouTube video: Customer Service that Gets Raving Fans (https://youtu.be/BgN50m6g9jY)

What guarantee could you give to your customers on the launch range? Can you promote your next big launch with a guarantee that a rocket will leave the ground at least every 30 seconds?



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