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Hosted satellite payload procurement: A brief how-to guide

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Overview

Our prior article *Satellite systems procurement: A brief how-to guide* outlined the considerations to take into account in procuring a satellite system, whether commercial or government.

In this article, we will extend our examination of the satellite procurement process to focus on the how-to of a specialized variation – procurement of a hosted payload. Many of the general elements applicable to procuring satellite systems will apply, but there are also unique considerations involved in a hosted payload arrangement.

What is a hosted payload?

A hosted payload situation occurs when a third party's communication mission (or other) payload is hosted on the bus of another company's satellite. The system architecture of the host satellite is developed or modified to accommodate one or more third party hosted payloads, by specifically including a location(s) for the payload on the bus and adjusting the satellite design to account for the payload weight, power requirements, technology, and other characteristics to be supported by the satellite platform. The hosted payload is typically owned by the third-party operator, but can also be subject to a leasing, operational, or other funding arrangement where the third-party operator may have

the right of use as to the hosted payload but not the actual title.

A hosted payload may be a substantial payload, perhaps as large or costly as the satellite owner's payload, and may be designed and constructed by the satellite manufacturer (sometimes referred to as a condosat arrangement). More commonly, the phrase hosted payload refers to a significantly smaller payload which puts a much lower demand on the satellite's resources and may be designed and constructed by a third-party manufacturer other than the prime contractor for the satellite itself.

Why a hosted payload

A hosted payload can provide a win-win opportunity for both the host (satellite owner) and the owner of the hosted payload. The cost of procuring a satellite and a launch is quite high, and there is also the cost of an orbital slot, mission planning, execution costs, and other expenses. A hosted payload provides an opportunity to share these costs for the benefit of both parties. The host obtains payments for providing the opportunity for the secondary payload to be supported by and launched on its satellite bus, and the secondary payload operator can obtain a much less expensive program by being included on a satellite already being built for other purposes.

In addition, the host may have a unique satellite system that cannot be replicated by the party whose payload is being hosted other than through the hosting arrangement. The unique features may include satellite location (LEO or MEO, for example, or a particular orbital slot), having numerous satellites in the constellation that allow multiple hosting opportunities, or time to market advantages in the case of host satellites already in construction.

Issues to consider in structuring a hosted payload arrangement

The financial benefits of the hosting arrangement are clear, but they come with additional issues and complexities. The obvious one is how to divide the savings that come from the hosting arrangement. There does not seem to be any established or formulaic approach to this, and given the customized nature of many of these arrangements the economics are most often agreed by a case-specific negotiation.

But there are also complexities that arise from the hosting arrangement itself, including a number of key differences in the structure, consideration, and risks in establishing a hosted payload structure. This article focuses on the extra business, financial, technical, and legal arrangements attendant to a hosted payload arrangement not generally contained in a more straightforward satellite procurement.

Additional parties and additional agreements

Satellite system procurements typically involve one purchaser and its selected satellite system vendors and financing arrangements, which by itself provides significant challenges. The dollar amounts are high, and potential liabilities are substantial. As outlined in our prior article, *Satellite systems procurement: A brief how-to guide*, the agreements that implement these arrangements have a number of unique provisions, almost all of which include limitations on liability, specified remedies for specific failures, and clauses that allocate power and control between the parties in specific situations.

By adding in a hosted payload owner and its respective vendors and financing, the number of parties and sets of arrangements multiplies. There needs to be a basic hosting arrangement between the hosted payload owner and the satellite owner, perhaps the primary agreement that implements the hosting arrangement. There is also a procurement contract between the hosted payload

owner and the payload manufacturer, which is by itself a negotiated transaction with technical complexities. There is also the task of integrating the hosted payload into the satellite, which could be reasonably straightforward or technically quite complicated, resulting in additions to the satellite procurement contract and the need for arrangements (often not separately documented) between the payload manufacturer and satellite manufacturer.

In some cases the arrangements and agreements are all entered into roughly at the same time, but this is more common in a condosat arrangement where the satellite and all payloads are being built by the same manufacturer but the payloads are separately owned.

Hosted payload situations more frequently see the hosting agreement being entered into at a different time than the satellite procurement, and the hosted payload procurement also happens at a different time with different players.

Having multiple agreements that must fit with each other puts an additional burden on the drafters. Should special provisions be made between the agreements with the respective vendors as to their rights, obligations, and contract adjustments relative to each other, including insurance coverage, excusable delay, risk of loss, and passage of title? Or are certain players immune from the risks of the hosting arrangement, and able to proceed with contracts that make no reference to the hosting? Pulling this all together adds several layers of complexity and chances for things to go wrong.

Financial terms for hosting arrangements

The satellite owner and the hosted payload owner must agree on the financial arrangements for the hosting. There does not seem to be an accepted paradigm for how to do this, and many variants have been used or suggested.

The host may charge a hosting fee, which can be a one-time fee or series of pre-launch (and possible post-launch) payments for the hosting. A key issue in this variation is whether the hosting fee is fully earned by the satellite owner redesigning the satellite to accommodate the hosting, and whether the fee is therefore due even if the hosted payload owner discontinues the project.

In other projects there is an ongoing fee (possibly in addition to the initial hosting fee) for the continued hosting. This structure may have performance elements, meaning that the hosted payload owner pays so long as it receives the benefit of the hosting services. There is an issue here regarding the cause of the payload owner not receiving the benefit of the hosting services. If the hosted payload is malfunctioning and has to be shut down or modified in some manner, the satellite owner has performed but the payload owner is not actually receiving the benefit of the hosting services, so the agreements need to address whether all or some portion of the fee is due.

In still other projects, particularly the condosat projects with multiple payloads being built by the satellite manufacturer, the hosted payload owner may pay a share of the satellite construction cost, and ongoing satellite operational costs such as tracking, telemetry, and control (TTC) and satellite operational staff, consistent with being a part owner of the satellite itself.

In addition to documenting the unique fee or cost sharing provisions, there are a number of questions and issues to consider:

- If the satellite or the hosted payload is delayed or for any reason has to be canceled (such as technical issues), is any portion of the hosting fee refundable? What about the costs of the hosted payload itself, does the owner have to absorb the entire cost of construction of a hosted payload which can no longer be hosted? (This is probable, but the hosted payload owner may have a termination for convenience provision in its contract with the manufacturer.)
- If the hosted payload is being constructed by the satellite manufacturer, the hosted payload owner may want its own termination for convenience provision with a cap on its exposure. This seems reasonable, but the result is an impact on the owner of the original or non-hosted payload, who has to absorb the additional satellite construction cost now that the hosted payload owner has left the project (assuming some but not all of the costs it was supposed to bear).
- What occurs in the case of a financial default by either the satellite owner or the hosted payload owner? Does the outcome change if the hosted payload has already been integrated into the satellite or launched?

Timing considerations

Satellites and payload programs are often delayed, both as to the procurement of the satellites and payloads as well as the building of the satellites and payloads. Given the multitude of players in a hosted payload program, the delay in either program will impact the other program, creating, at minimum, incremental program costs and/or risk to the core business, government, or scientific mission if the satellite launch is delayed.

Satellite industry players are used to the delay risks associated with launch, where delays in one program can have real effects on others. A prime example is a shared launch, where the two satellites need to be ready at the same time and delays on one program will force the other to wait or require re-matching of parties sharing the launch (taking into account heavy and light satellites for an optimal pairing).

However, with the hosted payload situation, where there are two manufacturers, the very real possibility exists that a delay by the hosted payload manufacturer may result in the hosted payload not being ready for integration in time to maintain the launch schedule. The satellite owner may (or may not) be willing to tolerate some delay, but in any event there will be a limit, creating the chilling prospect for the hosted payload owner of being left with no host. Since hosts are not fungible and there isn't a robust market for hosting opportunities, loss of the original host may effectively terminate the program for the hosted payload owner, who may have paid for the entire payload and all or most of the hosting fee and then has no project. And there may well be no insurance for these kinds of delay. There is, of course, no one way to address this risk, and it can be a significant challenge for the hosted payload owner and its advisers.

Insurance considerations

It is no surprise that the presence of a hosted payload complicates the placement of launch and in-orbit insurance. There are also manufacturer insurance issues relating to coverage of the hosted payload through integration, but these are reasonably straight forward.

The good news is that launch and in-orbit insurance can be placed on hosted payloads for the benefit of the payload owner. How and when to place it is less clear, other than that there seems to be a benefit to having the insurance for both the satellite and the hosted payload placed at the same time rather than separately.

Particularly in the case of a large hosted payload, there may be limitations on the overall amount of insurance that can be placed, and insurance advisers may counsel that placing the insurance all at once will maximize the amount that can be placed and yield the best rate.

In the case of a small hosted payload, particularly a one-time project for a particular mission rather than part of what will ultimately be a constellation of hosted payloads, the hosted payload owner may benefit from having the satellite owner lead the placement, or even purchase the insurance. This is particularly true if the satellite owner is a well-known operator with significant experience in the insurance market.

The key for drafting insurance provisions in the hosted payload agreements is to build in flexibility, so that unexpected twists or turns in the insurance market can be accommodated, while building in the general agreement of the players to cooperate and coordinate.

As is the case with many programs, there is a clear benefit to bringing in insurance advisers early so they can advise on structure and contract issues up front.

Technical compatibility and integration

Of all the issues facing a hosted payload arrangement, perhaps the least difficult to accommodate is the technical coordination, non-interference and compatibility of the hosted payload with the satellite and the payload(s) designed as part of the satellite, and the process of integration.

If the satellite design has already been prepared before the hosting arrangements are put in place, the design may need to be re-considered to ensure technical and operational compatibility. In most cases the hosted payload does not overly tax the satellite's resources, and although there need to be some design changes, they are fairly minor and straightforward in comparison to the overall satellite design and other changes that the satellite owner and manufacturer have already worked through. Similarly, there is an integration process that must be provided for and implemented. In most cases this process is no more complicated than integration of satellite systems and subsystems, and is taken in stride by the manufacturers.

Of course the re-design, however modest, is a change that produces increases in cost, which must be negotiated and covered by the respective sets of agreements. If the satellite design has not been set, and accommodations for the hosted payload are part of the initial design, it is harder to determine the incremental cost of the arrangement to the satellite owner, complicating the economics. On the other hand, including the hosted payload in the original design is almost certainly a less costly alternative than a later redesign.

In a minority of cases, the addition of a hosted payload does strain the satellite's resources, particularly the power requirements, and the new design must address how to balance the power needs of the different payloads. In the case of communications payloads that experience much higher and lower levels of usage at different times of the day, the power can be shifted during lower usage periods to hosted payloads primarily designed for scientific or other purposes. These complexities also may necessitate a hierarchy and priority scheme for allocating power or other satellite resources in the case of scarcity or conflict of needs. Also in a minority of cases the integration can be quite complex, requiring special design efforts and the addition of an integration period to the assembly and launch schedules.

Naturally all of this needs to be documented in the agreements, and lots of "what if" scenarios need to be considered by the parties. How do the respective parties address ownership rights, access to the bus system, power priority issues, access to redundant units, and rights to conduct testing or other satellite operations which have some risk to the other payload? Many agreements do not go into detail on these issues, since the "what if" scenarios are too numerous or too complicated, and just have a simple priority scheme for resolving issues (or leave the satellite owner in control of these issues, which in effect sets the priority in favor of the satellite owner). This, in turn, needs to be considered in structuring provisions for insurance to ensure that the arrangements will not negatively impact the insurability and recovery by either party.

Operational and anomaly considerations

Although in many programs the initial technical considerations in developing the hosted payload arrangement may be no more complex than the numerous other technical issues addressed in satellite procurements, more daunting is the task of anticipating those technical and operational considerations that might arise over the lifetime of the satellite and the hosted payload, and the implications for the hosting arrangement.

Some issues encountered in drafting agreements for the hosting arrangement include the following questions:

- If either the satellite or the hosted payload does not operate as predicted, such as drawing more (or providing less) power than expected or creating some interference issues, how is the situation handled? It may not be possible following launch to re-optimize, and either the satellite or the hosted payload is going to suffer in some manner. It is certainly fair to start with a requirement that the component operating outside of specification be adjusted or even shut down, but there should also be a process for remediation, re-testing, and re-enabling the relevant components, even if they cannot come completely back into specification.
- There also are implications for the financial arrangements. If the hosted payload is shut down, is the hosting fee still paid, or is it refunded?
- What if the shut down unit is still generating a problem for the rest of the satellite? What are the implications for liability of the parties and limitation on liability sections of the agreements?
- These issues become more complicated if the cause of the problem cannot be identified, such as a satellite anomaly causing the hosted payload to operate outside of specification, or a power problem not being readily attributable to the satellite but possibly a shortcoming in the hosted payload design. Issues like this may result in a priority scheme being implemented in the hosting agreement on a no-fault basis – if there is a resource scarcity, whatever the cause, the parties will have agreed on how it is to be addressed and which owner has priority.
- If the payloads are both of significant size and cost and the contracts are entered into concurrently, the issues are perceived differently than if a much smaller payload that is added subsequent to the satellite project being put in place. However, even these smaller payloads can cost tens of millions of dollars and/or have significant importance to the scientific mission or business of the hosted payload owner.
- There is a separate series of issues relating to end of life, where the satellite owner wants to de-orbit, place in inclined orbit, or replace the satellite. Or if the original host payload reaches end-of-life and the hosted payload has remaining useful life as does the satellite bus, the satellite owner would like the satellite to remain in service for a while before replacement. The agreements should address whether these decisions are at the discretion of the satellite owner at any time, are at the discretion of the satellite owner but only after the originally predicted useful life of the satellite or hosted payload has expired, or involve input from both parties.
- How do all of these technical decisions impact insurance coverage and/or the financial arrangements between the parties?

Legal considerations

The existence of a hosted payload complicates the consideration of applicable regulatory and legal issues that need to be addressed with any satellite system. This includes, for example:

- Frequency coordination, filings, and protections: the original coordination likely would not have included the hosted payload, which may involve different frequencies and coverages.
- Export issues in developing a joint satellite system including ITAR matters and TAAs do have the added burden of multiple parties.
- Legal considerations of, and approvals required to, implement ownership, operational, and other rights.

- In the case of a highly regulated payload owner (government or civilian) that will own the hosted payload, there may be a separate set of issues and different contractual paradigms to be reconciled.
- Government jurisdictional issues.
- Government control issues.

Financing and security issues

Satellite systems procurements may require financing to be put in place concurrently with entering into the applicable contracts for construction and launch, and the same is true of hosting. Lenders (including the government export credit agencies) will require a clean security structure to access to the satellite assets that are being financed. In the case of a hosted payload structure, the host and the hosted payload owners will need clear provisions of ownership and the ability to assign for financing purposes.

Perhaps the biggest complication is the addition to the mix of parties of more than one lender, equity player, or other source of financing, with its own requirements and preconceived notions as to how the arrangement will work. The financing and security agreements may need to be specifically tailored for the hosted payload arrangement. It may even be necessary for the parties to coordinate their financings to ensure the feasibility of two side-by-side financing packages, which is no simple task.

Accommodation of business plans

If the business plan of a satellite owner changes, it has to consider the various constraints on its ability to alter the series of preexisting arrangements put in place to support the prior business plan. These constraints are more numerous where a hosted payload is part of the arrangements:

- Satellite relocations to address more urgent service needs may be limited in a hosted payload agreement, and should be addressed in the hosting agreement. A relocation that does not have any significant impact on the hosted payload owner's business should certainly be permitted, but making that determination is not always easy.

- Changes in satellite operations to optimize satellite life (such as for inclined orbit) may result in unacceptable operations for certain payload services, and hence may cause a sub-optimal situation for one or the other of the host or hosted payload owners.
- Arrangements beyond the initial hosting should also be addressed in the agreements, as well as can be done given the limited ability of the parties to predict the future. Some sort of first refusal right on a successor or replacement satellite seems fairly straight forward, even though it may limit the satellite owner's flexibility to do something different the next time. Other first refusal rights or arrangements for additional satellites are also appropriate subjects to discuss and possibly add to the contract documents.

Special hosted payload considerations

- Additional parties and agreements
- Timing issues
- Insurance issues
- Technical compatibility
- Operational and anomaly considerations
- Legal issues
- Financing and security issues
- Accommodation of business plans
- Company or asset sale situations
- Financial and/or insolvency concerns

Company or asset sale situations

Both the satellite and the hosted payload owner will want to carefully consider the implications to them in the event of a sale of the other party or its satellite asset. Both parties will want to ensure that the issues addressed include:

- Provisions on assignment, which may include a free right to assign in connection with a company sale, or may condition that right (subject to reasonability). While the satellite owner does not want to cause economic harm to the payload owner, these arrangements are relatively unique, and the prospect of starting over with a new owner may be unsettling. Accordingly, as part of a free assignment right there may be restrictions as to relocation or repurposing of the host satellite in connection with the sale.
- The satellite owner may want creditworthiness limitations on the assignment right, and there may be issues regarding a sale to a competitor or to a party that would cause a regulatory issue.
- Legal conditions to the transfer of the asset, such as obtaining full regulatory approvals, should be included if possible.
- Payment of costs associated with respect to such a transfer, and any increase in costs resulting to either party as a result of the transfer, needs to be considered.

Financial issues or insolvency considerations

Satellite companies face significant challenges, and bankruptcy risks are not uncommon. Hosted payload arrangements create interdependencies between the two parties, and financial issues facing either company can present a challenge. The hosted payload party faces the most significant risks and challenges if the satellite owner goes into bankruptcy, including potential delays, opposition to any agreement modifications that would otherwise be readily implemented, and even rejection of the contract/loss of hosting rights. The satellite host faces financial issues if the hosted payload party is in financial trouble and if it enters bankruptcy.

The non-bankrupt party will need to continue to abide by the contract terms regardless of the status of pre-bankruptcy payments owed by the other party. Bankruptcy can be a multi-year process, and care needs to be taken to provide the optimum protective mechanisms in an agreement to protect your respective interests in the case of any insolvency situation.

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Consider the benefits to hosting/being hosted, which can be financially significant and may be the only way a hosted payload's business plan can be achieved. Some of the risks are considerable, and unlike those encountered in non-hosting situations, but they need to be evaluated in light of the very real benefits.

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Summary of best practices and takeaways

As either a satellite owner or a hosted payload operator, you need to carefully consider all the issues that may arise during the life cycle of your business and the life cycle of your satellite or payload partner. Hosted payloads bring very significant advantages to parties, particularly in an era of scarce orbital slot opportunities and the financial costs and risks of a satellite business. These significant advantages are paired with significant issues which you need to consider to protect your interests.

- Consider the benefits to hosting/being hosted, which can be financially significant and may be the only way a hosted payload's business plan can be achieved. Some of the risks are considerable, and unlike those encountered in non-hosting situations, but they need to be evaluated in light of the very real benefits.
- Consider the risks of the hosting structure with a multidisciplinary team, including possible business, technical, government, and regulatory outcomes during the life of the satellite and payload programs. Many of the issues are multi-faceted, and would benefit from a free exchange of views by different advisers.
- Know your hosting/hosted partner. As a practical matter, many of the risks that may occur will vary widely in significance depending upon the partner.
- Maintain the core business rights and flexibility you need in the structure and the documentation. All satellite programs are dynamic, requiring changes in understanding documentation during the life of the program, and hosted payload programs are certainly no exception to this.
- Try to anticipate every element of what can occur and address this in your agreements to protect your interests, at the same time appreciating and accepting that there will likely be a loss of flexibility for both parties in entering into a hosting arrangement.
- Consider how the numerous matters unique to the hosted payload arrangements will be reflected in the documents and how you will mitigate your risks in the document drafting. The lack of standard models of documentation and unusual risks will put a premium on creativity.

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