

Satellite systems procurement: A brief how-to guide

Randy Segal
Steven Kaufman



Hogan
Lovells



Overview

The decision to commission the construction and launch of a satellite system is a multiyear strategic decision for any entity, whether commercial or governmental. Unlike many noncustomized procurements, even ones of similar expense, the procurement is only the initial phase, and after a satellite construction contract is signed the parties embark upon a multiyear collaborative journey to keep the program on schedule, on budget, and within the original performance requirements. Additionally, numerous other complicated, high-risk, and/or interrelated program elements must be procured, including the launch services, ground systems, handsets, insurance, tracking telemetry and control, and various forms of ground support and back-office systems.

The procurement, integration, and deployment of a satellite system is similar to playing a multilevel chess match, but can be successfully navigated with the right understanding of each of the elements and how they interreact with each other. There are certainly many resources available regarding how to negotiate procurement contracts or standard terms, but there are precious few guides other than experience regarding integration of an overall satellite system across multiple years and multiple contracts.

Satellite contracts

The satellite construction contract forms the nucleus of any satellite system acquisition. It is the most complex of all system element procurements technically, financially, and legally. The terms and conditions in the contract set forth a blueprint for three +/- years of satellite development and delivery. Moreover, changes in technology, third-party dependencies, business plans, and/or other industry issues can lead to cost increases and schedule delays. Satellite manufacturers may have hundreds of subcontractors providing system components, and any number of other satellite program delays or third-party component failures can impact your program.

Each satellite manufacturer has its own form of contract, which has been reviewed extensively by its internal risk managers. To reduce procurement time, it is often best to use this form as much as practicable, although competitive procurements may end up starting with the customer's form of contract. In any event, to get the right satellite for the customer, the Statement of Work (SOW) and technical specifications will require the assistance of specialized outside consultants and will usually number into the thousands of pages.

Standard terms

As one might imagine, due to the cost of building a satellite, the risk of launching a satellite, the limited maintenance options once a satellite is in orbit, and the reliance on the satellite manufacturer once selection is made, certain key contractual terms will need be carefully structured to fit with the other elements of the satellite system procurement:

Title and risk of loss

Typically, both title and risk of loss will transfer at the moment immediately prior to launch, or intentional ignition. However, title can also be transferred after in-orbit testing, but at an increased cost. This is, perhaps, one of the most fundamental of contractual concepts for the end-to-end satellite procurement: Neither the satellite manufacturer nor the launch services provider accept any liability for satellite or launch failures following intentional ignition. The high-risk nature of the satellite industry has developed a structure that turns to satellite insurance (launch and in-orbit) for the customer's recourse for a failed launch or in-orbit failures (or anomalies). As a result, close attention needs to be paid the definition of the terms, triggers, and times related to transfer of title, risk of loss, launch risks, and insurance coverage. Satellite contracts also need to allow for conforming amendments to ensure that the three core risk-related contracts — satellite, launch, and insurance — avoid any unintended gap in the risk profile.

End-to-end integration responsibility

Few satellite contracts these days include end-to-end procurement and integration elements. The primary reason is that the satellite manufacturer does not build the ground systems or provide launch services, and thus would be subcontracting these elements to an entity which is traditionally a stand-alone manufacturer. Certainly, there is a benefit to having one manufacturer perform this end-to-end integration role, including with respect to coordination of the satellite completion and the launch services, but it comes with several downside elements. First is the cost, which can be expected to be subject to a mark-up in the range of twenty percent (or more) to compensate for the costs and risks associated with administrative oversight. Second is the distance this creates between the customer and the actual

manufacturer or service provider. Communications, requests, and modifications must be made through the satellite manufacturer, and this can result in sub-optimal program management and visibility. Finally, this can result in less flexibility for the customer as to working with alternative end-user terminal and/or ground system providers, where the core contract is less open as to the technology interfaces.

Preliminary (or conditional) and final acceptance

Most satellite procurements have some form of ground deliverables, which can range from the very basic to the very extensive, including all ground system elements and some reference user terminals (RUT) or other non-space elements. At the time of launch of the satellite, the customer will be torn between the benefits of controlling the ground elements versus the risk of the ground system having certain elements that are not acceptable. The concepts of preliminary or conditional acceptance are often used both in the terms and conditions as well as the technical sections of a satellite contract to indicate a time in the system acceptance where the ground elements are substantially complete, with minor deviations. This concept is designed to accommodate the need to start customer operations with the customer desire for the manufacturer to complete the remaining punch list of minor non-conformities. Care must be taken to consider how the pre-final acceptance period interacts with concepts of risk of loss, insurance responsibility, warranty period coverage and other contractual rights, obligations, and risks.

Satellite manufacturer selection generally focuses on:

- Technical capability, satellite capacity, and functionality.
- Pricing.
- Time requirements for delivery.
- Extent of desired customization.
- Launch vehicle and ground system interfaces and costs.

Post-launch obligations

As to the satellite, the manufacturer will not have liability or obligations after the launch, except for certain anomaly and on-going insurance support. To the extent that the contract includes ground system elements and/or certain elements with respect to end-user terminals, there will be important elements to consider with respect to both the hardware and software warranty and support. It will be important to consider the practical timing elements of these warranties, to balance the customer's desire to have access to these ground elements for testing, training, and to develop other system elements, yet at the same time to ensure warranty support is maintained for a sufficient period of time post-satellite delivery to provide needed support.

Options

Careful consideration should be given at the time of negotiation of the initial contract to identify and include those contractual options which are so necessary for customer flexibility over the construction period. Once a satellite manufacturer is selected, the customer's leverage for these manufacturer-specific items is dramatically reduced. Many of these options will relate to elements of the system other than the satellite itself (or additional satellites), such as the ability to launch on different launch vehicles besides the baseline, extended warranty services and support for ground and/or operational elements, satellite storage if there is a launch delay or other issue in the program, and various service and equipment options. In addition to seeking the longest exercise periods and the most favorable fixed prices, the customer may want to focus on the riskiest areas of the proposed system and try to build in extra flexibility through having additional options.

Contract change clauses

Careful consideration must also be given to the provisions and processes for contract changes. Once a contract is executed, as a practical matter it is very difficult to have anyone perform desired system changes other than the existing manufacturer (even though many satellite contracts contain negotiated cover remedies in which a replacement manufacturer in theory is obtained to complete the satellite construction), so flexibility in the form of a good changes clause is a necessity. Many first-time customers start with the simple but unrealistic plan not to make any changes throughout the life of a program. That is very seldom possible due to the complexity of satellite programs, lack of clarity as to end-user requirements, changes in technology, or program requirements not fully understood at the initial stages for a program that will continue for three+/- years and a wide variety of other practical considerations. As a result, it is important at minimum to include a provision permitting fairly broad latitude for directed changes and equitable adjustments of cost/schedule if changes would result in increases (or decreases) over the baseline program. Further, it is highly beneficial to have a provision that indicates that in case of a dispute over the equitable adjustment, the manufacturer will implement the change and the cost can be later disputed without waiver by the customer. This provision is often important in keeping the satellite construction in sync with the other elements of the program.

In-orbit incentives (or warranty payback)

Many satellite contracts include in-orbit incentives which are earned based on the performance of the satellite over a given number of years. Conversely, the contract may have warranty paybacks where the manufacturer must repay a certain amount of money based on failures of part of the communications capability of the satellite. This is a desirable term for a customer and provides a form of financing on favorable economic terms, and also maintains a degree of customer leverage over the manufacturer for continued support during the life of the satellite. To get the most mileage out of these provisions, they will need to be tied into expected insurance loss formulas.

Liquidated damages and late delivery termination

Most satellite contracts limit customer recourse for late delivery to two elements. First, there is typically a provision for liquidated damages and negotiations typically involve discussions of grace period, the absolute amount of damages and over what period of time (e.g., 180 days), and the slope of the payment during the applicable period (e.g., evenly assessed versus its increase and decrease over time). Second, there is often a customer right to terminate the satellite contract for late delivery after the end of the liquidated damages period, and for return of the payments made by the customer to the manufacturer. These two penalties present significant issues for both the customer and manufacturer. There is typically an offset in the schedule delay caused by customer-furnished items, which generally is defined to include the other elements of the satellite system, as well as force majeure and/or other arguments as to excusable delays relating to matters other than the satellite itself.

Given the complexity of a satellite program, and the interrelationships with other contracts (including the launch services contract), often there are disagreements as to liquidated damages and offset against any customer attributed delays, and managing potential claims for liquidated damages is a key item for both the customer and the manufacturer during the construction period. This can be exacerbated for satellite programs that run significantly over budget so that payment by the manufacturer of liquidated damages would eliminate much of the program margin or profit. Even more significantly, a leverage battle arises since most customers cannot as a business matter exercise the termination right for late delivery, but if a customer does assert a termination right, the result can be a very significant liability for the manufacturer and a satellite that is not usable for any obvious alternative purpose without significant additional changes and investment. As a result, issues with respect to late delivery figure prominently both in contract discussions and in program management.

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Complexity that works is built up out of modules that work perfectly, layered one over the other.

Kevin Kelly

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Launch service contracts

Unlike the satellite procurement contract where specifications are carefully crafted by the purchaser, launch vehicle contracts are for standard services and relate to standard launch vehicles. Other than price, negotiations generally center on the launch slot given to the customer on the launch service provider's manifest. Once again, significant coordination efforts are needed by the purchaser to ensure the seamless integration of satellite delivery, launch slot and insurance obligations, and to avoid unnecessary delays in operating the satellite, unnecessary costs for missing deadlines, or gaps in insurance coverage.

In an effort to reduce costs, some purchasers opt for a co-passenger with another satellite, for certain launch vehicles designed to launch two satellites simultaneously. This approach saves on costs but does place the schedule at increased risk of delay in the event one of the two satellites is not to be launched at the same time as the other. Coordination is also needed with regard to managing launch risk. Similar to satellite construction contracts, launch service contracts strictly limit liability, and for launch services, the launcher's liability is generally limited to a relaunch at a stated cost that can be insured. This effectively creates a partial overlap between the launch services contract remedy and launch

insurance which may need to be managed for optimal efficiency.

Launch and in-orbit insurance

As previously mentioned, except for in-orbit incentives or warranty paybacks, the satellite manufacturer's liability terminates upon launch. Similarly, the launch service provider's liability is limited to the cost of a relaunch, and then only if the option is triggered within the relevant time. When examined together, the procurer must ask what they are to do if the satellite does not perform as intended once in orbit. The answer is generally limited to insurance, although the insurance process is anything but simple.

Early in the satellite procurement process, it is recommended that a decision be made as to the insurance broker. Due to the specialization of the industry, there are a limited number of major satellite brokers – principally Aon/ISB, Marsh, and Willis Towers Watson – each of which markets to the same insurance underwriters. Typically the cost of brokers is not relevant to the procurer as it is paid by insurers from an insurance premium, which can cause some difficulties in government procurement.

Although the selection of the broker is done early in the procurement process, the actual insurance placement takes place typically a year or so prior to satellite launch per standard insurance placement processes.

Throughout this process, the broker prepares business and technical presentations to insurers with the assistance of the satellite manufacturer, launch service provider, and customer. The most important element of the insurance policy is the loss formula and what losses will result in partial and/or total constructive losses. The development of a loss formula is a complex technical-business-financial undertaking to determine what elements of a possible satellite failure will reasonably cause what business-financial harm, what elements of the satellite performance are most worth insuring, and what the insurance community will accept as reasonable losses for such failures. The customer is intimately involved in making key decisions related to loss formula, deductibles, and the amount insured.

As mentioned above, insurance timing and attachment of risk, coverage, and payments must match risk of loss and transfer of title in the satellite contract and launch services contracts. Typically insurance is placed to cover the launch plus one year of in-orbit operations. Brokers typically remain with the program throughout ongoing insurance renewals, but the client can change brokers for in-orbit placements. It is also critical both during the insurance placement process, and following launch to ensure full information to your broker on contract amendments, waivers, and/or other technical issues that arise during the program and post-launch so that the required updates to the insurers can be made so as to avoid any claim as to non-coverage. The care and feeding of the insurance syndicate is an important element during the satellite construction phase.

Ground systems

Once the satellite is launched and operating, it must have ground equipment to support its functionality. Although the satellite procurement receives much of the focus of the procurement effort, ground system specifications also must be development and implemented. The first step in determining ground systems technical specifications is determining the needs of the eventual end-users of the satellite capacity. End-user requirements must drive the design of the ground equipment and end-user terminals, which must drive the design of the satellite, so it is critical to ensure that the ground system is not

an afterthought. If the procured satellite system uses standard functionality, then the ground system and handsets/terminals are often a commodity procurement focused on price, quantity, schedule, termination and options. However, if the satellite is a customized system, the procurement of the supporting ground infrastructure is more developmental, and is driven by schedule and achievability.

Special note on government procurement of satellite systems

In addition to the issues set forth above that are applicable to all satellite procurements, there are even more complex considerations in the case of international government satellite procurements. This results from the inevitable differences that exist between applicable government procurement rules (both procedural and substantive) and the customary practices and contracting terms within the satellite industry.

Unlike most commercial acquisitions, complex government procurements often have unique and stringent procedural procurement rules that were not designed with satellite procurements in mind, and give rise to tensions that need to be carefully addressed. And the practices of the satellite industry are not mere custom, but the results of years of risk assessment by manufacturers, industry experts and insurers, so change is both difficult and likely to result in significant changes to pricing.

Resolving these inconsistencies requires planning and coordination between the local procurement experts, whose expertise is critical to understanding each unique government process and what changes can be made, and outside satellite counsel, whose knowledge of the satellite industry and manufacturers flexibility, can help lead to a smoother, more timely, and more cost-effective procurement. The earlier in the procurement process these inconsistencies can be identified and a plan for resolving them developed, the more flexibility will be afforded to the team in crafting a procurement strategy that meets all government procurement obligations, while deviating as little as possible from the norms of the satellite industry.

It is critical to understand the RFP process with local procurement experts, because the process can materially affect the substantive outcome. While procurement processes are intended to ensure transparency and to optimize the best results for the government purchaser, when inflexibly or reflexively applied to the satellite procurement process it typically will result in suboptimal financial, technical, and legal terms. There are many different ways to work with local procurement experts through careful pre-planning to achieve a solution that is both acceptable under local law and obtains the desired results for the government client.

Included in this understanding of the RFP process is a need to thoroughly understand the process and timing for any changes to be made to the procurement documents, and the various government approvals required at each stage of the process, including budgetary approvals. Often, procurements for governments are very time sensitive, especially around changes of administrations. A need to republish a procurement and start anew can translate to the entire loss of a window for the program.

Government procurement rules may not be highly developed or define particularly well which substantive requirements are mandatory, optional, and/or may be construed to be in the spirit of rather than strictly implemented. There may be internal processes, approvals, or exceptions that may be available as well to avoid those government procurement terms that are not compatible with a robust and beneficial satellite procurement effort.

The cost of bidding for a satellite contract, particularly on a government contract, is very high and can cost a manufacturer anywhere up to a range of US\$500,000 to US\$1 million. Accordingly, if a satellite manufacturer does not believe that the government procurement rules can accommodate a risk profile in its comfort zone, then the government procurement may result in a very limited number of bidders, a failed procurement, and/or highly unattractive terms. It is critical to consider not only the substantive considerations and tradeoffs, but also the procedural elements of government procurement in order to achieve a successful procurement. Satellite manufacturers will “no bid” (or present an exorbitant bid) if the government procurement process presents significant departures from customary risk patterns.

As is the case in most major system acquisitions, each decision impacts several other decisions. Therefore, it is best to look at the government procurement of a satellite as a multilevel chess match where each decision represents a tradeoff that will impact decisions with respect to other substantive terms or processes.

Certain segments of the ground communication system can be procured as part of the satellite procurement, ground system procurement, or separately, including:

- Antenna(s) and pads.
- SOC and NOC.
- Tracking telemetry and control, which may be outsourced.
- End-user terminals/handsets/equipment.
- Back-office and other service systems.



Considerations for government procurements

Substantive considerations

Title/risk of loss/insurance/warranty

The typical satellite contract structure, and how title/risk of loss/insurance/warranty issues are handled, is not contemplated by the typical government procurement process. Up-front planning is critical to determine how the procurement laws can be interpreted and/or exceptions made to allow for these terms.

Limitations on liability

Strict limitations of liability so common in the satellite industry are not typical for government procurement contracts.

Indemnification

Satellite manufacturers and launch service providers require indemnification under certain circumstances from the procurer. Some government procurement rules do not, on their face, contemplate the government entity accepting any indemnification obligations.

Bonds

Performance bonds and payment bonds are often contemplated by government procurements. There will be an impact on the cost of the procurement, the payment schedule, or other financial or schedule terms

to accommodate this requirement, particularly choice of law and forum is in a non-neutral jurisdiction.

Termination rights

Often government procurement, and general government laws, contemplate that the sovereign has the right to terminate contracts when it is in the national interest to do so. This essentially needs to be considered a termination for convenience provision which is quite familiar to all satellite manufacturers. The key difference, however, is in the contemplated termination payments, and in obtaining the flexibility to use the more familiar termination schedule. If this is not possible, one tradeoff is that the milestone schedule may be more front-ended, which in turn may lead to issues with respect to providing an advance payment bond.

Contract currency

Some government contracts may have required provisions as to portions (or all) of payments being made in local currency. This can significantly increase the price and/or affect the number of bidders to a procurement.

Liquidated damages

Manufacturers will be subject to liquidated damages for late deliveries, which usually increase periodically after a grace period. If a grace period is not allowed, the schedule and cost will be impacted. Further, typically liquidated damages are only payable with respect to major system delivery elements at the time of their preliminary or final acceptance, and not for individual milestones and/or individual components. If the government procurement rules contemplate higher payment structures, individually-assessed penalties and/or steep penalties, this can similarly affect the schedule and/or cost commitments under the contract.

Choice of law and jurisdiction

The requirement to select local law may increase the perceived risk of other elements required by local law, such as performance or advance payment bonds, limitation of liability and other government protective provisions. This can have a significant impact on how the potential bidder views any unusual substantive terms, and how the bidder prices or structures the bid in return.

Procedural considerations

RFP process

Typical government RFP processes have limitations on negotiations and best and final offers (BAFOs), and also specifically prescribe how technical and financial evaluations of bids are to be made. A commercial satellite procurement can obtain significantly more beneficial terms through negotiations, BAFOs, and consideration of technical capability differences (including satellite capacity), but these techniques often do not lend themselves to rigid or pass/fail criteria so common in government procurements. While government processes may contemplate clarification meetings with all bidders, this may not provide sufficient flexibility for reaching optimal terms.

Personal liability and risk

Government officials that are responsible for a satellite program often face personal liability, including criminal liability, for program decisions. Often, these programs are subject to strict annual audits. This potential for liability heightens the scrutiny required by outside counsel to ensure actions taken in achieving the best program results are also ones which do not expose the program leaders to risk, and requires additional sensitivity as to process, drafting of substantive

provisions, and to the required supporting documentation.

Process differences for approvals and signatures

For example, special “apostille” or authorized translations may be required. Contracts may be required to be physically signed either in the local jurisdiction or in the jurisdiction selected under the contract for the signing to be effective. Special requirements may exist as to initialing pages of contracts, and who can sign or approve ongoing program management efforts. These additional process differences do not typically affect substance, but may have significant time, logistical, or cost impacts.

Contract changes, amendments, and waivers

Significant up-front consideration needs to be given to what the process will be under applicable government rules for changes, amendments, and waivers to the contract, including who is authorized to sign, receiving budgetary approvals for increase, and any obligations as to competitive bidding of changes (which is generally not feasible as the changes are manufacturer-specific). This needs to be considered in light of the customer delays that the inability to make decisions may cause, as well as the inevitable need to adjust to changes throughout a satellite program. Further, this will be affected by any applicable prohibitions on waivers without any discernible benefit to the government.

Fixed prices, taxes, and importation

Government procurement rules often contain special provisions as to how expenses, including value-added tax (VAT) and importation obligations, will be addressed. It is important to pay close attention to the processes in place to address these requirements, because they can significantly impact the program.

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If you're confused, you're not paying attention.

Tom Peters

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A word about everything else satellite

The success of a satellite procurement is dependent on many governmental, regulatory, spectrum, and financial considerations. Typically, satellite manufacturing programs require compliance with U.S. ITAR requirements and obtaining a host of technical assistance agreement and other export approvals. Licenses from several regulatory administrations are required, as is obtaining an orbital slot, spectrum licenses, and frequency coordination. Financing a satellite system can be a daunting undertaking, and can be assisted by the various government export administrations including Coface, Ex-Im Bank, and Export Development Canada, which will finance French satellite programs, U.S. content, and Canadian contracts, respectively. These elements, significant in their own right, also impact the satellite procurement process.

Summary of best practices and takeaways

The decision to commission the construction and launch of a satellite is a multiyear strategic decision for any entity, where the parties will continue a multiyear collaborative process which is unlike any other. The parties' efforts will extend far beyond the normal contract selection, execution, and monitoring, with both parties working to keep the program on schedule, on budget, and within the original performance requirements. The following are the key takeaways that underpin a

successful satellite procurement for any entity:

- Successful planning and coordination between the internal business, procurement, and contracts team and outside counsel with satellite industry expertise is critical.
- Satellite procurements involve numerous risk-based contract issues, including provisions as to title, risk of loss, and limitation of liability, which arise from legitimate risk management practices and cannot just be negotiated.
- Satellite system procurements are not just a series of consecutive purchases, but a coherent whole, and participants need to ensure the seamless integration of all program and contractual elements from a technical, risk, business, and legal standpoint.
- Changes and mistakes even on relatively minor issues can have large impact due to the high costs involved. Satellite industry practices are not innately consistent with government procurement processes, and must be reconciled early in the procurement process.
- Flexibility and pre-planning are key in obtaining the best possible terms and conditions.
- A satellite program is dynamic over the full cycle of system construction, going well beyond contract execution and monitoring, and must

accommodate contract change notices, options, waivers, termination flexibility, and intensive program management throughout three +/- year cycle of program development and deployment.

- Programs are extremely tight. Avoiding delays and cost increases requires constant vigilance, crisp commercial decision making, and a minimum of post-contract changes.
- All programs are customized to some extent and contain development risk.
- The key role played by insurance shows high level of risk inherent in satellite programs compared to other procurements.



Randy S. Segal
Partner, Northern Virginia,
Washington, D.C., and Silicon Valley
T +1 703 610 6237
randy.segal@hoganlovells.com



Steven M. Kaufman
Partner, Washington, D.C.
T +1 202 637 5736
steven.kaufman@hoganlovells.com

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