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Exploiting Commercial SATCOM: A Better Way

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Since the late 1980s, elements of the Department of Defense and the US intelligence community have used commercial satellite communications (SATCOM) to augment their organic SATCOM capabilities. Following the Persian Gulf Conflict of 1990-91, Congress directed the DOD to pursue greater use of commercial SATCOM, providing \$15 million in the fiscal year 1992 Defense appropriation in order for DOD “to study ways of using commercial communication satellite capabilities” and “begin moving aggressively toward maximum utilization of commercial satellite communications systems.”¹ In 1997, the senior communications flag officers of the military services committed the military to the long-term employment of commercial satellite communications to augment military owned and operated SATCOM systems.² The Joint Requirements Oversight Council (JROC) endorsed this decision in October 1997.³ Today, the Defense Department continues to expand its use of commercial satellite communications; however, DOD’s approach for leasing commercial SATCOM is inefficient and expensive.

Joint Vision 2020 identifies continuous information superiority as an essential element of US warfighting for the first part of the current century.⁴ The various service requirements to pass information between dispersed, mobile elements, as in the Army’s concept for the Future Force and the Navy’s vision for Network-Centric Warfare, rely on information superiority.⁵ The result is that the US military’s need to pass large amounts of information (hundreds and soon thousands of megabits per second) will continue to grow. Only space-based communications can meet this need. Although the military is undertaking an effort to greatly increase the information-carrying capacity of its organic military SATCOM (MILSATCOM) systems, the

	Operations Desert Shield/Storm	Operation Noble Anvil	Operation Enduring Freedom	Operation Iraqi Freedom
Total SATCOM Used (Mbps)	100	250	750	2,400
Total Force Engaged	500,000	51,000	55,000	235,000
Number of 5,000 Military Member Force Increments	100	10.2	11	47
SATCOM Used per 5,000 Military Members (Mbps)	1	24.5	68.2	51.1

Figure 1. Increasing Demand for SATCOM Since 1990.

Transformational Communications Office will not be able to deliver a functional worldwide system until sometime in the second decade of this century.⁶

Until such new capabilities are available—and quite probably even after they are, the Defense Department will require commercial SATCOM to complement its military systems to fully meet its needs for transmitting information among deployed forces and between deployed forces and the sustaining base in the United States. In 1997, military communications planners projected that the growing demand within the military for satellite communications would consistently exceed the capacity of available military systems. Operation Enduring Freedom in Afghanistan and Operation Iraqi Freedom have more than validated this projection. Before Operation Enduring Freedom, the greatest demand US Central Command (CENTCOM) projected for information transfer using SATCOM was 500 megabits (million bits) per second (Mbps) and it routinely used about 100 Mbps. Shortly after the operation commenced, however, CENTCOM identified that its forces needed not less than 500 Mbps and potentially more than one gigabit (one billion bits) per second (Gbps). The required increase in SATCOM capacity was met by leasing it from commercial industry.

As shown in Figure 1, the demand for SATCOM by deployed military forces has grown markedly since Operation Desert Storm in 1991. This has

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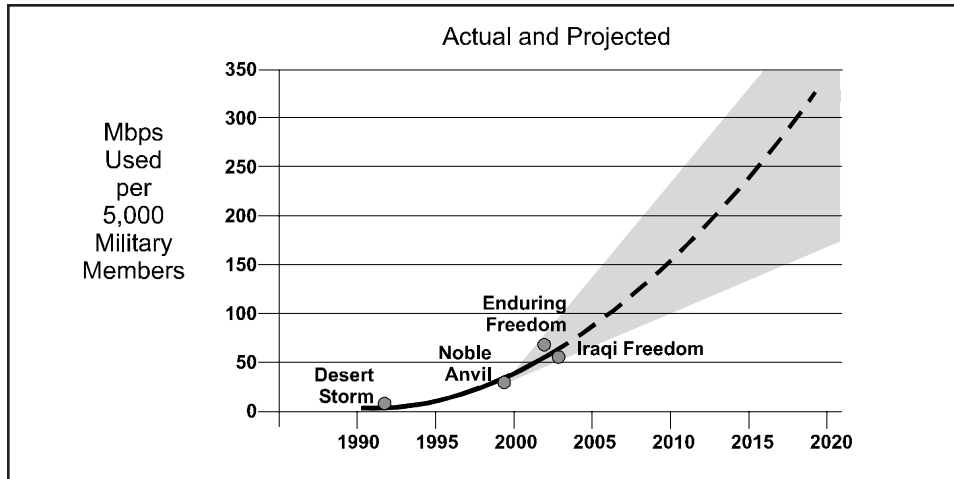


Figure 2. Growth in SATCOM Needed to Support 5,000 Military Members.

been the case even though the number of deployed forces in operations since Desert Storm has been smaller, often much smaller. A good way to assess the trend in the military’s demand for satellite communications is to look at the amount of SATCOM required to support a consistently-sized increment of military forces. Figure 1 and Figure 2 are based on historical information regarding the SATCOM actually used, which is available from US Strategic Command, DOD’s SATCOM operational manager. They show that since 1991 the satellite communications required to support an increment, or force package, of 5,000 deployed military members has increased from 1 Mbps during Operation Desert Storm to an initial assessment of about 51 Mbps during Operation Iraqi Freedom. The demand for SATCOM is expected to continue to increase in the future; the rate of increase is uncertain. Figure 2 suggests how greatly the requirement may increase if the current trend continues.

The Commercial SATCOM Industry

The commercial satellite communications industry primarily works with commercial customers. It has evolved into an international business; most of the firms in the industry are international consortia. While there are commercial SATCOM providers which can be considered as US companies, such as PanAmSat and Loral’s Skynet, the predominantly international nature of the industry severely hampers the US government’s ability to influence it or to enter into agreements with it that are anything other than commercial in nature. To maximize their profits, these companies are interested in leasing as much of the capacity of each satellite they orbit as possible. Generally they structure the business plan for a satellite—including the baseline rate structure—to generate a profit once 70 percent of the satellite’s information throughput is used, although

their goal is to continually lease 100 percent of the capacity of each satellite. Most of their customers are large firms like News Corp., Boeing, and Citibank. These firms present their total requirements for all elements of the company to one or more SATCOM providers in order to obtain the most efficient and cost-effective provision of satellite communications to meet those requirements. Thus, two elements of a firm may be a thousand miles apart but still can be serviced by transmissions from the same satellite and the same transponder leased by the firm. They can be simultaneously supported with no increase in cost to the firm, other than the marginal costs of operating two ground terminals rather than one, and the firm would incur such marginal costs in any event.

In addition to presenting the total requirements of their entire enterprise, these firms also project their requirements over years—three, five, or ten years—and negotiate with a commercial SATCOM provider for leases of transponders to cover such long-term periods.⁷ This benefits both the firm with the need and the SATCOM provider. It allows both to plan for the long term. The SATCOM provider can forecast the overall utilization of the transponders and satellites it has on-orbit over a decade or more. In turn, it can very effectively project its requirements for replacing satellites in its constellation or adding satellites to that constellation. The firm leasing the satellite communications capacity garners the benefit of lower leasing rates because the SATCOM provider can offer lower rates based on the assured use of its transponders and its resulting ability to project an assured income stream and the associated profits—a good portion of which it will plan to expend on replacement and additional satellites, depending on the overall demand from its customers. For example, the RAND Corporation's Project Air Force conducted a study in 2000 of commercial SATCOM support to the DOD. This study compared the costs for single and ten-year leases of whole transponders for a total throughput of one gigabit per second. For ten-year leases, the cost was \$58 million per year. For single-year leases, the cost was \$77 million per year. For a ten-year requirement, the savings resulting from entering into a single ten-year lease rather than ten one-year leases was thus projected to be \$19 million per year.⁸ Leasing the same capacity on a quarterly basis doubled the cost, while leasing it on a weekly basis quadrupled the cost. Costs for leases for smaller amounts of capacity, especially for less than that of an entire transponder, are even higher, since the commercial SATCOM provider may be unable to find a customer for the transponder's unused capacity.

DOD's Current Method for Obtaining Commercial SATCOM

The method DOD follows today for obtaining commercial satellite communications is ad hoc. With the exception of the US Navy and its Challenge Athena program, the services and the Department of Defense do not plan for and

do not program funds to obtain commercial SATCOM. Instead, the current practice is to effectively delegate to the level of the military unit needing SATCOM support the responsibility to plan, arrange, and fund for the lease of the commercial SATCOM that unit requires. As already indicated, for small requirements for bandwidth (less than the capacity of an entire transponder on board a commercial communications satellite) or for short-term requirements (less than a year), commercial satellite communications rates increase substantially, especially for last-minute, short-duration demands for small amounts of bandwidth.

Additionally, while the Commander of US Strategic Command (STRATCOM), in his assigned role as DOD's SATCOM operational manager, is responsible for providing and managing all satellite communications required by the US military to perform its assigned missions, he has no budget to pay for the required commercial leases. Neither does the Defense Information Systems Agency (DISA), which the STRATCOM Commander has designated as his day-to-day manager of the military's use of commercial satellite communications. Currently, DISA must charge the costs it incurs to lease commercial satellite capacity back to the unit requesting the lease. As a result, DOD requirements are presented to the commercial SATCOM industry on a piecemeal, catch-as-catch-can basis.

Furthermore, the Defense Department and its subordinate units typically do not enter into leases for periods greater than a single year. There are a variety of reasons for this, some of them procedural, some administrative, some policy, and one based on a DOD interpretation of law. The law is the Anti-Deficiency Act (31 U.S.C. 1341 [a][1]). Congress enacted this law to prevent elements of the executive branch from entering into contracts for which the Congress had not actually appropriated money and which therefore the executive branch might be unable to pay. For the US government, such a situation is embarrassing and untenable. For a commercial firm operating in a capitalist market economy, expecting it will be paid a fair amount for services it renders, such a situation is intolerable. As the Defense Department normally interprets the Anti-Deficiency Act, military units are prevented from entering into multi-year leases unless they "fence" a part of their budget during each year of the lease to cover the termination costs in case the unit has to terminate the lease.

The Defense Department requires this approach to ensure that a unit which enters into a lease can cover the cost of terminating that lease out of its own portion of the DOD budget. However, this approach presents the military with a nearly insurmountable barrier to multi-year leasing, because the termination costs for individual leases from the SATCOM industry are typically equal to the unpaid balance of the leases. These termination provisions protect the vendor who has agreed to provide a service for a certain period of time and in exchange does not attempt to lease the same service to someone else. The

vendor therefore projects and expects a certain income based on the provisions of the lease contract. Such a lease-by-lease view applies to the DOD because US military units present their requirements to the industry one at a time on an ad-hoc basis. If a lease is terminated early, the termination clause usually provides that the lessee either pay the balance of the lease or provide an alternative party who will assume the balance of the lease, ensuring the vendor of the income it believed it would obtain when it entered into the lease.

As a result of this current practice, units throughout DOD continue to treat commercial SATCOM as a luxury to be used only when they cannot obtain access to MILSATCOM systems and only if they can afford it. Consequently, Strategic Command and its customers must scramble in times of crisis. Efforts to lease commercial satellite communications then become urgent—lest an adversary or the news media lease the available bandwidth before DOD can lease it. Worse, once the commercial SATCOM is obtained, routine communications that were using MILSATCOM during peacetime may have to be shifted to the commercial systems. There are several reasons for this. First, for the cost reasons discussed above, military organizations avoid using commercial SATCOM when MILSATCOM capacity is available. Second, most tactical Army and Air Force units have no organic terminal equipment that is compatible with the C, Ku, and Ka commercial satellite communications bands. Third, MILSATCOM systems are designed to reorient their areas of coverage over any portion of the earth's surface except the polar regions. Commercial SATCOM systems, on the other hand, are generally designed with fixed coverage areas where there is a strong customer base. The contingencies and conflicts to which the US military responds are not always within those areas.

Commercial Practices—A Better Way

The Defense Department can change the way it obtains commercial satellite communications. As acknowledged by the 1997 Senior Warfighters Forum, the US military has a long-term, continuing need to augment its MILSATCOM systems with commercial SATCOM. The Defense Department has, however imperfectly, committed to using commercial satellite communications as an essential element of the infrastructure comprising its Global Information Grid. The department acknowledged and reaffirmed its commitment to commercial SATCOM with the advent of the DOD Teleport program in 2000.⁹ The critical feature of this program is the addition at selected Standard Tactical Entry Point SATCOM stations of the necessary antennae and transceiver equipment to allow commercial C and Ku band SATCOM to extend the Global Information Grid to warfighting units deployed throughout the world.

Since its reliance on commercial satellite communications is recognized, known, and predictable, the Defense Department has every reason to

“DOD’s approach for leasing commercial SATCOM is inefficient and expensive.”

improve the way it obtains commercial SATCOM. The department does not have only a few requirements or even a plethora of unpredictable, ad-hoc requirements. The department relies on commercial SATCOM just as it relies on commercial terrestrial communications capabilities. Operations Enduring Freedom and Iraqi Freedom demonstrated the utility of commercial satellite communications to the US military. US Central Command’s use of commercial SATCOM grew from less than 100 Mbps in August 2001 to more than two billion bits per second (2 Gbps) in the winter of 2003.¹⁰ Given this reliance, DOD should learn from and apply existing commercial practices in order to obtain the commercial SATCOM it needs in the most efficient, cost-effective manner practicable.

The Classic Commercial Approach

One approach the Department of Defense can follow is to do as the Navy has done with its Challenge Athena program, consolidating all current and projected requirements from its vessels into a single program. Using this methodology, Strategic Command should begin to consolidate the net current and projected requirements which all elements of DOD have for commercial SATCOM. Further, the command should be provided with the budget necessary to secure leases of the commercial SATCOM capacity to meet all or a substantial portion of DOD’s total demand. The requirements can be identified by geographic areas and could be segregated into those that are routine and recurring and those which are contingent—needing to be fulfilled only in the event of a contingency or conflict. These requirements should not be established simply for the current or next fiscal year; instead, they should be projected well into the future—for a decade or more. Strategic Command can then present these requirements on an enterprise-wide basis on behalf of DOD to the commercial satellite communications industry.

While the exact location, nature, and scope of contingencies can never be precisely predicted, DOD’s overall demand can nonetheless be forecast with a large degree of confidence. Since there will be some uncertainty in its forecasts, if DOD uses the classic commercial techniques for lease management, it should not attempt to enter into long-term leases for all of its projected require-

ments. However, the location as well as the throughput demands of recurrent requirements can be predicted, and areas of intense interest can be forecast with reasonable certainty. Therefore, DOD could enter into leases for a percentage of its future requirements for commercial SATCOM. Entering into long-term leases for 70 to 75 percent of these requirements would be prudent.

Innovative New Commercial Best Practices

As with all areas of business, the commercial satellite communications industry does not have the luxury of resting on its laurels. Changing times require adaptive organizations to develop innovative ways to meet the new business environment. The satellite industry in general and satellite communications in particular have not grown as much as had been forecast a decade ago. This has led to the development of innovative leasing arrangements for commercial SATCOM—creativity from which the DOD can benefit. Key innovations in the leasing of commercial satellite communications include lease rates based on the aggregation of all bandwidth leased by a single customer from a single provider, long-term lease pricing for a base year with option-year lease contracts, provisions for termination clauses based upon specific circumstances with no liability surcharge, and portability of leases of commercial SATCOM. All of these ideas are approachable if DOD can represent itself and its multitude of requirements for commercial satellite communications as a single enterprise, and then actively leverage its status as a huge customer of commercial SATCOM. To do so, DOD must think of itself as a large, significant, influential customer and negotiate lease terms appropriate for such a client.

The concept of obtaining lease rates from satellite providers based on the aggregate amount of bandwidth a customer leases from each provider is straightforward and is often referred to as volume discounts. It would work particularly well for the US military if DOD moves forward to consolidate all of its commercial SATCOM leasing actions through Strategic Command—enabling the command to leverage the tremendous amount of business that DOD brings to the commercial SATCOM industry each year. The idea is basically that as a major customer of a satellite communications provider when its many leases are viewed in the aggregate, DOD should be able to successfully negotiate terms that would allow it to receive the benefit of decreasing per-unit lease costs (for instance, 1.5 Mbps could serve as the unit) as the total amount of bandwidth which DOD leases from that provider—anywhere in the world—increases. This approach is being used today by many firms to decrease their cost of leasing satellite communications based on the total amount of business which they bring to a SATCOM provider.

The idea of negotiating lease pricing based on the total duration of a lease, even if the lease is for a base year with option years, is similarly

powerful. Commercial customers can obtain such arrangements today, including firms which in turn provide this leased satellite communications to the government. Throughout the history of DOD leasing of commercial SATCOM, few leases have been allowed to expire after only a year or less, and those usually were recognized to be clearly short-term requirements when the lease was initiated. If the Anti-Deficiency Act inhibits DOD use of multi-year leasing, a possible alternative is to enter into leases for a single base year with option years covering the balance of the forecast requirement. Following emerging commercial practice, DOD again can leverage being a very large customer of commercial SATCOM and demand that satellite communications providers use multi-year pricing rates based on the total duration of a lease if all options are exercised. Both the commercial providers and DOD win in this case—the winning provider gets a nearly certain long-term customer, and DOD obtains the benefit of multi-year pricing.

Another concept which is seeing use today between customers and their commercial SATCOM providers is the liberal incorporation of a true “termination for convenience” clause in SATCOM leases. Unlike the present official termination for convenience clause contained in the Federal Acquisition Regulation, these termination clauses allow the customer to end service when its requirement ends without further liability. It is enabled when a customer, whether dealing with one or several SATCOM providers, treats its satellite requirements on an enterprise basis and negotiates with its SATCOM providers to treat all of its leases on an aggregate basis. For an organization such as the Defense Department, with large total requirements for commercial satellite communications, an occasional early lease termination presents at most a marginal decrement in its overall lease commitments—termination for convenience without liability is therefore equitable. This approach is ideal for DOD when entering into leases for contingencies, as the duration of the contingency can rarely be accurately estimated when it begins. When coupled with the recommendation to negotiate multi-year prices for base plus option-year contracts, the tool of a no-liability termination for convenience clause is truly a powerful one.

A fourth recent innovation in best commercial practices is the creation of terms which provide for the portability of a lease for commercial bandwidth. Although innovated by industry, this approach seems ideally suited for facilitating military use of commercial satellite communications. The basis for portability is the recognition that although a requirement for leasing on-orbit bandwidth in one part of the world may end, another, often similar requirement may be beginning in another region—or using a different portion of the SATCOM spectrum (e.g., Ku-band instead of C-band). By building the appropriately flexible terms into its leases, the Defense Department can virtually assure

itself of not having to pay for unused bandwidth—especially if the requirement to use the bandwidth essentially remains the same except for a shift in the geographic location of the actual customers.

Improving DOD's Partnership with the SATCOM Industry

The Department of Defense also should consider dealing directly with the satellite communications providers by either eliminating the various middlemen or brokers it has typically employed or by hiring a single firm to act on behalf of DOD in all of its commercial SATCOM transactions. Historically, the Defense Department does not enter directly into contracts with actual satellite providers such as INTELSAT, INMARSAT, PanAmSat, and Eutelsat. Instead, the department has awarded contracts to firms which are not actually in the business of owning and operating commercial communications satellites and allowed these firms to effectively sub-contract with the actual SATCOM providers. While there have been benefits to this approach, there have also been drawbacks. The primary one is that the firms with which DOD has contracted do not have the same potential negotiating clout with the SATCOM providers as DOD itself would have—especially if Strategic Command is empowered to negotiate on behalf of the entire department. Given DOD's use of large amounts of commercial satellite communications, the department should consider either becoming its own negotiator and contracting agent with the SATCOM providers or, alternatively, it could use a single firm to obtain such leases. In the latter case, the difference from existing practice would be that a single firm representing DOD's total enterprise-wide requirements implicitly would also represent DOD's clout as a major customer of the commercial satellite communications industry.

If DOD begins to approach the SATCOM industry in a more effective manner, representing itself to the industry, regularly sharing forecasts of the bandwidth capacity it will need from the industry over a 10-year or longer period, and potentially enacting other related initiatives, then the SATCOM industry can similarly adopt initiatives such as pricing based on the complete period of a lease (base plus option years) to build what promises to be an extremely effective partnership with DOD. Both parties would give a little to gain a lot. Examples of the US military partnering with industry to obtain portions of its enabling infrastructure abound: seaborne shipping, the Commercial Reserve Air Fleet (CRAF), electrical power, and terrestrial communications are prominent ones. It makes eminent sense for DOD to develop a similar partnership with industry for its commercial satellite communications needs.

In a recent report, the Futron Corporation encouraged the SATCOM industry and the military to make accommodations to improve their working relationship, noting that “the [US military] is a very stable customer, even if it

cannot always enter into the same kind of long-term contracts that are normal for big commercial satellite customers” and that “the US military . . . [is] by far one of the industry’s biggest customers, if not *the* biggest [but] it purchases capacity like a small-time customer.”¹¹ Both parties are well aware of these facts. Ideas to improve the existing relationship are plentiful. If both modify their approaches in recognition of the interests of the other, it may even be possible to develop “Most Favored Customer” status and pricing arrangements for the Department of Defense with the satellite communications industry.¹²

Benefits of Changing

Both DOD and the satellite communications industry can benefit if the Defense Department revises the ways by which it leases commercial SATCOM. Advantages to DOD include reduced administrative overhead and reduced costs plus improved assurance of availability. Unit-level users will no longer be averse to using commercial satellite communications if it is centrally funded and managed. Lease clauses providing for portability and true termination for convenience—without liability—will eliminate the fear that DOD and, in turn, the American taxpayer, might be left stuck paying for unused bandwidth. If the Department of Defense adopts more cost-effective leasing practices, commercial satellite communications will be better integrated as an element of the Global Information Grid, carrying more of DOD’s routine SATCOM requirements.

The SATCOM industry would get the biggest benefit from a single organization managing and leasing all DOD leases of commercial satellite communications. This would put an end to a host of disparate elements from within the DOD leasing a multitude of apparently unrelated requirements, especially as on occasion some military units have chosen to obtain commercial SATCOM on their own. Instead, the industry would be able to work with a single organization representing all of DOD’s requirements on an enterprise-wide, integrated, long-term basis. Industry would be able to work with a Defense Department that employs the emerging best commercial practices by which commercial customers deal with commercial SATCOM providers.¹³ Additionally, if DOD presents its total global requirements and forecasts those requirements—including foreseeable variations—over a multi-year period and leases capacity based on those forecasts, then the commercial SATCOM industry can include DOD’s requirements into its long-term plans for accommodating the demands it has from its total customer base.

While the Department of Defense is not in a position to sole-source its contracts for commercial satellite communications with a single vendor, it can share its total projected requirements with industry. DOD can break down its total forecast demand into a small number of solicitations for long-term contracts and subsequently enter into multiple contracts with different vendors

which together provide the required capacity. Whether or not DOD makes such projections and aggregates its collective requirements for commercial satellite communications into one set of contracts administered by Strategic Command and DISA, these requirements are and will be there—ever growing—and will have to be met by DOD over the balance of the current decade and well into the next. If the Defense Department does not pursue this strategy, it simply will have to pay more for the bandwidth it knows today it will have to lease—especially as long as it continues to enter into leases for periods of one year or less.

One apparent consideration which makes the services and some defense agencies reluctant to pool their requirements and funding under the consolidated management of Strategic Command is a misperception that the current DOD system prevents other elements of DOD from realizing when a unit has entered into a lease for commercial SATCOM capacity and thereby prevents the Joint Staff from redirecting the use of such leases to higher-priority requirements. This is not the case. All DOD users of commercial satellite communications must report annually to the Joint Staff regarding their SATCOM use and the lease costs they incur under the provisions of Chairman of the Joint Chiefs of Staff Instruction 6250.01A.¹⁴ That instruction also provides that the Joint Staff can allocate or reallocate SATCOM resources available to DOD to meet higher-priority requirements.¹⁵ Recognizing this should remove that obstacle to better leasing practices that would benefit the entire Department of Defense.

Conclusion

The Defense Department and the US military have committed themselves to using commercial SATCOM as part of the overall information infrastructure for the Global Information Grid. Although efforts to dramatically increase the capacity of future MILSATCOM systems are under way, the military will rely on commercial satellite communications throughout the current decade and well into the second decade of the 21st century—or longer. Congress, the General Accounting Office, and the Department of Defense have long recognized the weaknesses in DOD's existing approach to leasing commercial SATCOM.¹⁶ Efforts to provide the benefits of better leasing practices to DOD continue. But no substantive change has as yet been forthcoming, not even the expedient of consolidating the leasing of each service's requirements and presenting each service's forecast requirements to industry in a coordinated manner through the Joint Staff or US Strategic Command.

The DOD is long overdue to revamp the methods it uses to obtain commercial SATCOM. The Defense Department should seize the initiative, coordinate with Congress, and adopt internal and external business practices which emulate commercial best practice. DOD should aggregate its total col-

lective requirements for commercial satellite communications into a single set that Strategic Command can lease and manage on an enterprise basis. Recent industry innovations will permit DOD to enter into leases based on long-term rates for the complete set of its current and forecast commercial SATCOM requirements. Adoption of these initiatives would permit the commercial SATCOM industry to better understand and plan for meeting US military requirements. Their adoption would permit all elements of DOD to obtain commercial satellite communications rapidly, reliably, and affordably.

NOTES

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12. The author is indebted to various people within the commercial satellite communications industry, especially members of the Satellite Industry Association, who have eagerly shared with him their ideas for how their industry and the US Department of Defense can more effectively partner with each other.

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