Intellectual Property Valuation

In the Context of U.S. DoD Acquisition & Contracting

12 January 2017

Introduction

The purpose of this white paper is to function as a very brief introduction to the subject of intellectual property (IP) valuation, with a focus on its application to voluntary licensing within the aerospace and defense (A&D) industry and U.S. DoD. It quickly summarizes the standard approaches used in the wide world of IP valuation. When we use the term 'wide world,' we mean that there are tens of thousands of IP transactions occurring every week outside the realm of DoD contracting, some of them subject to Securities and Exchange Commission disclosure requirements, some of them subject to oversight by the Internal Revenue Service, some of them subject – potentially – to various best practices tests and standards developed by specialized standards organizations under the auspices of the American National Standards Institute (ANSI) or its international counterparts.

There are many books and articles written about IP valuation by experts in the field. This quick introduction is meant only to educate the A&D community about IP valuation and some of the issues that arise when IP valuation is conducted in the defense industry environment.

Types of Intellectual Property

There are four basic types of Intellectual Property (IP): patents, trademarks, copyrights, and trade secrets. The latter form of IP includes a wide variety of information, including business information or technical data.

What Question Is The IP Valuation Expert Trying to Answer?

The first question the IP valuation expert would like to answer is: What should the buyer, licensee or assignee (herein collectively referred to as 'the buyer') of the IP be willing to pay, given all the relevant facts and risks of the transaction, the history of similar transactions, the supportability of assumptions, the value that the buyer is able to create with the IP, and possibly the cost that the buyer is able to avoid and/or the time lapse avoided in seeking alternative replacements by buying the IP rights in question?

The second question the IP valuation expert would like to answer – and this bears directly on the answer to the first question – is: What is the buyer's best alternative to a negotiated agreement?

The third question the IP valuation expert would like to answer is: If doing the proposed transaction diminishes the profitability of the IP owner in the normal course of her business, what is the extent of the profit loss that the IP owner could reasonably expect to experience?

Questions number one and two are really trying to assess what a buyer of IP rights should be willing to pay for those rights, while question number three tries to assess what the IP owner's loss might be, when the IP owner's on-going or planned business is harmed. Questions number one and two imply freedom on the part of both parties to either do or not do the transaction. In other words, implicitly the IP is valued as though neither party is being coerced. Neither is harmed by doing the transaction, and the potential is present for both parties to benefit from the transaction.

In the case of question number three, the situation is often coercive; the IP owner considers doing a transaction that will harm her ongoing or planned business, perhaps because of some other benefit. Typically, an IP transaction in which the IP owner needs to calculate lost profits is one in which another more beneficial transaction is offered, perhaps to offset (to a greater or lesser extent) the destructive aspects of the first. Often in this type of transaction, the asymmetric market power of the buyer of the rights is used to obtain rights that normally would not be granted. The buyer of IP rights 'ties' the demand to be granted commercially damaging rights (from the IP owner) to the purchase of some related or unrelated product or service from the IP owner.

Summary of the Basic Valuation Approaches

There are three basic approaches to the valuation of Intellectual Property: cost, market, and income.

The Cost Approach

The Cost Approach is based on the economic principle of substitution – the IP value is influenced by the cost to create a substitute asset. It involves an analysis of all cost components a buyer might incur in creating the asset, such as materials, labor, tooling, analyses, testing, and other costs including testing and qualification to assure that it is a valid substitute. There are two major cost-based methods for measuring value: (1) reproduction cost, and (2) replacement cost. To calculate reproduction cost, one measures the cost of constructing an exact duplicate of the underlying asset. To calculate replacement cost, one measures the cost of creating the functional equivalent of the underlying asset. Neither method considers the market demand or the market acceptance of the underlying technology.

In calculating costs, the costs incurred by the IP owner in the course of its development of the IP in question may be useful in modeling the costs the buyer may incur in creating a substitute asset. Of course, the conceptual difficulty with heavy reliance on costs previously incurred by the IP owner is that the historical cost for the IP owner to develop the IP of interest is not necessarily what it would actually cost the IP buyer to develop functionally equivalent IP today. The IP buyer may very well be able to develop the IP less expensively, given the progress of technology, knowledge, tools, and techniques over time. On the other hand, the IP owner may have developed a great deal of expertise in the field of the subject IP, so much so that the IP rights buyer may not be able to put a comparable capability together in a reasonable period of time. So between a possibly long time to market and less efficiency because of having less experienced and knowledgeable people, it may cost the IP rights buyer more than the IP rights seller to develop the same or similar IP.

One example of use of the cost method is the following. Suppose decision makers in a program office or a buying command decide that they would like government purpose rights to all the know-how, software and documentation concerning the business, engineering, manufacturing, supplier management, and quality processes needed to design, develop, manufacture, test, and commercially certify (with the FAA) a flight management system (FMS) for air transport class aircraft. Perhaps these decision makers believe that the handful of commercial companies capable of developing and certifying these systems are not to their liking for one reason or another, whether because of price or some other reason. And they have determined to obtain the technology and know-how so that they can set up a DoD entity or a private company (that is not currently in the business of furnishing complex commercial avionics systems and in certifying such systems with the FAA) to make commercial FMS for them, thereby bypassing the current commercial FMS providers.

In such a case, there are not readily available IP transaction market comparables: Commercial FMS providers typically don't grant ownership-like rights to key enabling know-how to their competitors. And even in the odd circumstance that one or more of them might do so, the likelihood is low that the details of the transaction would be made public. Even if such details were made public, it is unlikely that the IP valuation expert would consider the financials in one or two transactions to be indicative of a 'market.' Such financials might be more indicative, perhaps, of the particular market power dynamics in those peculiar circumstances than in the general market value of the IP. This request of rights in such comprehensive data and software is more akin to a sale of the company itself, which may be a source of potential market information, but a market that includes tangible and human assets in addition to the IP. In such a case, it is difficult to calculate persuasively the reduced cost or enhanced income of the licensee or its agent (sub-licensee), because of the speculative nature of the calculation. The amount of money and time to bring a DoD entity or another company not currently in the commercial avionics business for air transport class aircraft (the larger commercial jets) up to speed regarding all of the processes and know-how required could easily result in a financial model that would never get to break-even.

One might legitimately ask why a customer or potential licensee of any kind might want to engage in a licensing transaction that might never get to break-even, if the contemplated investments are actually made. One answer is that sometimes such transactions are taken forward for 'strategic' reasons, rather than for proximal financial reasons.

Questions such as these aside, the IP valuation specialist is confronted in a case like this with a licensee that may wish to avoid the cost and time needed to develop the strategically important capability. Of course, if the know-how and processes in question have been developed over a period of decades, with no records now available for most or perhaps all of the investment incurred, there will be a challenge in accurately estimating what has been spent over a period of years or decades. But there are methods that can be used, even in a circumstance like this, to get within a reasonably small uncertainty basket.

From the licensee's or assignee's perspective, the primary reason for not using the cost approach to value, in many circumstances, is that the cost of development is irrelevant to the value that may be created with it. In other words, the licensee or assignee often doesn't care what the development cost has been or might be. For the buyer's purposes, the most important questions

that must be addressed are the following: (1) how much money can I reasonably make (or save) through the use of the IP in question; (2) what will it cost me in royalties and other expenses to obtain the rights to and to commercialize or implement the IP I seek, and (3) what alternatives exist in the market with the same or similar capabilities and how much cost and time would it take to acquire such alternatives? If the IP rights sought cannot be obtained for a reasonable percentage of the risk-adjusted profits of the projected business, the business case may not be a sufficiently profitable one.

On the other hand, looked at from the perspective of the IP owner, if the maximum IP cost (including the possibility of lost profits through misuse or misappropriation) that will make financial sense to the licensee or assignee does not fully compensate the IP owner for their upside anticipated in absence of the transaction, then the transaction may not have enough value in it to be attractive to the IP owner.

Another difficulty with using the cost approach is that enterprises don't invest in IP to simply get a one-to-one return on their actual costs. Most enterprises have in place a rather elaborate overhead structure, decision-making apparatus, business processes, and enabling IP and personnel assembled at great cost over a period of years or decades – all designed to invest in the kind of IP that will dependably in the aggregate, generate a significant multiple on the enterprise's on-going R&D and other overhead investments. And these R&D and overhead investments are made at significant risk; so any returns on these investments must be risk-adjusted as well. In other words, the profits not only must be a significant multiple of the investments; they must be so after a reasonable deduction for the risk the enterprise has undertaken to make the investments in the first place.

So in many circumstances, from the IP owner's perspective, cost may not be an optimal approach, particularly when the IP owner is asked to give broad, ownership like rights, to the buyer. This is of course the case when a company has developed a successful product on its own expense – whether out of IR&D or profits – and then is required to furnish that product's IP (and possibly the IP developed to use, make, maintain, and/or repair the product) to DoD with government purpose rights (GPR) or unlimited rights. In such cases, the IP owner's IP valuation expert may want to calculate the enterprise's expected lost profits, or the multiple that it expects on its R&D and other related investments specific to the IP in question.

In some cases, when there is no credible business case for the use of the IP, when there are no convincing market comparables and when lost profits cannot credibly be calculated, cost may be the preferred approach.

The Market Approach

The analogy used most often to characterize the market approach is the real estate market. A real estate agent or her surrogate will pull sales data on houses from the seller's neighborhood that have recently sold and compare them to the seller's house. Valuing the house to be sold will be an exercise of comparison with 'comparables' in the neighborhood. Of course, the difficulty with applying market comparables in IP rights transactions is that their complexity and difference from other IP rights transactions may make comparisons more difficult than the comparisons between house sales. IP tends to be more unusual than similar when compared to other IP, and with the

wide variability in the kinds of rights that are transacted from deal to deal, it can be challenging to find comparables that are thoroughly convincing.

Sometimes, there really is nothing comparable. Or there may not be a sufficient number and variety of comparables whose transaction details are publicly known in the market. In other words, there may not be real market data – only anecdotes. In this situation, and when the IP valuation expert has the luxury of time and money, market research can be done. There are a couple of basic types of market research that might be employed: focus groups and surveys. Of the two, the more potentially rigorous are surveys structured to yield statistically valid results.

When is the market approach most often used? It's used with IP that is a product or a service or is product-like or service-like. In other words, its natural use is in markets where there are acceptable substitutes or the near-term potential for acceptable substitutes. Example IP in this scenario might be software in executable form, software as a service, information as a service or spare parts.

Industry standard royalty rates are a form of market comparable, but of course, to employ industry standard royalty rates, one must have verifiable comparables to begin with. Without convincing comparables – and enough of them – industry standard royalty rates may not be very useful.

Finally, enterprises in A&D typically do not invest in R&D and in overhead accounts in order to license IP (except for licensing of executable software, software as a service, and packaged proprietary information). The multiple on R&D and overhead expense required in profits by their investors will typically not be satisfied by royalty rates that others are willing to pay. Such companies – to stay profitable and retain investors – typically require profits significantly beyond what obtainable royalties would provide. This is, of course, not peculiar to aerospace and defense.

The Income Approach

While companies will typically invest in R&D, in their overhead structure (e.g. business, engineering, and manufacturing processes and tools, training and education of employees, and development of business partner relationships), and capitalized items in order to sell products and services, they will sometimes license their technology and know-how. They will often do so when they are looking to generate a financial benefit from their IP in markets in which they cannot or do not want to participate. Or in the A&D industry in particular, they may do so to satisfy an offset or technology transfer requirement.

In such cases, the approach that best fits the facts may be one that allocates a reasonable percentage of the buyer's risk-adjusted profits or savings to the IP seller. Of course a 'reasonable percentage' can be debatable, but it is calculable based on the maturity of the IP and the target market, the incremental costs required on the part of the IP buyer to translate the IP into a financially beneficial form, the scope and extent of the license rights, comparables, the height of the barrier to entry provided by the IP, the risks to the seller's sales and profits, the risks to the buyer's sales and profits, and other matters.

The income approach requires an understanding of the sales and cash flow that will be enabled by the transaction, or alternatively, it requires an understanding of the savings that the IP buyer will be able to achieve through the use of the IP. To employ this approach, the IP valuation expert will need to develop a financial model that describes the expected benefits and costs (i.e. cash flow) to the IP buyer. Once this is calculated, then the share of those financial benefits that accrue to the seller can be assessed, based on inputs described above.

The discount rate selected to represent the cost of money and risk to the projected cash flows is one of the most important components of the income calculation. There are various methodologies developed for calculating this rate. They often are scenario based and may vary somewhat depending on the experience of the IP valuation expert, the historical information regarding similar transactions available to the IP valuation expert, and the analytical orientation of the enterprise doing the valuation work.

Another very important input to this calculation is the assessment of the remaining useful life of the IP and the rate at which it will be replaced.

A special case of the application of the income approach is lost profits. In this variant, the IP seller has its profits diverted by the IP buyer, such as when being requested to relinquish exclusivity to its technology or through infringement, misappropriation/misuse, or coercive tying. In such a case, the actual lost profits and projected lost profits are calculated. In some cases, a risk-free rate may be used as the discount rate. In this instance, no income apportionment calculation is done, since the value of the IP is 100 percent of the value of the lost profits, to both the IP buyer and the IP seller.

If the IP owner is coerced into providing broad ownership like rights to the IP buyer, lost profits may be based on all anticipated future sales, risk adjusted for likelihood of sales. However, it can be difficult to put together a financial model that would capture all of the ways its business may be damaged.

When an A&D company has both a commercial element and a defense element in its business model, calculating the value of licensing ownership like rights to the company's commercial IP to DoD can result in some very large numbers. This is so because with GPR, the federal government can provide the company's commercial IP to the company's commercial as well as defense competitors. And certainly, in the normal course of things, when GPR converts to unlimited rights, there are no conceptual or practical impediments at all to a collapse in IP exclusivity and market differentiation occurring.

Commercial IP Valuation Practices vs. DoD Pricing Procedures

Although IP valuation in the commercial marketplace is focused on the four basic types of IP (patents, trademarks, copyrights, and trade secrets), IP valuation in DoD environment is generally focused on 'data rights' – an abbreviated way of referring to the license rights under trade secret and copyright laws that the Government obtains in technical data and computer software. There is a stark contrast between commercial IP valuation practices and traditional procedures for pricing DoD contracts.

DoD Cost Analysis. Standard DoD procedures found in the FAR and DoD FAR supplement regulations use a cost-based approach to determining a fair and reasonable price. Contractors are required to submit a technical proposal describing the manner in which the product will be produced or the services will be performed. A separate cost proposal is required in which Contractors are required to disclose detailed estimates of their proposed costs. The DoD performs a detailed examination of individual cost elements, e.g., direct labor costs, direct material costs, indirect costs, subcontract costs, facilities costs, etc. in a 'cost analysis' to ensure that the costs are fair and reasonable, and then uses these estimated costs in a 'weighted guidelines' formula to calculate a profit, that when added to the costs will yield a 'fair and reasonable' price. To ensure that contractors meet the cost disclosure requirements, the regulations prescribe a complex set of rules that require contractors to disclose their accounting systems and estimating systems to the Government for approval, and further require contractors to certify that the 'cost or pricing data' they are providing are accurate, complete and current.

DoD Price Analysis. The regulations specify use of 'price analysis' where certified cost or pricing data are not required, such as when there is adequate price competition or when DoD is purchasing a 'commercial item' as defined in FAR Part 2.101. In addition, DoD Contracting Officers are required to use 'price analysis' in conjunction with cost analysis to verify that the overall price determined through the detailed bottoms-up calculation of costs + profit, arrived at via cost analysis, is fair and reasonable. Price analysis always involves some form of comparison with other prices paid for comparable products or services.

Compared to Industry Cost Method. The Cost Method of IP valuation, which assesses the value of the licensed technology by calculating the amount to develop the proprietary technology, is closest to the cost analysis method that predominates in DoD. The theory behind this methodology is that the licensee will avoid incurring these costs itself (and will save the time required to duplicate the R&D on its own) and thus will be willing to pay fees and royalties equal to or less than the anticipated cost, which may be more or less than the historic development cost. As noted above, there are a variety of concerns with this method. The primary concern is that the historic cost of development is a very poor indicator of the value of the IP. Technologies worth millions have resulted from a few thousand dollars' worth of timely and ingenious R&D, while millions have been spent developing technologies that are virtually worthless (either because the R&D effort failed or because more attractive technology has emerged). For all these reasons the Cost Method is considered the commercial IP valuation method of last resort and is generally used as a fallback where sufficient data is unavailable to pursue the Income Method or the Market Method. It may also be used in conjunction with the other preferred methods as a way to provide a 'sanity check' on the results of the preferred valuation methods. It is striking that the Cost Method that is the least favored methodology for commercial IP Valuation is the preferred method for pricing negotiated DoD contracts, while the Market and Income methods of valuation, which are the primary methods used by industry are either considered a secondary tool to be used in conjunction with cost analysis to test the bottoms-up cost estimate (in the case of the Market Method) or rarely, if ever, used by DoD (in the case of the Income Method).

Compared to Industry Market Method. The Market Method is the preferred commercial method of IP valuation when sufficient market data is available. Data on comparable transactions are used to determine a value based on the market value of similar IP assets recently licensed under similar terms and conditions. The Market Method of IP valuation is quite comparable to Price Analysis in

the USG/DoD world. FAR 15.404-1 *Proposal Analysis Techniques* describes price analysis in some detail. Standard price analysis techniques specified in the regulations include comparing offers with one another, comparing offers with current market prices, comparing offers made with previous prices paid for similar items, using parametric estimating methods/application of rough yardsticks (e.g. cost estimating relationships), or comparing prices with independently developed government estimates.

Compared to Industry Income Method. There is no direct equivalent to the Income Method of IP Valuation in standard DoD cost or pricing procedures. As described above, the Income approach determines the value of IP assets by calculating the projected cash flows to be generated by a buyer employing the IP and attributing some portion of that income to the IP, as distinct from the other 'complementary assets' deployed by the business (production facilities, sales & marketing network, etc.). In commercial practice, this method involves modeling a prospective licensee's costs and profits, and projecting its revenues in various scenarios. In contrast, the DoD, uses specific company historical data to estimate specific costs for a specific project.

Contrasting the DoD environment with the IP valuation techniques used by industry highlights numerous difficulties that DoD and Industry will encounter as they begin to negotiate more DoD licenses for expanded rights in technical data and computer software developed at private expense.

Three differences stand out:

1. Differences in Preferred Methods. In the DoD, the vast majority of negotiated contracts are based on a build-up of costs using cost estimating systems and procedures that utilize historic costs. The vast majority of commercial license agreements are negotiated using a combination of 3 valuation methods, only one of which – the Cost Method – may involve the analysis of historic costs. Yet, the Cost Method – is the least reliable and least preferred method of IP valuation in the commercial world. In addition, the Cost Method, in the context of how the DoD applies it, does not take into account the Strategic Value of the IP to the DoD. Although the IP may have no market value outside of its current use to the IP owner in the A&D marketplace or a relatively low replacement cost value, it may be impossible to replace. For example, a strategically significant weapons component of a platform may have a cost to replace it but also has a time factor involved in replacing, testing and deploying it. As such, by only considering the replacement cost in valuing the IP, one would be excluding the cost of (a) the time it would take to develop a similar capability, (b) the cost of necessitating a switch to an alternative capability, including qualification costs, and (c) the cost of a potential capability gap that may arise as a result of an alternative replacement. This suggests that the DoD may need to pay significantly more for the IP than is suggested under the Cost Method in order to avoid these three factors.

2. Differences in Data Availability & Relevancy. The DoD pricing system is awash in detailed data. DoD has access to every piece of cost data that could possibly be a factor in calculating the price of a product or service it is procuring. Further the data being used in the analysis belongs to the prospective contractor who has shared it with DoD for purposes of negotiating a contract. Contrast this with the world of commercial IP valuation where data is usually scarce and where the data most often used is 'third party' data, not belonging to the prospective licensor. In many cases the data is by necessity aggregated industry data or even hypothetical

data. This data, when and where available, is less reliable than the company's own data. In the DoD environment, cost data is specific to a company and the specific project being proposed. It could not be more relevant to the estimated cost and price of the project. In the commercial IP valuation arena, the data that is most readily available – a company's own historic development cost data – is the least relevant to the future commercial value of the IP asset in question.

3. Differences in Data Accuracy, Completeness and Timeliness. Perhaps the most important difference between the traditional DoD procurement environment and the commercial IP licensing environment is the requirement for data to be accurate, complete, and current. In the DoD environment a company is basing its item prices on its own cost data and that provided to it by its subcontractors. In that situation it is not unreasonable to require the company to ensure (and certify) that the data they are providing to the DoD for use in its pricing are accurate, complete and current. This is in stark contrast to the IP Valuation environment where the data used in the preferred valuation methods – Market and Income – rely on market data that is often difficult to obtain and which is rarely, if ever, 'complete.' Likewise, the Cost method would involve speculative assumptions regarding costs of development by the buyer. Further, while industry best practices make every effort to ensure that the data used in IP valuations is as recent as possible, it is simply not possible to obtain outside data that is current right up to the time of negotiations. With regard to accuracy, companies seeking to assess the value of their IP using the preferred Income or Market methods are dependent on third party data whose accuracy is dependent on a variety of factors outside their control. It is not possible for a company to certify the accuracy of such third-party data. One of the most significant differences pertains to commercial accounting practices; the accounting practices of commercial companies will typically not satisfy the accurate, complete, and current standard, even when the Cost approach is used.

Conclusion

The norms, best practices, and standards used in the field of IP valuation are widely applicable and have been developed in other contexts. Just as GAAP accounting standards are applicable to defense business financials, so are the principles, best practices, and standards of IP valuation applicable to transactions in the A&D industry and investments sought by those contemplating entry to the A&D market.

It has been proposed that a voluntary consensus standard or set of standards be developed for IP valuation that can easily be used by A&D companies and DoD. The potential benefits of such standards would be the simplification and streamlining of negotiations in IP agreements, the predictability of financial IP agreement outcomes, and the ability of DoD and companies to budget for IP rights. In addition, OMB Circular A-119 (which implements aspects of the "National Technology Transfer and Advancement Act of 1995") directs federal agencies to prefer voluntary consensus standards over regulation and other types of standards.

The Licensing Executives Society (USA and Canada) Inc. (LES) has applied for accreditation as an American National Standards Institute (ANSI) standards development organization (SDO). ANSI is the only authority in the U.S. capable of accrediting voluntary consensus standards development organizations. It currently has in its orbit more than 200 such accredited SDOs. And it is the sole representative of the U.S. to the International Organization for Standardization (ISO).

LES has been working with ANSI for the past year and a half, developing its policies and procedures for ANSI-compliant standards development. It has recently submitted its application for accreditation to ANSI and expects to be accredited in the first half of the 2017 calendar year. LES has already established five standards committees in the field of IP management. One of these is the IP valuation standards committee that would be applicable to (and may be tailored to) the U.S. aerospace and defense industry and to DoD licensing scenarios.

An additional benefit to the A&D industry and to DoD of taking this approach is that many of the best minds in IP valuation – who are regular participants in LES activities – will be attracted to help improve the way IP transactions are done in the A&D industry and in U.S. DoD.

Another contextual matter that is of at least equal importance with OMB Circular A-119 is Section 875 in the FY17 National Defense Authorization Act (NDAA), entitled "Use of Commercial or Non-Governmental Standards in Lieu of Military Specifications and Standards." This section of the law opens with the following paragraph:

- "IN GENERAL—The Secretary of Defense shall ensure that the Department of Defense uses commercial or non-Government specifications and standards in lieu of military specifications and standards, including for procuring new systems, major modifications, upgrades to current systems, non-developmental and commercial items, and programs in all acquisition categories, unless no practical alternative exists to meet user needs. If it is not practicable to use a commercial or non-Governmental standard, a Government-unique specification may be used."

In accordance with Section 875, commercial standards for IP valuation are preferred to DoD unique approaches.