

# IP management in aerospace and defence

Aerospace and defence companies were there at the start of the technology revolution. Today, innovation continues across the sectors, as do cutting-edge approaches to IP management

By **Bill Elkington**

A father of the high-technology and telecommunications industries in the United States is aerospace and defence (A&D). I say “a” father because success will always be claimed by many fathers, both possibly biological and adoptive. Evidence of a progenitor-offspring relationship abounds, but I will reference just a few examples to prove my point. First there was ENIAC, sponsored by the US Army for calculating the flight of artillery projectiles, which many regard as the first general-purpose electronic computer. Then there was Whirlwind, sponsored by the US Navy to drive a flight simulator and often referred to as the indirect predecessor of all business computers and minicomputers developed and sold in the 1960s.

Direct sequence spread spectrum was invented in an ITT laboratory in the late 1940s for the purpose of secret military communications and is now the basis of cellular communication systems and WiFi systems, worldwide. Global positioning system (GPS) receivers – originally developed by Rockwell Collins and others for purely military application – are now used broadly for commercial and consumer uses. I could go on.

While this original relationship between A&D and the high-technology and telecommunications industries is widely acknowledged, there is little interest in an

ongoing relationship between the two now. Perhaps this is due to the significant difference in the size and operating characteristics of the two broad market areas. Perhaps the dramatically different roles that patents play in the two market areas have caused a cultural and linguistic fracture. The reasons may be multiple.

My purpose in this article is to encourage the reconnection of these two once-close worlds by looking at what is going on and has been going on in the wonderful world of IP management in A&D. The idea here is to let the rest of the world know that we do still exist, and that we may still have something to contribute to the ongoing IP management dialogue.

First, though, I beg your indulgence for some personal reminiscences and information that are spread throughout this article. My only excuse is that this information may help to bring some green shoots of a new understanding to light.

There are several factoids concerning intellectual property and IP management in the A&D industry that I would like to bring to your attention:

- Submarine patents continue to live and thrive in A&D.
- Collaborative development and technology transfer is how we do business in A&D; it is at the heart of everything.
- Patents have been of secondary and perhaps tertiary importance to our business strategically, while know-how, proprietary information – trade secrets – and copyrights are central; so the management of trade secrets and copyrights should be and is our focus.
- The locus of IP management for us is in transactions – the everyday transactions through which we get what we need from subcontractors, suppliers,

competitors and customers, and provide what they need from us.

- And because the locus of strategically important IP transactions for us is in everyday joint development work with our development partners, broad IP knowledge and understanding within the A&D enterprise are pivotal to ensuring that the IP exchanges with our partners are managed well.

### Submarine patents

Let's start by talking about a little-known fact that may surprise you. As everyone knows, the US Patent and Trademark Office convinced the US Congress to change the patent law in the United States because of a fellow by the name of Lemelson and his use of the submarine patent – a patent application that is kept in the patent office for years or decades, as the inventor and the examiner twiddle with the claims and the world catches up to his invention. Finally, the patent issues and the world is found to be infringing the patent. So the US patent law was changed in the mid-1990s to allow a patent only a potential life of 20 years from the date of filing rather than an indefinite life from that date.

My introduction to the wonderful world of IP management came when I joined ITT. I had been hired in 1992 to license ITT technology outside its served markets and two different attorneys there approached me immediately. One of them took me to lunch, and ever since then I have been uncomfortable being invited to any meal by any lawyer – particularly lunch. It turned out that this practitioner was one of the head attorneys for the company, and he made it clear that he was all for my success at ITT.

There was just one thing, he said. Under no circumstance was I ever to risk putting the company in court as a result of my licensing activities. Later, I was to learn what to call a licensing job with this restriction. I learned the term from the remarkable attorney and legendary licensing executive Bob Bramson. "Licensing on your knees" was what he called it, as he sneered in my general direction. You see, licensing patents without the willingness to go to court – to file a complaint – is a beggarly proposition.

The second attorney to approach me at ITT brought me a patent. It was RE34,004, "Secure Single Sideband Communication System Using Modulated Noise Carrier". It had originally been filed in March 1953 and issued as Patent Number 4,176,316 in November 1979. It had been put under



### Rockwell Collins

Rockwell Collins is a pioneer in the design, production and support of innovative solutions for aerospace and defence applications. The company's expertise in flight-deck avionics, cabin electronics, mission communications, information management, and simulation and training is strengthened by its global service and support network spanning 27 countries. Working together, its global team of nearly 20,000 employees shares a vision to create the most trusted source of communication and aviation electronics solutions.

The company's aviation electronics systems and products are installed in the flight decks of nearly every air transport aircraft in the world. Its airborne and ground-based communication systems transmit nearly 70% of all US and allied military communication. Rockwell Collins develops new technology to enable network-centric operations for the military, delivers integrated electronic solutions for new commercial aircraft, and provides a level of service and support that increases reliability and lowers operational costs for its customers throughout the world.

secret order by the US government and remained in that submarine status, so to say, for about 26 years. The purpose of the invention was to keep wireless military communications secret by making the transmitted signal look like noise. An additional and much more important feature of the invention was to enable much higher data density in the same frequency space.

I won't go into the sordid details of what I did, what BTG USA did, what Dickstein Shapiro did and didn't do, and what did and didn't happen regarding that patent. But I do bring it up because it has been regarded by many as the invention



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– or as representing the invention (perhaps not very well) – of direct sequence spread spectrum, the wireless communication technology that most of us use in our mobilephones and computers (WiFi) and GPS receivers today.

The inventors on the patent are Mort Rogoff and Lou DeRosa, both now deceased. In the early to mid-1990s, when I was fussing around with the patent, I had the great honour of meeting and working with Rogoff, and I had the personal enjoyment of participating in a meeting with him and Andrew Viterbi, co-founder and chief technical officer at Qualcomm. As I recall, Viterbi, upon meeting Rogoff, disappeared for several minutes and came back with one of the spread spectrum textbooks that he had helped to write, in which was reproduced Rogoff’s “noise wheel” – a signature device he used in his invention’s reduction to practise.

Viterbi gave Rogoff his pen and had him sign his textbook. I don’t think much was accomplished in the meeting after that. As I

remember it now, there seemed to be a lot of questions about how Rogoff came to think of the invention, who else was working in the field at the time, who influenced his thinking and what he did, and how. You know: the normal conversation between inventor giants in related fields, separated by a generation, who have high regard for one another’s work.

So as I say, this relationship between A&D and the high-technology and telecommunications fields goes back a long way, and a patent placed under secrecy order can bring us back together.

And there continues to be a great deal that goes on in A&D, behind closed doors: wireless communications, computer and network security, anti-reverse-engineering, electronics packaging, novel applications of advanced materials, deterministic networking technology, very high efficiency processors and other areas. All are good candidates for US Department of Defence-enforced submarine patents.

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**How we do business today**

A&D in the United States is a collaborative industry. To develop most new products, collaborative development programmes are required. And this means sharing intellectual property between suppliers, competitors and customers.

In fact, significant intellectual property – highly proprietary inventions and trade secrets – must be shared regularly with others to achieve success. At a minimum, a company such as Rockwell Collins will need to share requirements and product specifications with a supplier. Often, we will need to collaborate in the development of the requirements and top-level specifications that are to be applied to our products by our customers.

Sometimes we will develop one or more sub-systems, and our supplier or co-development partner will develop one or more sub-systems, and then we will integrate these into one product. Sometimes a co-development partner will pay us a percentage of the development cost of a sub-system or product to meet its unique requirements – requirements that we otherwise would not consider. Sometimes a customer will furnish us with the maths needed in a particular function or with unique graphical characteristics to build into our displays.

When we do development work to meet the unique requirements of a customer, before we take that product out to other customers, we will carefully – and often at significant expense – pull intellectual property out of the product that is uniquely ascribable to that initial customer. The look and feel of our products is often tailored to the specific needs of our customers, because they need to differentiate their products, and our products are a very visible and operationally integral part of those products.

**Doing deals**

In Rockwell Collins, we estimate that we do about 3,000 significant IP transactions per year with suppliers, customers and competitors. These agreements routinely dispose ownership and licence rights for:

- Intellectual property that was developed prior to the engagement (background intellectual property) and is necessary to practise the intellectual property yet to be developed (foreground intellectual property).
- Foreground intellectual property that will be developed individually by the parties during the engagement.
- Foreground intellectual property that will be developed jointly or collaboratively by the parties during the engagement.

The quandary is often that the provider of requirements and specifications wants control of these, but the supplier of product to these specifications – especially when these requirements and specifications depend heavily on industry standards – wants to be able to sell products to others: products that may have built into them designs that satisfy the aforementioned specifications. In other words, a customer may develop unique top-level requirements and specifications to differentiate itself from its competitors. But the supplier may need – in order to offer acceptably priced products to the marketplace – to offer products that make use of some of these requirements and specifications.

**Ownership issues**

Another area of negotiation, beyond licence rights to requirements and specifications, concerns ownership. To try to allocate ownership rationally in a collaborative



Integrated crew display system

development effort, the supplier and customer will often attempt to define mutually exclusive domains of ownership. The objective is to provide the parties with a clear method of sorting out what will belong to whom when, in the heat of collaboration, who created what invention becomes difficult to determine. This predetermined ownership helps to increase trust between the parties and thereby encourages a cooperative and collaborative spirit in joint development.

But of course, it is often quite difficult to define mutually exclusive ownership regions. A general characterisation of such regions is easily arrived at, but a mutually exclusive definition of each often cannot be devised to the complete satisfaction of both parties. The result can be increased reliance on the broader relationship between the supplier and customer to place bounds on the behaviour of each regarding intellectual property. In other words, sometimes the best that the contractual language can do in such circumstances is to provide a guide to the parties rather than a clear and precise definition of rights. The parties will then come to rely on trust between them and their ongoing commercial relationship spanning many joint development projects to regulate the possible IP excesses of the other.

The fundamental issue with this resolution to the question of IP ownership

in collaborative relationships is the asymmetry in market power between the parties: the customer in A&D typically (but not always) has significantly greater market power than the supplier. And this is often quite different from the market power relationships in high-technology and wireless telecommunications.

For example, in the case of wireless telecommunications, Qualcomm has for a significant period of time enjoyed greater or equivalent market power to the handset manufacturers, which is also true of Intel and Microsoft in the personal computing space. So far, this sort of dramatic market power shift to suppliers has not occurred in A&D.

#### **Sophisticated understanding**

From a practical point of view, a collaborative business model – a business model that is characterised by a great deal of joint development, in addition to any standards work – requires a sophisticated understanding of IP issues by product development, contracts and subcontracts teams. Often, innovations that take place in the course of development are unpredictable and issues of ownership and rights therefore crop up all the time.

Often, prior to development, much intellectual property cannot be specifically identified. This unpredicted and unexpected new intellectual property will often need to be licensed to others to support the development effort. Working in this environment will require diligence by the team, and specifically the contracts and subcontracts functions, to ensure that contractual vehicles are modified prior to disclosure by the engineering team to other companies – whether customer, supplier or co-development partner.

In addition, if there is an *a priori* ownership or rights agreement concerning intellectual property that is brought into the discussion or made part of a joint effort, the development team must pay a great deal of attention to what is brought up, discussed or presented by any member of the team. In such situations, a best practice is for a formal process of IP management, review and release to be developed and used by the development team.

All of this means that development teams need to become quite sophisticated in their understanding of IP issues. This has significant implications for the IP management function, because it will need to value intellectual property as it is developed and provided, or as it is licensed in, and will need to ensure that the

development teams have the proper training and coaching to deal with the strategic and tactical IP issues that arise.

### Best practices

The IP management function will need to ensure that IP ownership and licence rights decisions are reviewed at the appropriate level in the company. A best practice in this regard is to set the review level based on IP value. Of course, value is distinct from price, and the business leaders in the corporation will need to make a judgement as to whether it is in the corporation's interest to price the company's intellectual property consistent with its value. Likewise, a business judgement will need to be made on the price to be paid for the rights to others' intellectual property, and valuation of others' intellectual property by the IP management function will be an important input to this decision.

So in best practices companies in A&D, the valuation function becomes pivotal. Valuation is the means by which potential strategic importance can be assessed. It can

determine what level, and therefore who, will have decision-making authority. It can bring into focus issues that may otherwise remain murky and hidden.

A focus on IP valuation can become the means by which joint development partners can speak rationally with one another about IP ownership and rights. It can bring what are potentially emotional discussions into the bright light of rational analysis. "It's all about value," as Ruud Peters – chief executive of Intellectual Property & Standards at Philips – likes to say, when talking about intellectual property. And of course, he is right. *iam*

**Bill Elkington** is senior director, IP management, Rockwell Collins Inc and Licensing Executives Society (USA and Canada) trustee for the IP100 Executive Forum and Corporate Communications

## Action plan



In A&D best practices companies, IP management people should consider the following:

- Actively encouraging and reviewing possible "submarine patent" ideas.
- Structuring their role around IP valuation to place their function at the centre of strategic decision making.
- Developing IP review and management protocols for joint product development teams to follow.
- Integrating patent decision making with the IP collaboration process.
- Introducing valuation as a key concept in negotiation of IP ownership and licence rights in collaborative developments.

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