

## PRESIDENTIAL COMMISSION ON OFFSETS

### *The Effects of Commercial Offsets on Aerospace Subcontractors*

Testimony of  
Todd A. Watkins, Lehigh University

Before the Presidential Commission on Offsets  
White House Conference Center, December 4, 2000

Thank you Mr. Chairman and the other members of the Committee, I am honored by the opportunity to speak with you this morning. You invited me to discuss my case research on the effects of commercial offsets on an aerospace subcontractor in the broader context of subcontracting trends in the industry. I have submitted for the record a more detailed research article published last year.<sup>1</sup>

The case involved a U.S. company that for confidentiality reasons I will call the Generic Aircraft Company, or GA. GA produces major structural subsections—such as wings—for the prime airframe manufacturers.

The research was to extend the analysis of lean manufacturing practices—which began largely in the auto industry—to aerospace supplier management. American aerospace

companies began moving to the lean manufacturing model in the 1990s as the industry restructured. Like much of the industry, GA implemented a whole range of supplier management practices normally associated with lean manufacturing, such as collaborating closely with suppliers, building long-term relationships, and assisting them in improving. But aerospace differs from lean manufacturing's roots in the auto industry in the need to manage a supply base across the two sectors of defense and commercial products. GA's business was roughly evenly split between commercial and defense, and I was looking at how they did that.

Here is where the case gets interesting from the point of view of this Committee. While GA's suppliers and supplier management practices differed little between the two sectors, the major exception was offsets. A principal goal of their supplier management system was to increase the number of foreign suppliers. But all the pressure for this was coming from commercial customers because GA supplied

---

<sup>1</sup> Todd A. Watkins, "Dual-Use Supplier Management and Strategic International Sourcing in Aircraft Manufacturing," in *Trends and Challenges in Aerospace Offsets*, Charles Wessner, ed., National Academy Press, Washington D.C., 1999.

## PRESIDENTIAL COMMISSION ON OFFSETS

subsections for aircraft targeted at Pacific Rim markets.

So, GA went looking for new foreign suppliers. Their first was a Japanese firm that I call Nagoya Aerospace. GA transferred to Nagoya the production of a particular substructure that they'd been doing in-house for many years. This was a mature, middle-technology assembly; comprising about 15-20 percent by cost of the total structure that GA was sending to the prime contractor for the final aircraft, call it the Norton Alpha. A year later the same substructure was second-sourced to a Korean company. Subsequently, GA has made similar arrangements for numerous other products with suppliers throughout the world.

Now, couple this with the lean manufacturing model. GA had the responsibility—pushed down from the top tiers—for managing and improving the quality of the lower supplier tiers. The combined result was that GA had to take on a new role of both finding and improving foreign suppliers. GA spent considerable effort shifting the production of that part to its foreign supplier, including technical and managerial assistance.

Ultimately, Nagoya was given the responsibility for managing the production of that substructure. This means that Nagoya ended up managing the relationship with those US suppliers who had been supplying GA for that substructure.

Note, parenthetically here, given the complexity of aircraft, this form of production sharing makes data collection on offsets very difficult. The product coming back to GA from Nagoya and the Korean manufacturer contains US components and subassemblies. It is unclear how this would get counted in offset credits when it goes to the prime contractor, Norton.

GA did receive significant payback from this considerable time, money and effort over a decade to increase their ability to work with international suppliers. It made them more attractive to other customers in the highly competitive middle-tier supplier market. A new major US customer, Kramden, came to GA specifically because Kramden's target market was also the Pacific Rim, and GA had established relationships with Pacific Rim suppliers such as Nagoya. Because GA found helping its foreign supplier was beneficial to its own business, they have deepened the relationship over time. Nagoya moved from essentially a build-to-print shop to being GA's development partner on a new major substructure for Kramden.

Where does this case take us in terms of key policy issues? Let me focus on four: employment, technology transfer, trade distortion, and the competitive effect on the industrial base.

## *PRESIDENTIAL COMMISSION ON OFFSETS*

First, the impact of these foreign sourcing efforts on GA employment was marginal, probably no more than a few percent direct effect. The short run net effect was actually probably positive because of the new deal with Kramden. The longer run remains unclear. Nagoya may have become a more viable competitor because GA helped them expand their skill base, and perhaps even more importantly introduced them to Norton. Since then, on a new aircraft, the Norton Gamma, Nagoya completely bypassed GA and went directly to work for Norton.

Concerning the second policy issue, the most important technology transferred in this case--a mid-tier, metal-banging company--was tacit manufacturing knowledge. GA was not transferring design know-how or their proprietary in-house sophisticated manufacturing technologies. This was a mature, mid-technology product. They transferred manufacturing know-how that allowed the foreign supplier to move more rapidly down the learning curve. It was experiential knowledge, such as engineers noticing that a pneumatic press was turned up too high. They were also training their foreign suppliers in the prime customers' preferred procedures, such as their quality management processes, which differ from prime to prime.

It is difficult to police this from a policy perspective. It is the type of non-market activity that goes on

routinely within any company. Nor can it be distinguished from one of the classic reasons for strategic alliances: to learn from one another.

Third, the case study illustrates that trade distortion may be inevitable. GA transitioned products to the UK, Korea and Australia because these were big markets for their customers, not because of price or quality differentials. Note that because limiting the supply base to a select few is a major lean manufacturing strategy, the units being supplied to GA from foreign sources were going into all their customers' aircraft, not just those for the UK.

Fourth, what is the effect on the competitiveness of the U.S. supply base? Speeding manufacturing learning curves through outsourcing like this is unlikely to create new competitors for the top-tier. The barriers to entering the top tier are too great. However, this process is clearly expanding the foreign skill base.

But the process does put a palpable squeeze on the middle tier US suppliers. Top-tier firms are passing responsibilities down, for teaming, for expanding their necessary skills, for design and risk sharing. And at the same time demanding foreign sources. The mid-tier firms follow the same lean manufacturing paradigm with their own suppliers--including foreign suppliers--attempting to work with the best and make them better. The mid-tier

## *PRESIDENTIAL COMMISSION ON OFFSETS*

squeeze is between 1) satisfying their customers' needs and 2) possibly helping create their own mid-tier competitors.

So, what can this Presidential Commission on Offsets do? Let me make one concrete recommendation that I hope goes constructively beyond a vague call for bilateral and multilateral dialog on trade-restrictive offset practices. I agree. But offset-like policies are used in some form or other by well over 100 countries, the US included, and indeed seem to be increasing in non-defense areas.

The pressure on GA for offsets increased their overhead burden because they now had to manage a process of seeking out and training international sources. Overhead costs, especially the management of procurement, rose significantly as a fraction of sales. There were several new job titles, for example, in the procurement group that included the word "China."

Trying to dramatically reduce offsets through applying trade law might only exacerbate these costs. The measurement issues would be enormous. The GA case demonstrates that much of the problem is buried layers deep in the supply chain. Adding the extensive reporting requirements that would be needed to make the system transparent would simply add to the offset burden.

Assuming offsets stay, how can these extra costs be reduced, while still achieving the developmental goals that most offset policies are designed for?

Consider creating markets in tradable offset credits. Tradable credits are well proven to reduce the cost of regulatory compliance--sometimes by factors of 6 or more--in environmental applications in the Clean Air Act and elsewhere.

In the idealized offset credit market, anyone--not just the contractors--who found a clever, cost effective way of satisfying offset requirements could earn bankable, tradable offset credits. If Norton wanted to sell a defense system but needed to meet offset obligations to close the deal, it could buy them from the most cost effective provider. Norton lets market incentives do the work, rather than a costly Norton overseas offset investment corporation or Norton's mid-tier suppliers' new China procurement managers.

Tradable credits have two other policy related advantages: 1) they increase the transparency of offset transactions, and 2) their exchange premiums or discounts serve as a signal to both the contractors and the issuing authority the real costs of compliance, which would be particularly useful where requirements may be unintentionally too restrictive.

Thank you.