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Student Project: International Offset for Space Offsets Enable Planetary Probe Technology Exchanges Internationally

International offset is often part of large sales by companies to other countries, and has been integral to international trade for the past 50 years. The selling companies, frequently aerospace companies, are required to compensate the purchasing country for a perceived loss to the economy of the purchasing country. This compensation is formalized in most countries with laws and regulations related to industrial participation, regional benefits, and other forms of offset policy. Exceptions are countries with informal offset practices, which include the United States with its informal offset based on Buy America, the Barry Amendment, politically expedient placement of work in various states, and other informal offset practices. This paper focuses primarily on offset opportunities with countries having formal offset policies (e.g.: U.K., Canada, France, Germany, India, South Korea, Chile, South Africa, Malaysia, Norway and over 100 others) representing the vast majority of international transactions for aerospace and other large systems.

Offset typically takes the form of direct or indirect offset:

1. Direct offset is compensation that deals directly with the contract. An example of direct offset would be developing an aircraft test or assembly facility in a customer country for a sale of aircraft that would be tested or assembled in that facility.
2. Indirect offset is compensation that does not deal with the contract. For example, an offset project involving a space program or environmental research, not directly related to a contract for aircraft (or a contract for road building equipment, data systems, etc.) would be considered indirect offset. Since offset obligors are frequently aerospace companies space related indirect offset projects, such as space probes, can be a “win-win” opportunity.

Offset can provide many benefits to customer countries. Offset can stimulate economic development in customer countries and can also create business enterprises in customer countries. For example, when Boeing or Lockheed Martin sells aircraft to India, when Caterpillar sells road building equipment to Canada, when Dell sells computers to Australia, these companies incur offset obligations in those countries in accordance with their formal offset policies. The recent decision by the U.S. Air Force to purchase the EADS/Northrop Grumman - Airbus KC-45 tanker instead of the Boeing tanker was enabled by a proposed assembly plant in Alabama and significant work in most other states, adhering to informal U.S. offset policies. Again, this paper is focused on those countries with formal offset policies, and primarily with indirect offset opportunities. Space program indirect offset project initiatives being considered

for India and Canada, to be worked in conjunction with the Indian Space Research Organization (ISRO) and the Canadian Space Agency (CSA) exemplify potential indirect offset projects for recent aircraft sales by U.S. companies to those countries. Perhaps most important are potential offset projects involving cooperation among adversarial nations. Such potential offset projects might include joint space solar power missions, lunar missions, or space probe missions, involving cooperation between Pakistan and India, or between Israel and Palestine.

Over \$100 Billion of indirect offsets (offset not directly contract related) are currently obligated, which will result in many indirect offset projects throughout the world. This large amount of money represents an opportunity for offset projects that can have significant positive impacts on international space mission. A planned international planetary probe offset project could be created from a technology or services transaction between a seller such as Lockheed Martin, Boeing, Northrup Grumman, Raytheon, etc. and a buyer who can be any international country such as Canada, the UK, Brazil, etc. The seller typically budgets about three to five percent of the contract value to cover offset related costs. This can be used to create offset projects such as indirect offset projects involving planetary probe technology. The planetary probe community provides space missions probe technology such as IT, sensors, space subsystems, and related hardware. This concept of using international offset obligations to fund interplanetary space missions allows the probe community to conduct extensive research, and space exploration. The customer country obtains a means to launch, oversee, collect data and collaborate internationally. The planetary probe community benefits from the launch and completion of more missions, while the seller fulfills offset obligations and the customer country benefits from advancing their space program.

A few examples of offset contract valued:

Country	US Company	Aerospace Technology	Contract Value	3% - 5% of Contract Value
South Korea	Boeing	F-15 jets	\$2.3 Billion	\$69M – \$115M
India	Boeing	777s, 787s, 737s	\$11 Billion	\$330M – 550M
Canada	Lockheed	C-130	\$1.4 Billion	\$42M - \$70M

A more detailed example of international offset funding in action for space related program applications is the Svalbard ground station on Spitsbergen Island. A joint offset funded venture between Kongsberg of Norway and Lockheed Martin developed a ground station for tracking and data collection from planetary probes, satellites and other space communications. The initial funding of the offset project was \$50 Million and since then the value of the enterprise has grown to many times that initial funding amount. The ground station was used as an anchor client for NASA’s Gravity Probe B satellite, as well as for other NASA programs and EOS commercial applications.

Another example took place during the recent purchase by Malaysia of Sukhoi jets from Russia. As part of their offset program the Russians offered to fly a Malaysian astronaut to the International Space Station in return for the contract. The astronaut flew in late 2007. In the May 12, 2008 issue of Countertrade and Offset article on the Industrial Role for Offset in Malaysia, the Malaysian Defense Minister, Najib Tun Razak stated: “. . . I am glad to say that the astronaut offset program has brought about much benefit to the nation. Experiments and

scientific research related to the offset program have paved the way for Malaysian scientists to be involved in scientific programs to space.” The expansion of space exploration creates many new opportunities to do science and research in space on a global scale. As more countries become space-faring nations, the international space science community will achieve more space discoveries and breakthroughs.

The “reality of money in the aerospace industry” is that in a given year, take 2005 for example, aerospace sales amounted to \$144.7B in comparison to \$26.9B in space sales for the top three aerospace companies. Leveraging international offset funding for space projects such as international planetary probe applications could help boost the amount of capital flowing into the space industry. Offset projects are not easy to do, and frequently require interactions with people not familiar with space, but they do represent a potential source of funding for space projects.

As a student activity, we have learned about international offset. Our intentions are to inform the international planetary probe community of this concept and how it can provide more funding for space missions. We will take what we learn from the 6th International Planetary Probe Workshop and share it with the offset community. A planned International Offset Conference in Hawaii during the 2009 timeframe with an Asian Pacific emphasis represents one opportunity for interaction with the offset community. Should there be an interest to collaborate in an offset project, we will take necessary steps to bring together both sides.