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LEO in East Europe 1963-1974

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Abstract:

I became responsible for developing the market for computers in Eastern and Central Europe during the early days of the expansion of the computer industry in 1963 until 1974. In this paper, I describe LEO's successful entry into that market to take what I believe to have been a leading position during my period as export manager. We primarily achieved this position due to LEO's achieving a deep understanding of the special features driving this market during the Cold War, which enabled LEO to meet the market's needs more successfully.

Keywords: Computers, Computer Market, Leo, Soviet, Comecom, Cocom, Countertrade, Barter, East Europe.

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1 Backstory

In November 1951, J. Lyons Co Ltd, one of Britain's foremost food and restaurant businesses (Bird, 2000), announced and demonstrated the world's first commercial computer application running on an in-house computer called LEO: Lyons Electronic Office. LEO was in many respects an unexpected success. Interest in the project by industry and commerce persuaded Lyons to set up a subsidiary company, LEO Computers Limited, to make and sell computers for business and government use. Following this announcement, many of Britain's major industrial and commercial companies together with several government departments purchased LEO computers.

LEO 1 was a first-generation electronic digital computer that used valves, had a 2000-word store based on mercury delay lines, and linked directly to a variety of input and output devices. Its operating software was limited, and programming relied on an assembly language intercode. Only one LEO 1 was constructed and used both for Lyons own data processing and as a bureau service. LEO 1 was followed in the mid-1950s by LEO 2, which was much faster and had a larger store. The later LEO 2s had increased speeds largely due to transistors' replacing valves and core storage's replacing the mercury delay lines (Bird, 1994, page 257). In total, 11 LEO 2s were built (Bird, 1994, p. 234) In turn. LEO 2s were replaced in the early 1960s by the LEO 3 range comprising the upward-compatible LEO 3, LEO 360, and LEO 326. The LEO 3 range were third-generation computers with multitasking capabilities, a sophisticated operating system, the master routine, and a high-level "business" language CLEO (comparable to COBOL).

In 1963, Lyons decided to sell its computer company to another major British multinational company. Also, English Electric developed the Marconi family of Computers; hence, the company became English Electric LEO Marconi (EELM). The combined company established a new range System 4, which it intended to be IBM 360 compatible. Later mergers of all the U.K. computer makers established International Computers Limited (ICL), which sold both the LEO System 4 series and the former ICT 1900 series until the 2900 range of computers replaced both.

Researchers have thoroughly documented LEO's story (Bird, 1994; Caminer, Aris, Hermon, & Land, 1997; Ferry, 2003; Land, 2012)1. LEO is now widely recognized as the world's first commercial digital computer. Its technical achievements and especially its application experience are well known, as are its subsequent failure to counter the strength of competitors, primarily IBM, which led to attempts to consolidate the British computer industry through a series of mergers. The English Electric Computer Division, which had already incorporated Elliot Automation, merged with LEO to form English Electric LEO Marconi (EELM). And, some years later, under strong government pressure, a hoped-for British winner emerged from International Computer Technology's (ICT) merging with EELM to form International Computers Ltd (ICL).

2 LEO in Eastern Europe

Less well known is the story of LEO in the Soviet Union and the nations of East and Central Europe, which comprised the Soviet-dominated Warsaw Pact countries (known as COMECON), and Yugoslavia (which stayed independent of this grouping). The region's market differed from the West's, which created a series of exceptional problems and opportunities. Success depended on taking advantage of the opportunities and finding ways to overcome the problems In 1964, on the basis that I could speak German, LEO's then Managing Director, T. R. Thompson, asked me to take on the role of export manager for a company that had virtually no export business outside the successful LEO companies in South Africa and Australia. However, I had the good fortune to have attached to me Daniel Broido, then Chief Mechanical Engineer of LEO.

Broido had been a refugee from Russia following the Bolshevik Revolution in 1917. He first moved to Germany, where he completed his technical education, and came to London in the 1930s. He worked with several companies on document reading before Lyons and LEO recruited him in 1954. Broido was a

[1] The LEO Computers Society website includes a comprehensive bibliography of material about LEO: see http://www.leo-computers.org.uk/images/Comp-biblio-240115.pdf

pioneer in mark-sensing[2], which led to the design and development of the Lector Document Reader and, subsequently, the Autolector, the online version.

In Russia, Broido's father had been a leading Menshevik, a moderate left-wing party that had led the revolution, which Lenin and the Bolsheviks subsequently overthrew. Nevertheless, Broido had kept himself well connected in the Soviet Union and with several of the Russian satellite countries.

Broido had always believed that the Soviet Union and the Warsaw pact counties provided a unique opportunity for LEO. He had already demonstrated as much by introducing LEO to potential customers in Czechoslovakia where the National Railways and the Ministry of Social Security (and, subsequently, major steelworks in Ostrava: Nova Huta Clementa Gotwald) had duly purchased large LEO 3 systems. The decision then to concentrate our non-Commonwealth exports, initially, on the 'soft underbelly' of the European Market was self-evident and proved to be a remarkable success.

3 Background: the Market

The East and Central European market comprised COMECON (the Soviet Union and its satellite nations, the DDR (East Germany), Czechoslovakia, Bulgaria, Hungary and Romania, plus Tito's Yugoslavia, and Albania). During the Cold War, trade with those countries was limited and restricted for two main reasons. In part, COMECON countries were self-isolated from the West and focused on a determination to trade in the bloc to achieve economic self-sufficiency, (Kaser, 1967; Zwass, 1989; Cortada, 2008). Perhaps more important was the Cold War, which led the Western powers to impose a strategic embargo on the supply to the Soviet Bloc of military equipment and dual use equipment (e.g., computers that could be used for either civilian or military applications). The Coordinating Committee of NATO (COCOM) enforced the Strategic Embargo (Mastanduno, 1992). The Soviet Bloc countries, in consequence of these policies, found it difficult to keep up with global developments in technology and were chronically short of convertible foreign exchange.

Although theoretical work on computing had been highly developed in academic projects, computer design, manufacture, and usage increasingly lagged behind that of the West (Hally, 2003; Malinovski, 2006). By the 60s, the countries had barely developed a range of computers at the level of LEO 1 and LEO 2 produced in the West in the 50s. Stalin had totally underestimated computers' potential, and he allocated only modest research and development funds to the new industry in successive five-year plans in contrast with the efforts and achievements of the bloc in the space programs in that period. In due course, the bloc's weaknesses in computer developments became a major impediment to their space program, too.

By the time Broido had succeeded in opening the Czechoslovak market with the sale of two large LEO 3 systems (2 x 360, 1 x 326) in the late 60s, several small, early-model Western computers had been installed in Russia and other COMECON countries. These computers included the early German Zuses, Elliot Automation 503, 803, and 4100 Series, Ferranti Pegasus and Mercury, PDPs, IBM 1401, and, later, IBM 360, ICT1300, English Electric, KDP10, KDF8, and KDF6.

It was becoming clear that, under normal conditions, especially given the needs of centrally planned economies, the demand for computing equipment could, as Broido had foreseen, be considerable.

4 Particular Features of the Market

4.1 Foreign Trade Organizations

In the Soviet Bloc, in sharp contrast to a typically Western market, branches of the Ministry of Foreign Trade handled all computer purchasing through specialized foreign trade organizations (FTOs). The FTOs were monopoly buyers, staffed by professionally trained negotiators who usually knew a foreign language but who had a limited understanding of the products they were responsible for purchasing on behalf of the ultimate end user.

[2] Mark sensing readers were designed to read marks made on documents where the value sensed depended on the position on the paper of the mark made. For example a salesman would mark the quantity ordered in the appropriate column on a grid printed on the order form.

To be successful, we had to become skillful negotiators capable of coping with all the stratagems the buyers threw at us.

4.2 Permitting Imports of Computers

To manage end users, one had to go through a long and complex process to obtain permission to acquire an imported computer, which required the permission of their responsible minister, who, in turn, had to have the approval of a) the State Committee for Science and Technology; b) the Ministry of Finance to ensure that foreign exchange was allocated for the purchase; c) Gosplan, responsible for the planning of the Economy and, in particular, the five-year plans; and d) the Security Services to ensure that the equipment could not be used for non-approved purposes and were installed in a secure environment. At one time, we counted that one required fifteen signatures to purchase a computer.

A deputy prime minister often had to make the final signature granting the award of a contract to purchase a computer from the West.

4.3 Negotiating Contracts

The time required from first considering a data-processing project, which required a more powerful computer than generally available in the Soviet bloc, to specification, the internal selling of the project, the receiving of the necessary authorization, and the starting of the final negotiations leading to a contract could be several years. The contract negotiations themselves could be equally protracted. Over this period, we had little or no contact with the end user. The only real understanding of their requirements depended on our staff's experience of applications and our limited knowledge of the FTO negotiators

A typical contact would include detailed schedules of air conditioning equipment, spare parts delivered with the equipment (generally sufficient to last for three years as our engineers estimated), and provision of training for the end user staff partly on site or in our training schools set up in the branches but, more often, in our training facilities in the UK.

One significant business advantage the potential Western vendor had was the knowledge that, once they had been invited to the FTO to come and negotiate the purchase, the FTO had the necessary authority and means to pay for the purchase. Another advantage, reflecting the lack of development of commercial law, was that the Ministry of Foreign Trade was prepared for the contracts to be executed under the commercial conditions of the supplying countries or, more often, under the commercial laws of selected countries such as Britain or Sweden.

Nevertheless, the negotiations were always tough and protracted and not necessarily successful. We sometimes negotiated with the knowledge that a competitor might be negotiating in the room next door. On one occasion, I was invited to negotiate three separate contracts simultaneously for key ministries over the Christmas period while knowing that each end user had been allocated currency for the current year and had to complete the purchase before the year finished. In fact, three FTO teams sitting at separate tables or sometimes in different rooms called me to negotiate paragraph by paragraph. It was rather like playing simultaneous chess.

4.4 Surveillance of our staff

The Western computer companies trying to establish themselves in this market had to be aware that they and their staff were under close surveillance. In practice, this surveillance was a kind of industrial espionage designed to glean as much knowledge as possible of Western computer technology much in advance of that available in the Soviet Union at that time. At the same time, we were under strict rules from COCOM to limit the passing of advanced technological information to the Soviet Bloc.

5 Developing the Market

5.1 Local branches

We recognized quite early that, if we were to become successful long-term suppliers of computer equipment and systems, we would need to develop a deep understanding of the market and its requirements, to negotiate clear and comprehensive contracts that could be effectively implemented and monitored, and to establish a presence in the market by opening branches in each of the counties. Each

branch would have to have sales, customer support service, engineers, and training staff and, thereby, learn and understand the requirements of the market, its opportunities, and challenges.

For example, following Broido's breakthrough success in selling two LEO systems in Czechoslovakia, we opened Branch offices in the then Czechoslovak cities of Prague, Bratislava, and Brno. To underscore our determination to stay in each market, we staffed our branches mainly by locally recruited and trained personnel that U.K. engineers and systems specialists, sometimes expatriates of the country concerned, supported. However, in Yugoslavia, we used a large local Agency company, Inter-Export, that represented several important Western businesses. A LEO manager, John Durham, supervised their English Electric LEO Marconi (EELM) business. Major successes were the sale of large computer systems to the Yugoslav Army and the BOR copper mining complex.

Over the next few years, we opened similar local branches in all the other Soviet Bloc countries once we had established a base of sufficient sales and installed computers to justify the cost. By the early seventies, we had an organization in the Soviet Union, mainly in Moscow, of some 30 staff and their families. We had set up only the second ever registered British office authorized by the Soviet Union. Our total number of staff in the bloc numbered some 120 personnel plus their families.

Our situation contrasted with all the other Western computer companies seeking to open and penetrate this market. They mainly used their German or Austrian offices, situated primarily in Vienna, to send sales personnel to the Soviet Bloc on an opportunistic basis. IBM, however, set up a headquarters near Vienna specifically to develop these markets. At its peak, it employed some 2500 people but achieved limited success.

Because few Western companies operated by opening a branch network, it became essential to establish ground rules for operating in the bloc. The government tried to control our activities by, for example, allowing us only to recruit local staff specifically approved by them. Further, we were allocated premises to use and to accommodate our expatriate staff. This situation turned out to be extremely complicated, time-consuming, and difficult given the mutual suspicions and restrictions on both sides during the Cold War.

5.2 Building the Team

Because we expected U.K staff to live for several years in a difficult environment, we decided that it would best to recruit married staff, some with young families, on the basis that a family was likely to be more stable and, in a way, self-sufficient. The positions were attractive to some of LEO's more adventurous staff, mainly men

Few understood the conditions under which they would be working and living in a Communist country at that time: poor accommodation, hotels that provided strange and inadequate food, limited facilities to allow them to cook in their rooms, constant KGB surveillance, poor shopping facilities, and little activity for spouses and families. Health and education services were also not what British individuals were accustomed, although one of our engineers survived harrowing conditions in a Moscow hospital following peritonitis. Stress could be considerable: after the UK expelled 105 Soviet from the UK, the children of our staff attending the school at the British Embassy had to be handed out of the windows to their anxious parents in the face of hostile crowds outside the school.

Nevertheless, the success of an assignment usually depended on the wife's ability to live in that environment. I developed the custom of interviewing the wives to give them a picture of what conditions for them might be like for them and for the job applicants, who might be enthusiastic about the opportunities and forget the hardships. In the event, some simply could not find it possible to live under the restrictions that the system imposed and others perhaps became too close to the Communist regime and posed potential security risks, but the majority accepted the conditions.

Some of our most successful managers were or became great linguists. Many of them had graduated in Slav language studies. Sepp Leimgruber and Nick Wynn were each fluent in some twelve languages; some spoke Russian, and most had some French, German, or Spanish. I decided to acquire a language laboratory and hire trainers to enable staff going on assignment to have at least a smattering of the language they required.

Several staff developed interesting and highly successful careers on returning to the UK. John Durham, Manager of the Yugoslav branch, became a successful software developer and entrepreneur. Alexander Dembitz, Manager of the Hungarian Branch, set up a company that, in addition to other activities, became the leading supplier of bank software to international banks. Alec Nacamuli, after his tour of duty in Moscow,

became the key member of the team that developed the Swift bank fund transfer system. Juergen Kraus, Manager of the DDR branch, became an effective entrepreneur in Germany. John Bradley, after his period as the deputy manager of the Moscow branch, became a senior official in the European Commission based in Brussels. Moshe Peled, who became responsible for our Counter Trade activities, used his counter trade experience in his subsequent career. Don Riley, a tough New Zealander, was the first manager of our Moscow branch became after he left LEO, and he became a supplier of computer work stations that President Gorbachov recognized as an important example of the technology that the Soviet Union lacked. Subsequently, back in London, he became a successful property owner and by converting old warehouses into factories. He then founded the brilliant Chocolate Factory heater in Southwark. Roger Landau, who managed the Polish branch and later the Czechoslovak branch, later married a Czech woman, became an expert of Indian Culture, and ended up as successful farmer in Britain.

5.3 Networking

As part of the drive to understand the market and become widely known, we networked as extensively as possible through participating in governmental trade missions, exhibitions, receptions, and Chamber of Commerce events. We also traveled and visited companies and decision makers. Exhibitions were sometimes crucially important because officially sponsored exhibitions were frequently provided with funds to purchase the exhibited goods. These became major efforts. For the first large computer exhibition INCOMEX in 1966 in Prague, we sent over 100 of our staff to cover the six weeks of the exhibition to demonstrate our serious intent following Broido's first successes there.

5.4 Counter Trade

As a consequence of the trade policies seeking self-sufficiency in the Soviet bloc, the region experienced a perpetual shortage of convertible foreign exchange. It soon became clear that, if we were to grow the market significantly, we would need to participate in a form of exchange called "counter trade" (Stevens, 1995). Counter trade is a form of business derived from the more primitive trade known as "barter".

Counter trade is a form of business that enables importers short of convertible currency to purchase goods and services they needed by offering, instead of payment, goods and services in exchange. These were frequently in surplus or difficult to sell through normal channels. Although an inefficient method of conducting international trade, counter trade created possibilities of business that were otherwise impossible.

We were under continuous pressure to buy a range of exotic products, such as trained falcons or racing camels (to resell to rich Middle East princes), various horns to grind up into medicines, and a wide variety of handicrafts, all of which we tried to avoid. We did try to import miniature electric motors, which turned out to be unreliable. Specialist companies in counter trade offered to take these types of products but at unreasonable prices.

We persisted and set up our own counter trade department to avoid loss and limit the risk of trading by only buying what we knew we could sell on. We succeeded, for example, by identifying a small Bulgarian vineyard making a good quality red wine, which we were able to sell to social clubs and for events at home. We purchased large quantities of ball bearings from Romania for the British motorcar industry. Through the ingenuity of Moshe Peled, we helped to ensure the production of a successful film at the famous Czech film studios at Barandov near Prague to supply a large system 4 installation to the regional government authority of Prague. Hungary was able to produce computer cabinets to our specification. We purchased hanging baskets in Bulgaria for flower arrangements, which we sold to garden centers and even municipalities. When electric and electronic typewriters displaced manual typewriters, we found a ready market for small manual machines made in East Germany and Bulgaria.

5.5 Co-operation

We always faced further pressure to help the Soviet Union and its satellites to reduce the technological gap between them and the West. We were willing to be supportive provided that the assistance was in COCOM rules and that we would not provide any form of potential help to their military capacity (especially during the Cold War). Problems arose over technologies that were essentially civilian but had a possible military use. I negotiated frequently with a company lawyer in attendance to help with any legal issues.

We modified a System 4 computer that that fell completely in the technical parameters defined by the COCOM regulations and offered it for sale but (not surprisingly) without much success. On the other hand,

we were permitted to supply a powerful English Electric KDF9 system for the Institute of High Energy Physics, partly staffed by International Scientists who demanded access to powerful state of the art computers. With the co-operation of the Russians, we were able to satisfy COCOM that the use of the computer was not in breach of the regulations by providing or Ministry of Technology with regular analyses of the computer output and the contents of its store.

As I mention in Section 1, in the early days of the computer industry, Russian research and thinking about computer concepts was reasonably advanced and sometimes ahead of the West (Hally, 2003). Russia produced early computers with similar computing power as LEO 1in significant numbers, but these systems almost totally lacked efficient peripherals.

For a considerable time, Russia had rudimentary designs and manufacturing capabilities for reliable storage (e.g., chip-based storage) and printers, magnetic tape, and drums. This situation occurred largely due to Stalin's poor understanding of computers' potential: he did not allocate enough resources to the industry and research. In due course, under the leadership of the State Committee for Science and Technology and the Academy of Sciences, the problem was recognized, and the USSR Government began to realize the urgent need to catch up with the West.

Although there was a strongly argued opinion that the Soviet Union needed, for security and economic reasons, to become self-sufficient in information technology, a decision was taken against strong pressure from hard-liners to acquire already developed technology from the West, (Malinovski, 2006; Graham, 1998). At this point, the offer of co-operation by LEO, and later by ICL, to provide some technology and assembly rights became attractive to influential members of the decision making bodies and in particular to Deputy Chairman of Gosplan, Rakovski and Deputy Chairman of the State Committee for Science and Technolgy, Gvishiani. However, by then, the overwhelming dominance of the IBM 360 series in the West became the target for the Soviet Bloc and led to the defeat of the self-sufficiency group and those wanting to work with LEO/ICL.

Accordingly, the bloc developed a new plan, which would allocate all members of the Warsaw Pact with specific areas for developing the industry. The primary task (allocated to the Soviet Union) was to develop powerful computers to rival the systems of CDC and IBM. Key roles for a range of computers and peripherals were allocated to the DDR (East Germany) with major plants in Dresden and also, perhaps more surprisingly, to Bulgaria (mainly in Plovdiv) for smaller computers, disk systems, and electronic typewriters.

The bloc implemented the new plan by smuggling several IBM 360 systems via the German Democratic Republic (Deutche Demokratiche Republic) to Russia, Bulgaria, and elsewhere. The countries emulated the hardware reasonably effectively but slowly by reverse engineering, although poor manufacturing techniques and high fault rates impeded success. In the meantime, the attempts to emulate the software, systems, languages, and applications proved to be much more difficult than expected, which led to long delays in the project implementation.

6 Conclusion

Despite IBM's prestige and marketing strength and partly because of the United States' Cold War attitude, we became a major supplier of computing equipment from the West to the Soviet Union and its satellites from 1970 to 1990. I believe we did so primarily because we understood the vagaries and needs of this particular market. Our computers were installed in the key branches of government and industry throughout Eastern Europe, and the area became a profitable market for LEO, EELM, and ICL.

It has sometimes occurred to me that if, during the Cold War, as result of incipient conflict, we had stopped supplying spare parts for our installed computers, we would have caused chaos in the centrally planned economies of the Soviet Bloc.

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About the Authors

Ralph Land, CBE, FRSA (Fellow of the Royal Society of Arts), and his twin brother Frank came to Britain with their parents in 1939 as 10-year-old Jewish refugees from Germany. Following evacuation and Grammar School, Ralph took a degree in Economics at The London School of Economics, specializing in International Trade. After a short period in the Economics Research Division at LSE, he joined Lyons, firstly becoming Management Accountant for the Teashops Division and then, following the example of Frank, moving to LEO and appointment as Bureau Manager and then Export Manager. He was appointed as Export Manager of LEO in from 1963 until 1974 with responsibility for developing the market for computers in Eastern and Central Europe including the Soviet Union. As the paper shows, the rest of his career was spent developing exports to those countries. Subsequently, in 1976, he joined Rank Xerox to manage their substantial Eastern European Export Division and after retirement was recruited as Director of East European Affairs by Rolls-Royce Aerospace. Increasingly, as an acknowledged expert on East Europe he became advisor to the U.K. Government's "Know How" Fund, a Governor of the Westminster Foundation of Democracy, a frequent lecturer on Business covering Counter Trade and Negotiating Technique, and a an Honorary Fellow of SEESS (School of East European and Slav Studies) now part of University College London. He served on many Trade missions to Eastern Europe and was the Chairman of the Russo-British and British-Romanian Chambers of Commerce for a period of 9 years each. In 1985. the Queen awarded him an Officer of the Order of the British Empire (OBE) for services to exports and, in 1995, a Commander of the Order of the British Empire (CBE).