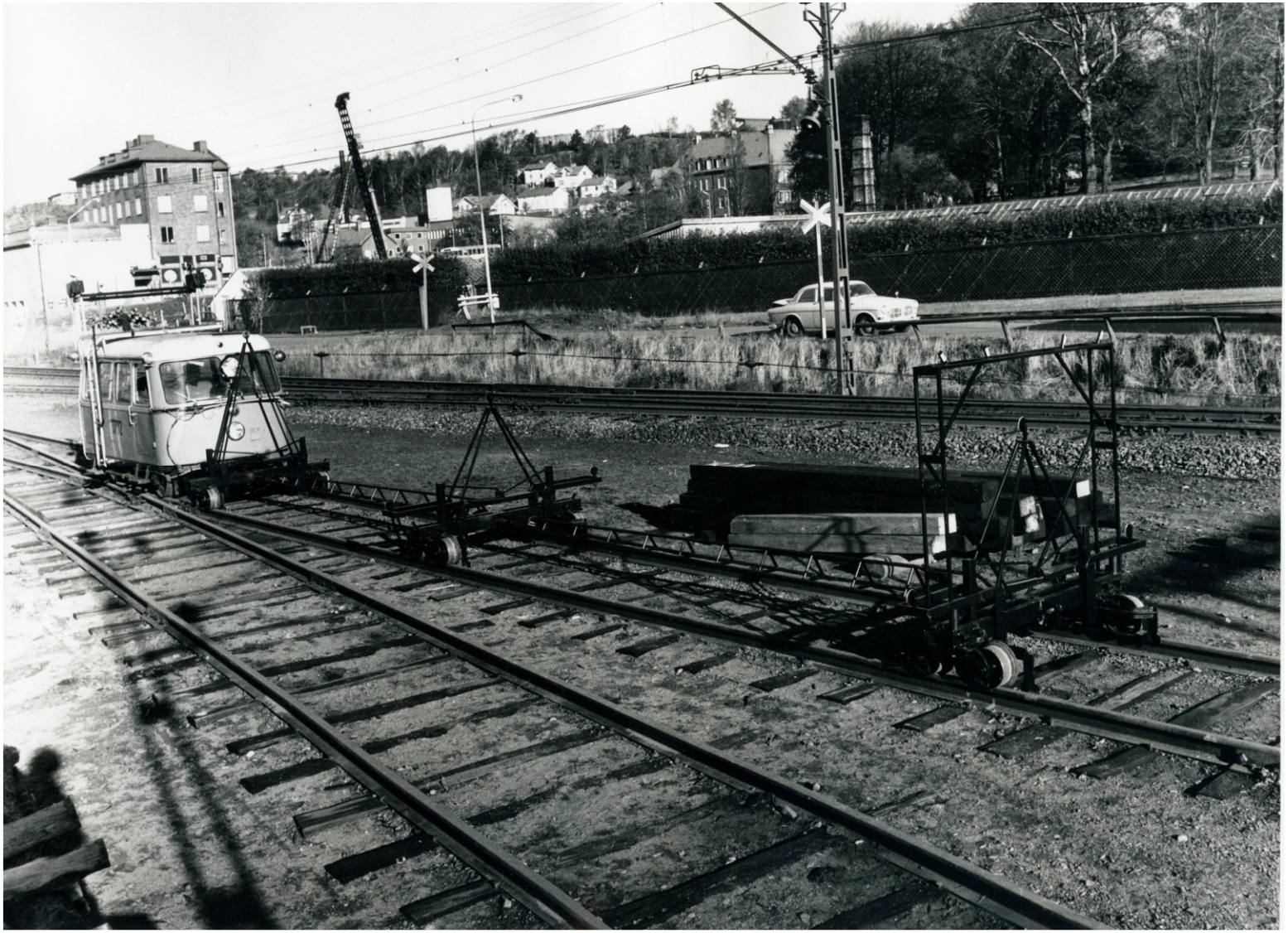
2025 version of our anniversary slide show. LKO has 52 years and L-KOPIA 32 years in business

Before the beginning

Sven Olof Axelsson, mentor and surveying engineer, and intern Lars Lundberg distance measuring with a Geodimeter on a windy spring night on Vrångö (outside Gothenburg) in 1968. This is the beginning of Lars Lundberg's surveying career.

This is the reason for L-KOPIA, the first “SJ STEFO” (Swedish State Railway STEFO) during on-track tests in Mölndal in 1973



L-Kopia's First Purpose

Staten Järnvägar (Swedish State Railway) developed a Stereo Photogrammetric Clearance System together with VIAK (a larger Swedish Consulting Engineering Company) in 1973.

L-KOPIA started as a one-man subcontractor to VIAK to develop the special 70 mm black & white film used with the system. We soon expanded to do much more.

Post Processing was performed in a Stereo Comparator

The STEFO System (Stereo Photogrammetric)

The STEFO system was used in Sweden, Norway, Finland, USA and Canada between 1973 and 1994. The projects in USA and Canada were handled by SRS (Swedish Rail System) in Solna, Sweden. In 1985 SRS America was formed and L-KOPIA became a subcontractor to SRS and SRS America. The picture is from the first project in Baltimore, Maryland (for AMTRAK) in January of 1981.

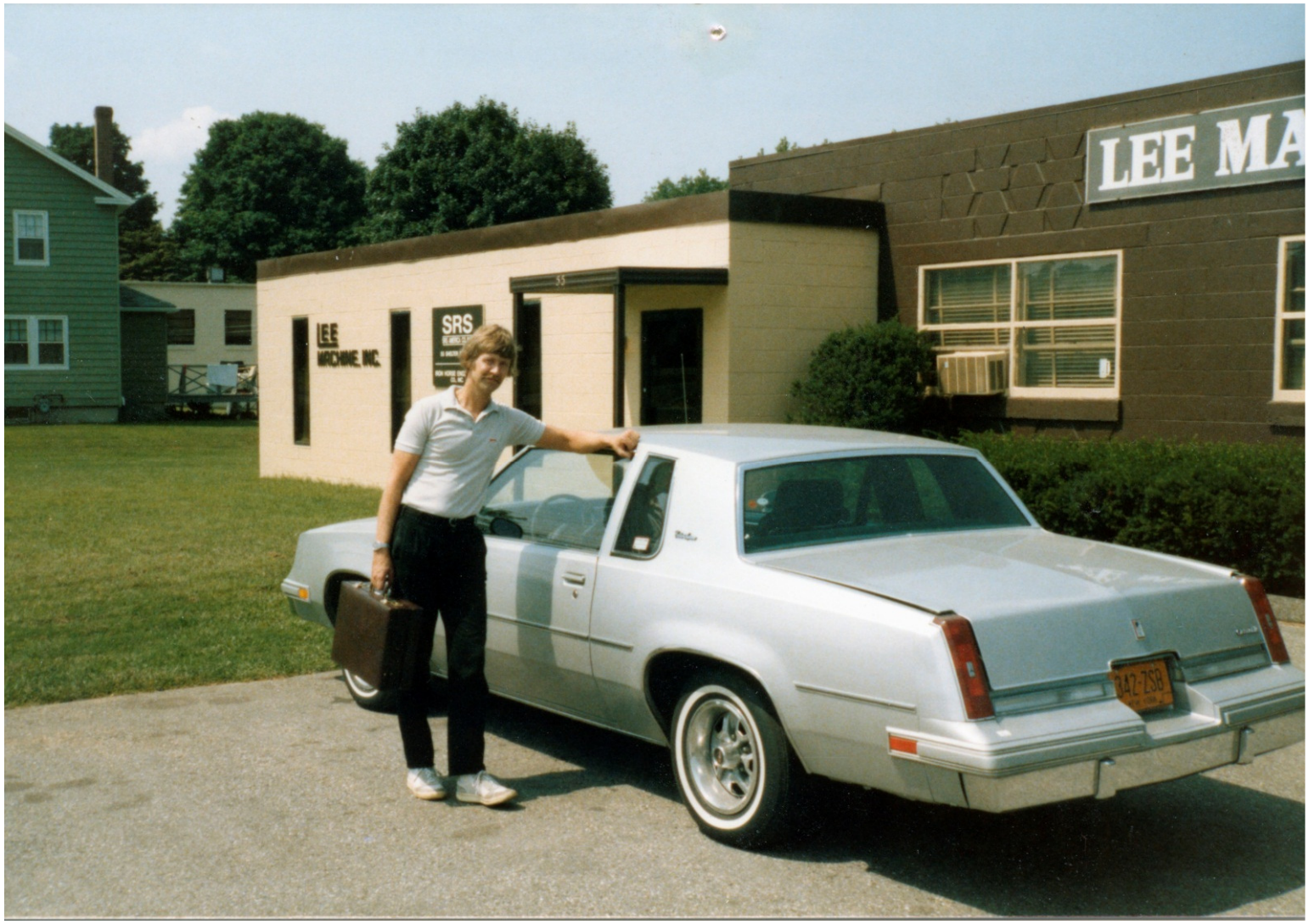
STEFO USA pioneers

Lars Lundberg and Mr. Glenn D. Graff (1925-2007) of AMTRAK. Mr. Graff took the STEFO to USA and was essential for the entire project. This picture was taken at Drottningholm outside Stockholm in 1989.

More pictures of “STEFO Pioneers”

Ed Walker of AMTRAK, Lars Lundberg of L-KOPIA and Bill Morehead, President of SRS America in Baltimore, MD.

And some more



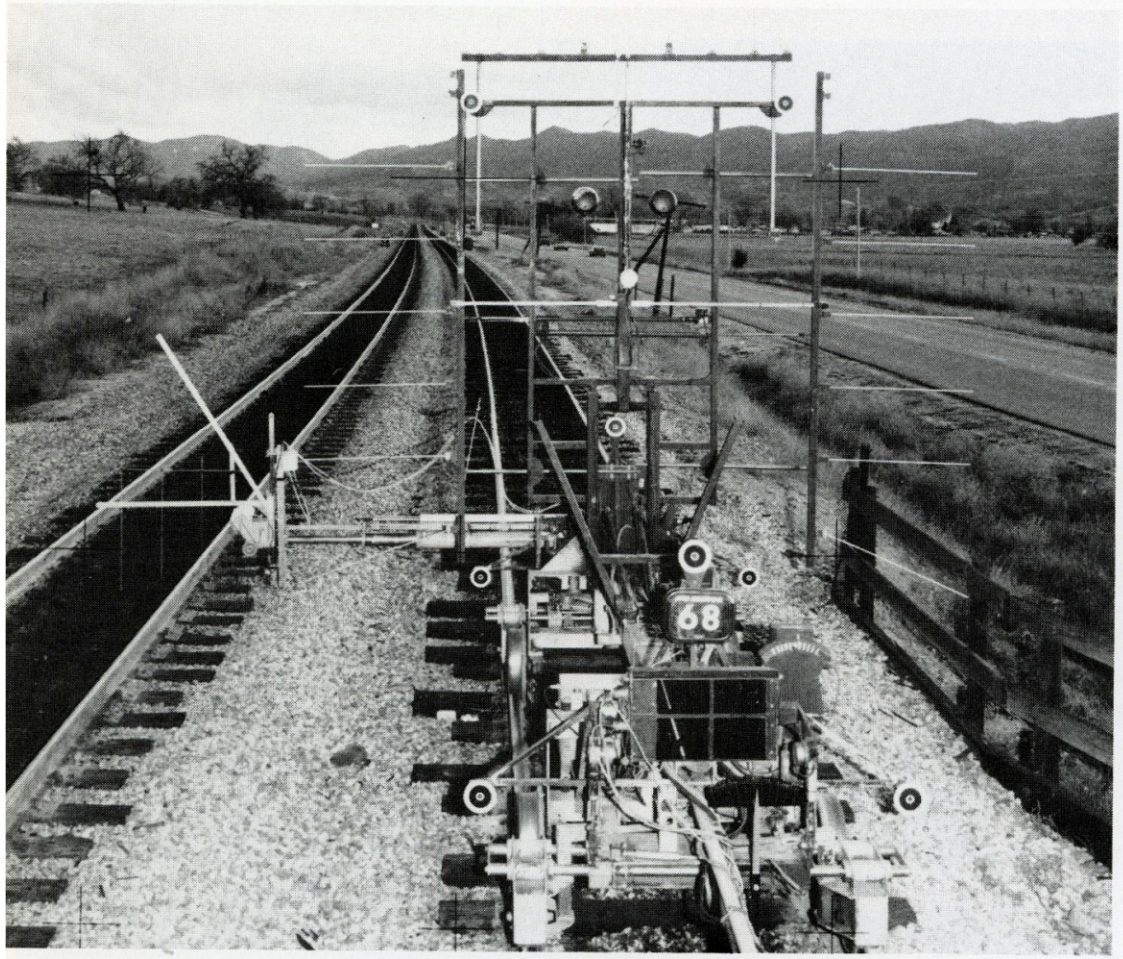
Lars Lundberg outside the SRS office in Danbury, Connecticut in the summer of 1985.

And waiting for train in Nevada

Mr. Dana Helsley of SRS America (later Manager at Norfolk Southern) with Southern Pacific RR representative somewhere in Nevada in 1985.

STEFO was first with NON CONTACT Track Center Surveys

STEFO SYSTEM — THE OPTOCATOR



Since October 1986, we also provide a non-touch-track-Center Measuring System by Laser Scanning. Picture at left shows the System with an aluminum frame for visual judging purposes; this is helpful but not required if the adjacent track space must not be fouled.

1984 Styling with AMTRAK Safety gear

Lars Lundberg in the STEFO driver's seat in 1984

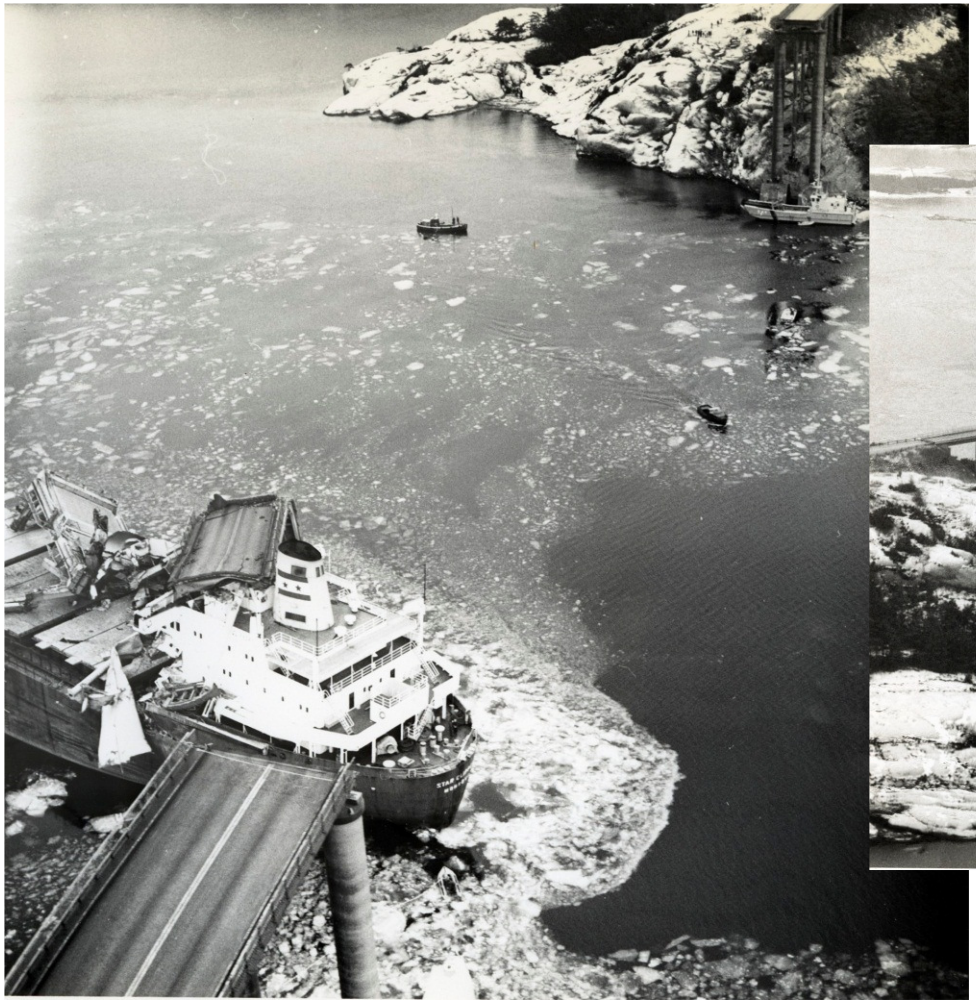
Arial Photography

L-KOPIA / LKO also took thousands of arial photos between 1973 to 1997 (99% in Sweden and 1% in Connecticut, USA). This picture was taken at Landvetter Airport (GOT) in 1989 with a SCANAIR DC 10 in view.

And Beautiful Gothenburg Harbor in 1995

For arial projects, L-KOPIA mostly used a Bell Jet Ranger from Osterman in Gothenburg

Sad photo assignment, the Tjörn Bridge Catastrophe in the morning of January 18th, 1981. Eight (8) people were killed after a tanker ship hit the bridge at 1:30 am



L-KOPIA performed most Arial Photo projects for larger Industries (private & public)

This is the state of the Art ”Sävenäs Waste to Energy Facillity”. The picture was deliverd to GRAAB and Information Manager Karl Åke Hansen in August of 1990 (Special Contribution to Karl Åke who has helped us with most scanning of older pictures for this presentation).

Taking off for Another Project

New ERA, the “Laser” is introduced for modern Clearance Measuring in Sweden:

The “**Inventors**”, Mr. J Hipp & Programmer Mr. Hector came from IBEO in Hamburg, Germany to show us the first Time of Flight laser on January 21st ,1991. The rest is LKO / L-KOPIA history.....

Very important participants at the first laser trial in Karlskrona. Above Per Arne Petterson & Marie Louise Lundgren of Banverket (Swedish (Rail Administration).

In the mid-80s, L-KOPIA teamed up with other smaller Hi-tech companies to improve STEFO and develop the L-KOPIA Clearance Laser System

Programmer Arne Eriksson of 3-COMP teamed up with L-KOPIA in the 80s and has been essential for the development of the LKO/L-KOPIA Clearance Laser System. This picture was taken in Osby, Sweden in 1992 when L-KOPIA sold a complete STEFO system to TRA in Taiwan.

The first L-KOPIA laser was delivered from IBEO in 1992.

1993 WAS a BIG year for us! L-KOPIA, Inc. was formed in Chicago, IL and we changed name to LKO Teknik AB in Sweden

Jeryl Lundberg
L-KOPIA cofounder & part owner

LASERSYSTEM MÄTFORDON LKO Teknik AB LASERSYSTEM MÄTFORDON

LKO Teknik AB
LASERSYSTEM-MÄTFORDON
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L-KOPIA, Inc. sold the FIRST L-KOPIA/LKO Clearance Laser System to CONRAIL in 1993

Pat Lynn of Conrail Engineering was the first L-KOPIA laser system operator in the USA.

The SECOND LKO/L-KOPIA Clearance Laser System was sold to BANVERKET (Swedish Rail Administration) in 1994

The second system to BANVERKET was a “double laser system”, mounted on the STEFO vehicle, to enable 360 degree scanning (the B1 laser had a 270-degree scanning area).

The first Laser Clearance Contracting Projects started in USA in 1993

An early L-KOPIA temporary installation on a customer's Hy-Rail vehicle. The picture is from the Fall of 1993.

The first L-KOPIA Clearance Laser Truck was built in 1996

The L-KOPIA 1996 GMC Suburban Laser Truck on track outside LAX.

The first LKO Clearance Laser Truck was built in 1997

The LKO 1997 TriStar Laser Truck was on display at Nordic Rail in Jönköping, Sweden in October of 1997.

LKO/L-KOPIA was early using e-mail for transfer of data and the WEB for advertising

Our first WEB-NEWSLETTER (Still under “News” on our Website)

LKO Surveying in Norwegian Railway Tunnels

01/01/1997

LKO has performed major surveying for Jernbaneverket, Norway, in 1996. Among individual projects are the "Lier Tunnel", one of the longest double track railroad tunnels in the world. It is over 10 km long.

LKO did the full survey in two-night shifts and collected over 1.000 cross sections containing 450 points each.

When performing surveying for JBV, we normally use a Robel rail car to carry the LKO laser system. We also installed a cross level and an odometer system for a total data collection.

In December LKO surveyed the Bergen's Line from Honefoss to Bergen, approximately 350 kilometer, 150 tunnels and 100 snowsheds. JBV receives our tunnel data on e-mail (approx. 10.700 cross sections).

Jernbaneverket has adapted their software for clear load simulation to match the LKO Clearance laser.

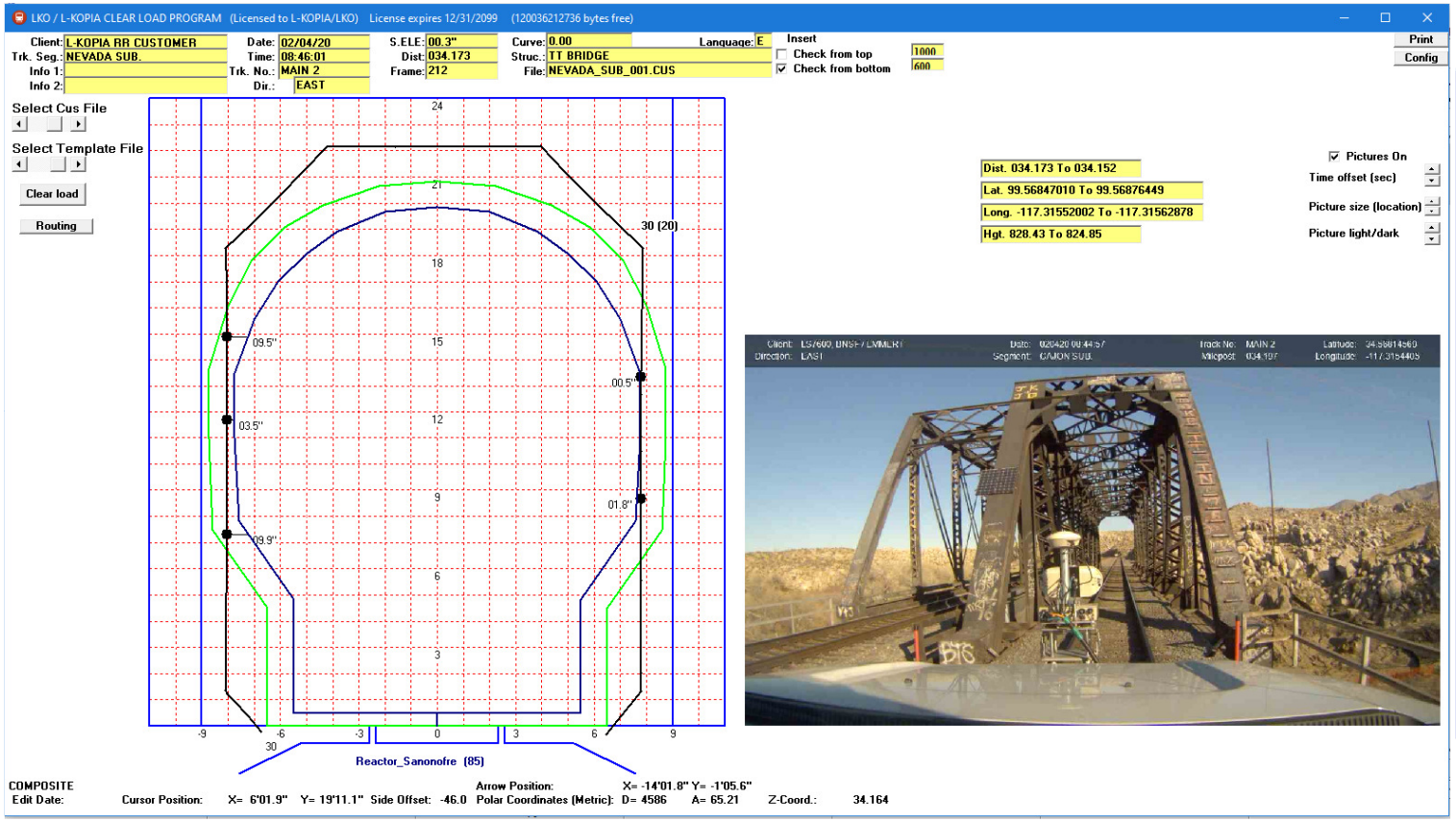
For further information, please click on "Contact Us".

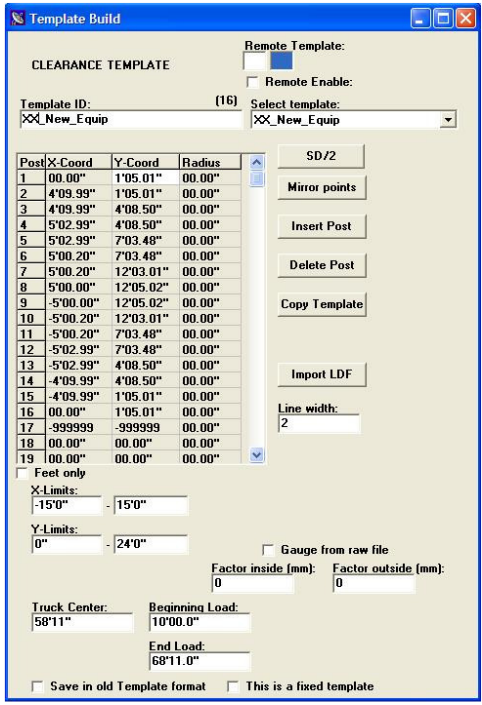
Fred Andersson of LKO/L-KOPIA designed the new logos in 1998

The logos above and Fred Andersson on a L-KOPIA project for I&M Rail Link in 1998.

These logos are still in use today, 27 years later.

LKO/L-KOPIA has developed many advanced Programs for use with our Data

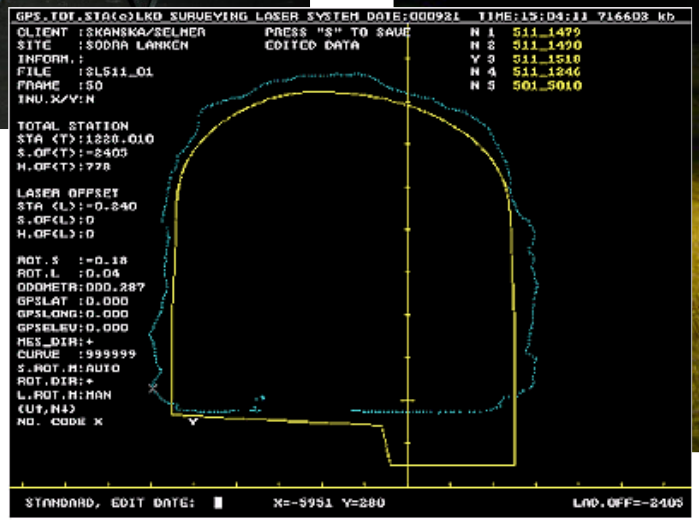




Post	X-Coord	Y-Coord	Radius
1	00.00"	1'05.01"	00.00"
2	4'09.99"	1'05.01"	00.00"
3	4'09.99"	4'08.50"	00.00"
4	5'02.99"	4'08.50"	00.00"
5	5'02.99"	7'03.48"	00.00"
6	5'00.20"	7'03.48"	00.00"
7	5'00.20"	12'03.01"	00.00"
8	5'00.00"	12'05.02"	00.00"
9	-5'00.00"	12'05.02"	00.00"
10	-5'00.20"	12'03.01"	00.00"
11	-5'00.20"	7'03.48"	00.00"
12	-5'02.99"	7'03.48"	00.00"
13	-5'02.99"	4'08.50"	00.00"
14	-4'09.99"	4'08.50"	00.00"
15	-4'09.99"	1'05.01"	00.00"
16	00.00"	1'05.01"	00.00"
17	-999999	-999999	00.00"
18	00.00"	00.00"	00.00"
19	00.00"	00.00"	00.00"

L-KOPIA's first ClearLoad software was developed in 1985 and today is a versatile and user-friendly simulation program with pictures of structures integrated with data. The sample is a well-known "big load" (nuclear waste container) that L-KOPIA cleared going thru a TT Bridge outside Victorville, California. This was the tightest clearance of the 200-mile run.

LKO/L-KOPIA also performed non-track related projects



LKO Teknik performed tunnel controls for Södra Länken (South Link) Project in Stockholm between 2001 and 2004. We surveyed 17 km of tunnels, every meter (3.5 ft.), with the LKO Surveying Laser System positioned with Total Stations (GeoROG, SBG and GEOIDEN).

A faster LKO/L-KOPIA Laser System is introduced in 2004

The first version of the L-KOPIA/LKO LD Clearance Laser System increased scanning rate **100%** (compared to our earlier B1 laser). The pictures are from the first project in Illinois in November of 2004.

L-KOPIA also performed Road Surveys for Boeing and other Companies

Daniel Lundberg of LKO, Murray McIntyre and David Beck of Boeing poses with the L-KOPIA Clearance Car outside Tulsa, Oklahoma in January of 2005.

L-KOPIA hires first Supervisor in 2006

Former Supervisor Gary Mitchell (right) was a traveling man with about 200 field days a year from 2006-2014. The picture is from Kansas and includes Andy Köster, who worked part time for LKO and also helped L-KOPIA in 2006.

LKO hires Supervisor & Technical Director in 1997

Per Arne Pettersson is also a traveling man with many countries under his belt. Here with RENFE in Spain in 1999. Per Arne is now LKO's Vice President.

LKO/L-KOPIA has sold over 35 laser systems worldwide

TRA, Taiwan personnel posing with the new B1 laser on the former STEFO vehicle (originally sold to TRA in 1993).

L-Kopia/LKO Load Measuring System in Monterrey, Mexico

And some more of our worldwide operations over the years

L-Kopia/LKO performed laser installation and training of System Operators in Adelaide, S. Australia in 2006 and 2007. Ron Fraser of Railtrack was our Australian Agent.

Per Arne Pettersson, Mats Johansson and Lars Lundberg in Sweetwater, Texas in February of 2003. All three are partners in LKO.

The latest and fastest from 2012-2023

The LKO/L-KOPIA Z+F Clearance Laser System was introduced in 2012. The system is capable of 200 Hz scanning speed, more than 10 times faster than earlier hardware. The latest Z+F 2D Scanner has a 270 Hz scanning rate.

Several LKO/L-KOPIA Z+F Clearance Laser Accuracy Tests were performed in 2012

Per Arne Pettersson of LKO and Kristian Nyblom of Four Stripes preparing for Z+F on-track tests in Falun in November 2012

Lars Lundberg checking the track cross-level as part of the accuracy test

Important teamwork

Coding Specialist Jesper Engberg of Barra (left), plus Bane Nor personnel and Per Arne Pettersson of LKO (right) are very important team members in developing our clearance laser systems. The Z+F 9020 (270 Hz) was installed in Oslo Norway in December of 2023.

L-KOPIA older surveys all over North America

The L-KOPIA/LKO Z+F Clearance Laser System was installed on two L-KOPIA Hy-Rails in March of 2013. Gary Mitchell and Per Arne Pettersson performed the installation and Gary started a 2,500 mile survey in Seattle, WA.

L-KOPIA surveys all over North America

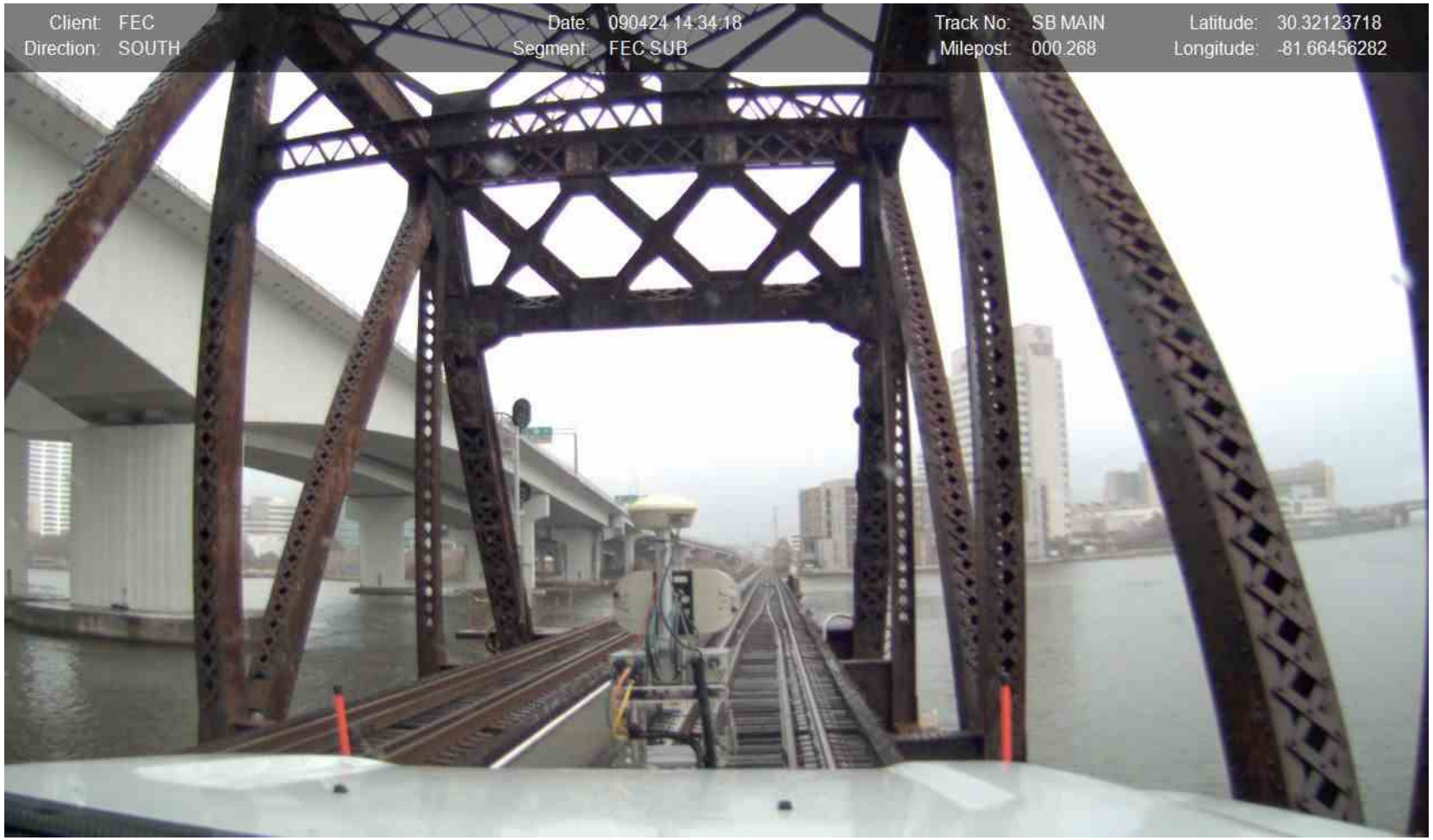
Erik Lundberg with the L-KOPIA/LKO Z+F Clearance Laser System in the New England area, August 2014. Erik helped L-KOPIA two summers (2013-2014) as laser operator, performing surveys from Seattle, WA to Banger, ME. A lot of travel on both roads and tracks both summers.

Projects in Sweden from 2019 to 2023

“Getingmidjan” in Stockholm was surveyed several times between 2019 and 2020. The photo on right shows the LKO Laser Truck CFE-095 at Östersund C on November 13th ,2023.

4-Wheel Drive helps!

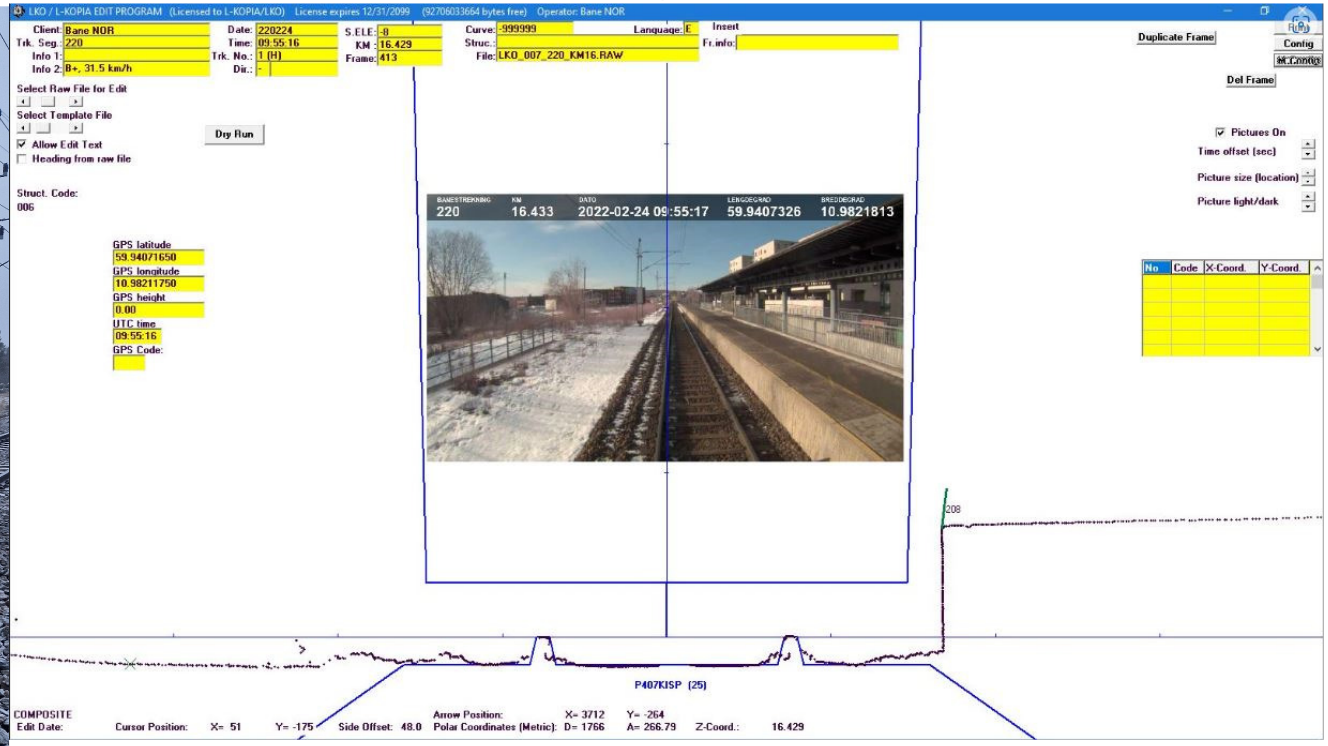
L-KOPIA Projects in USA in 2024



L-KOPIA, acting as subcontractor, performed a 340-mile Clearance Survey in Florida. Our crew started in Jacksonville on September 4th, 2024. The first major structure was the long double track bridge over the St. John River in Jacksonville. All data was delivered within 30 days after the survey.

LKO Projects in Sweden & Norway in 2024

The LKO Toyota Hy-Rail met with early snow at Kilometer 1,374 between Fjällåsen and Lappberg on October 29th.



A Platform Corner Sample from Bane Nor, Norway. We use the same RAW-files for all features in the LKO L-KOPIA Software. The Excel format sample below also gives our customer the total length of a platform.

D2 Platform

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	X (Platform Corner)	Y (Platform Corner)	Z(Meter)	Structure	On track	Direction	Track segment	Curve	S.ELE	Date measured	Time	Frame	Platform length
2	-1738	620	16.429	Platform	1 (H)		220	-999999	-2	22-02-24	9:55:04	314	195 meter
3	-1734	618	16.430		1 (H)		220	-999999	-2	22-02-24	9:55:04	315	
4	-1725	608	16.431		1 (H)		220	-999999	-2	22-02-24	9:55:04	316	

To be continued……!

Thank you very much for watching our anniversary slide show and please visit our website again soon. We add news a couple of times a year. Please do not hesitate to contact us if you have any questions:

www.lko.se **www.l-kopia.com**