

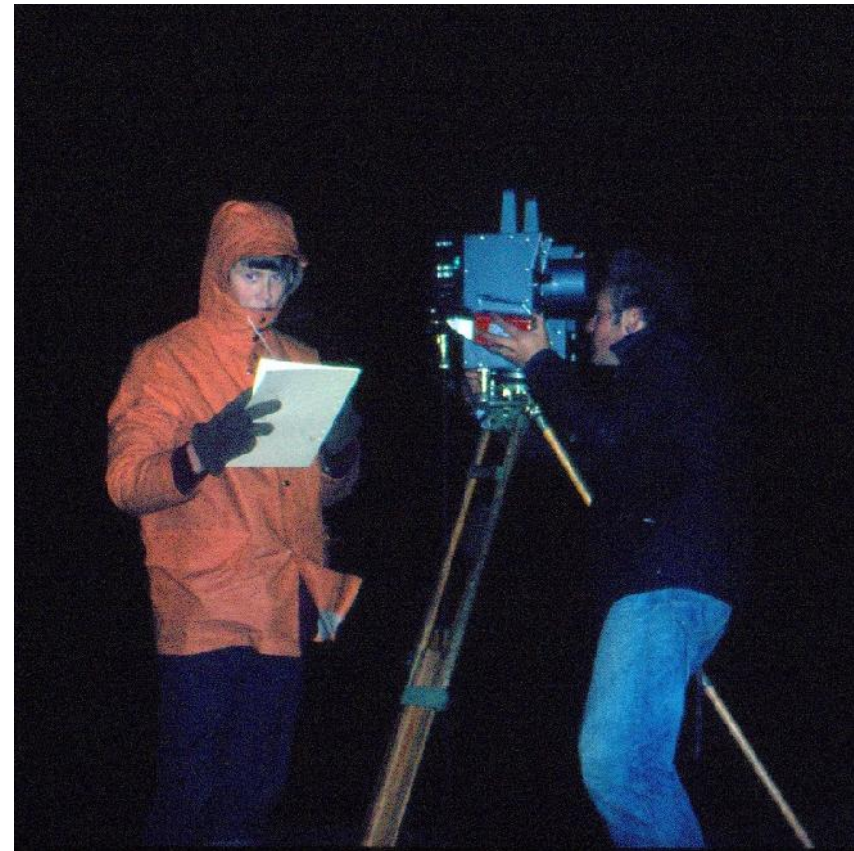


2013 40/20 Year Anniversary Slide Show

ENJOY!



Before the beginning



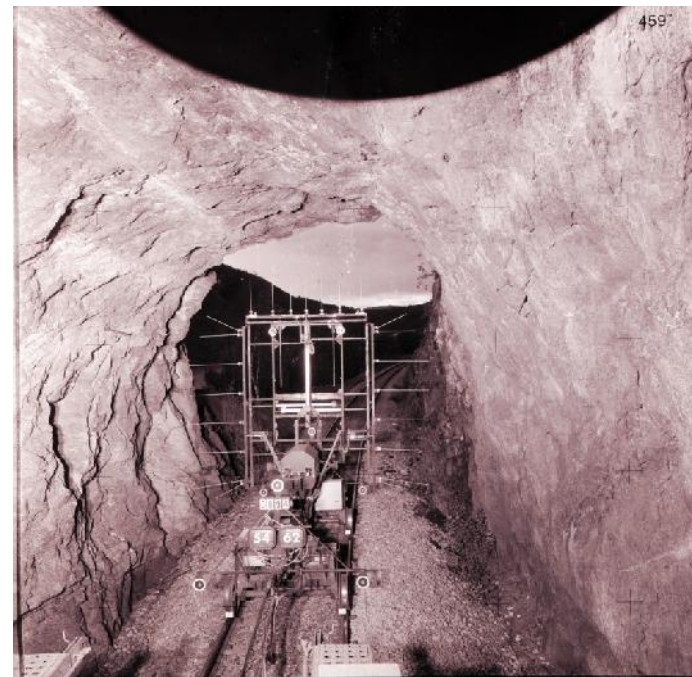
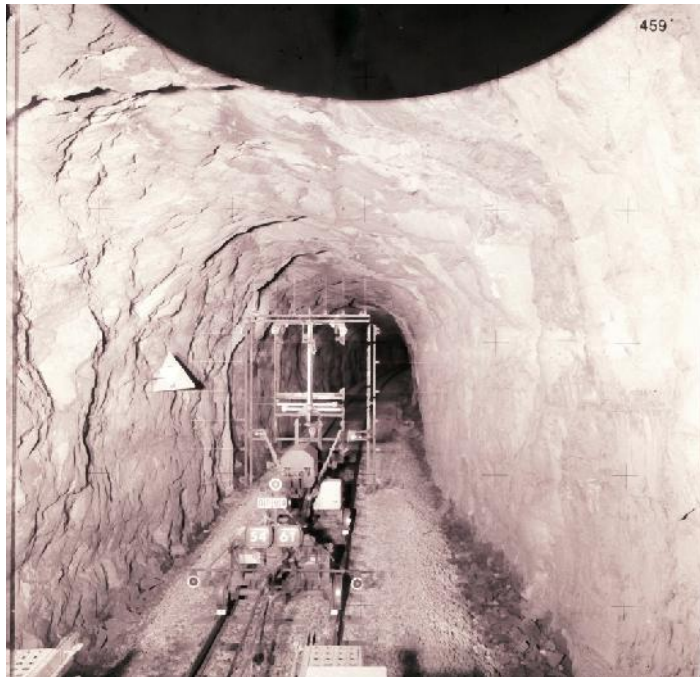
Mentor, Surveying Engineer, Sven Olof Axelsson and intern Lars Lundberg a windy spring night @ Vrångö outside Gothenburg in 1968, (distance measuring with Geodimeter). This is the beginning of Lars Lundberg's surveying path.

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



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 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. Below is a picture from one of the first USA projects in Baltimore, Maryland (for AMTRAK) in 1981.



STEFO USA pioneers:



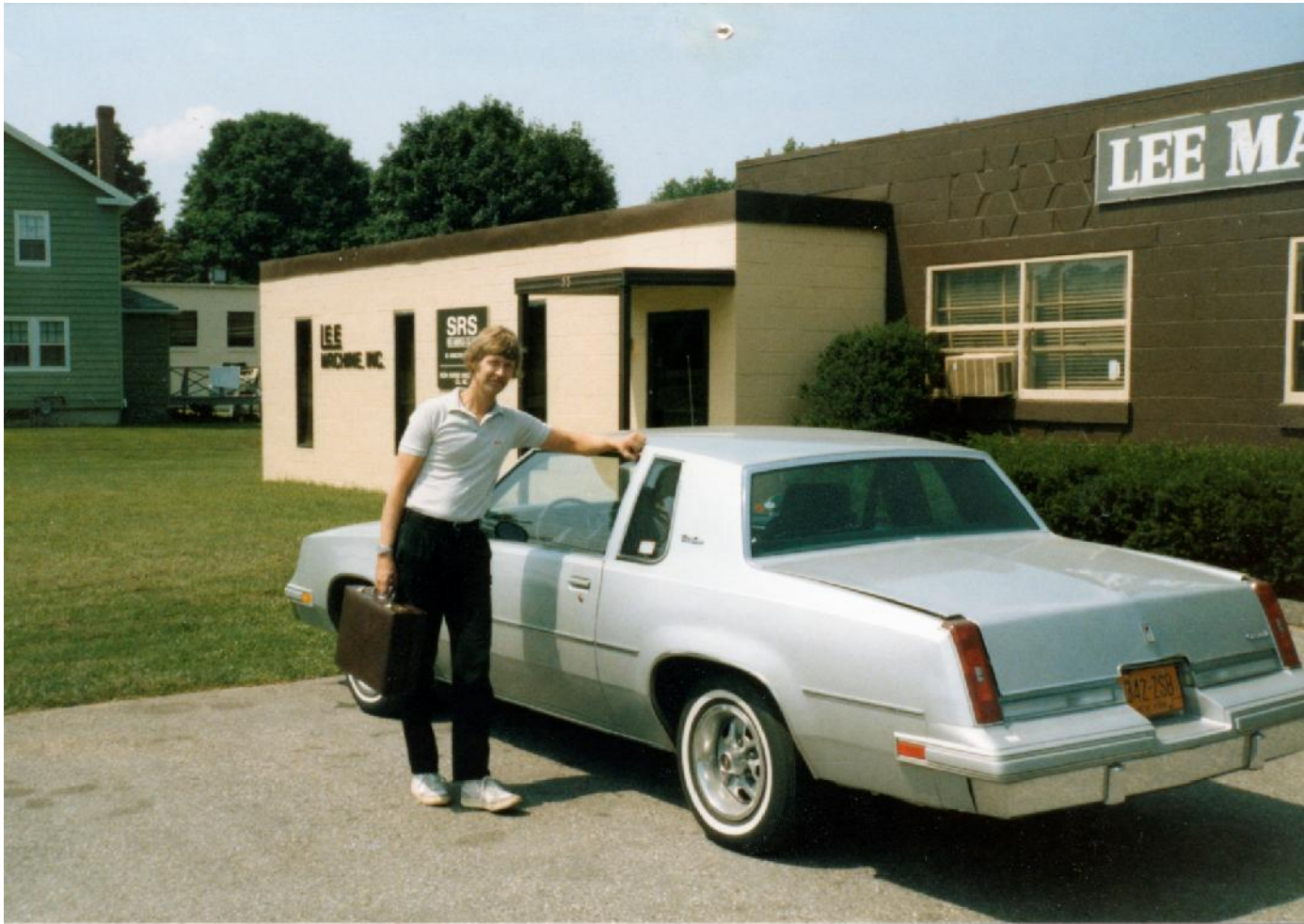
Lars Lundberg and Mr. Glenn D. Graff of AMTRAK (1925-2007). Mr. Graff took the STEFO to USA and was essential for the entire project. This picture was taken at Drottningholm outside Stockholm in 1989.

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.

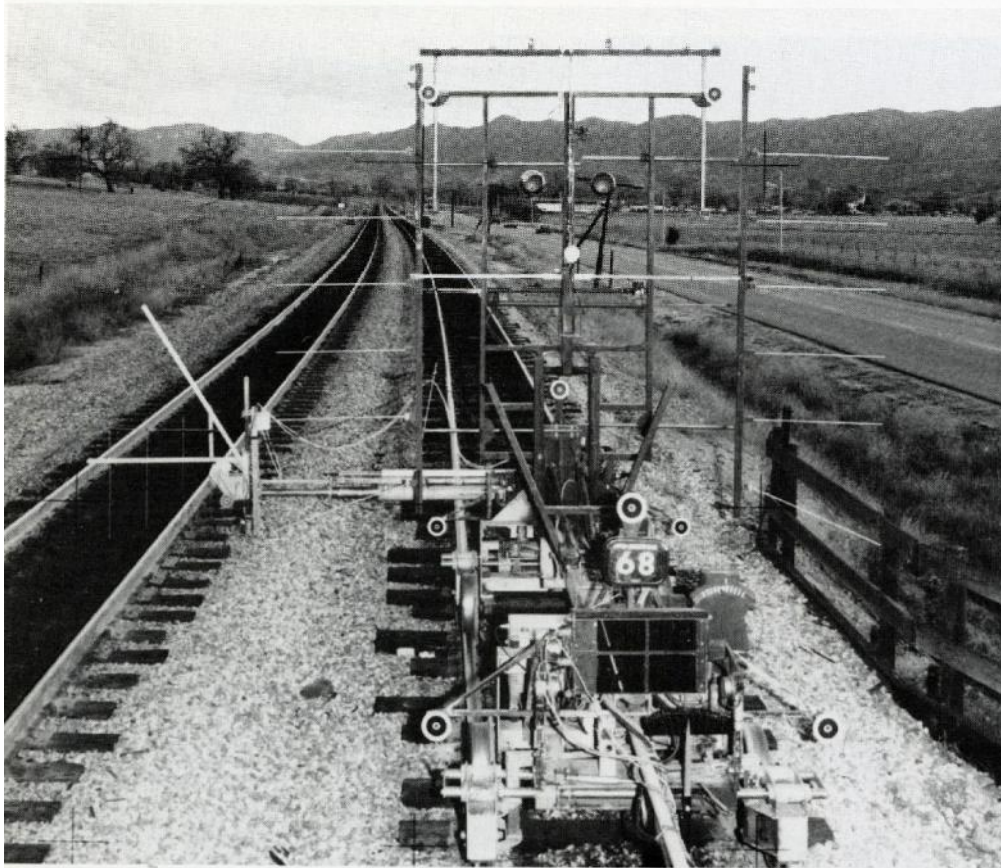
And waiting for train in Nevada:



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

L-KOPIA / LKO also took thousands of arial photos between 1973 to 1997 (99% in Sweden and 1% in Connecticut, USA). Here are some samples:



Landvetter Airport in 1989 (with a SCANAIR DC 10 in front).

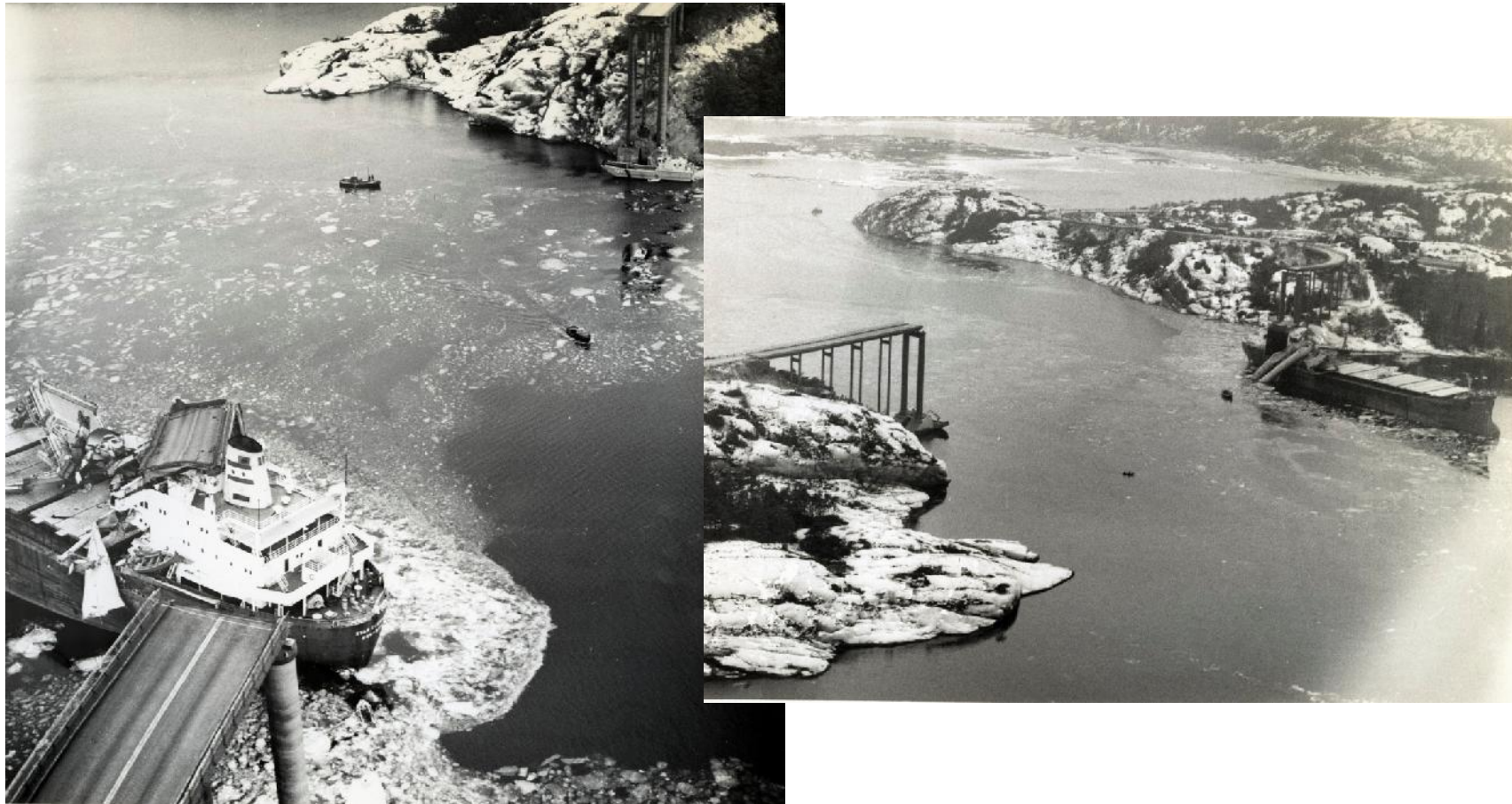
And Beautiful Gothenburg in 1995:



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 Facility". The picture was delivered 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).

And Finally, 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)).

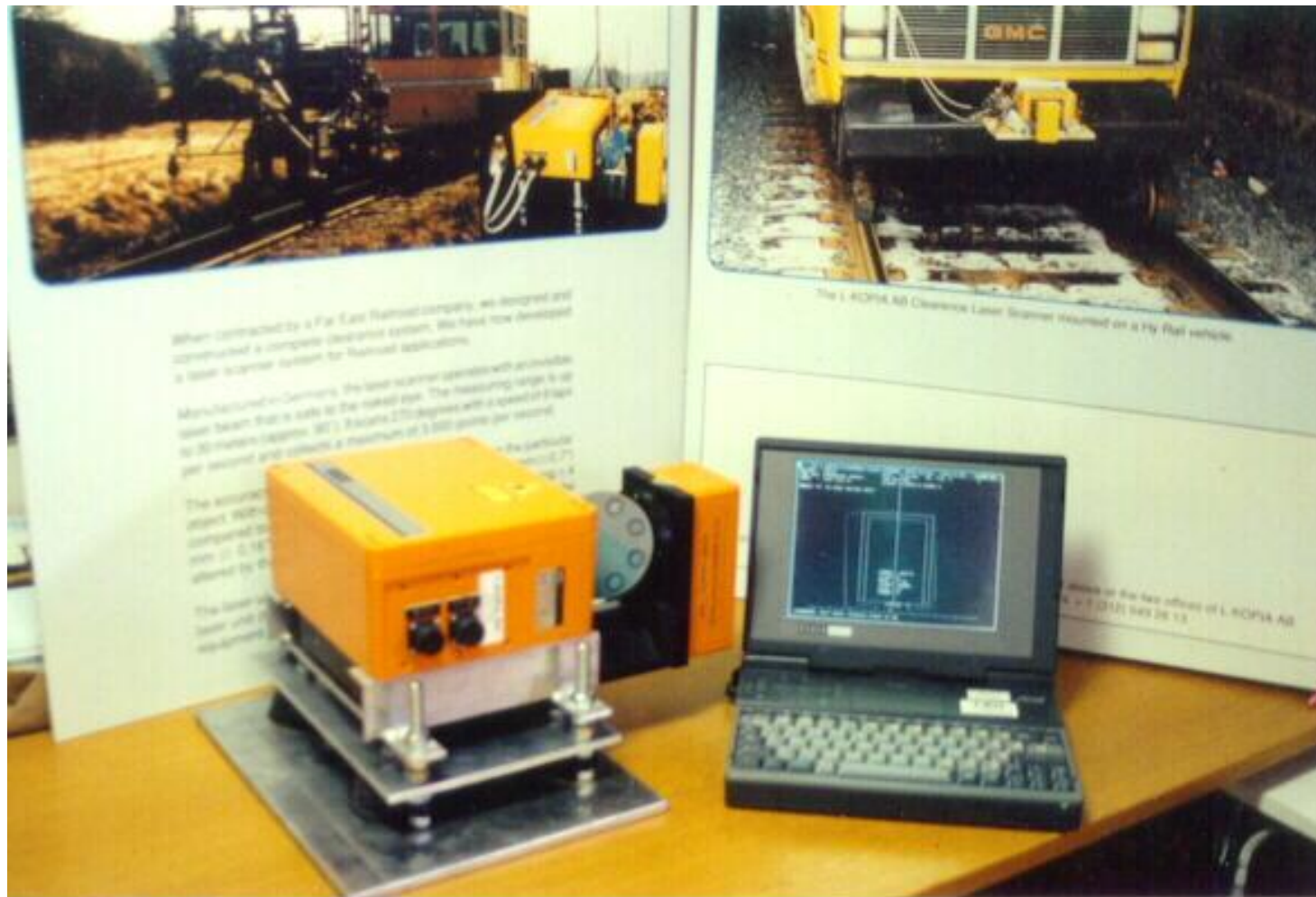


In the mid 80th L-KOPIA teamed up with other smaller Hi-tech companies to improve STEFO and develop the L-KOPIA Clearance Laser System:



Programmer Arne Eriksson of 3-COMP teamed up with L-KOPIA in the 80's 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:

L-KOPIA, Inc.

3810 N Sheffield Ave

Chicago, IL 60613

USA



Jeryl Lundberg is the L-KOPIA cofounder & part owner.



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 trolley to carry the LKO laser system. We also install 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 loggos in 1998:



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

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

The screenshot displays the ClearLoad software interface. On the left, there is a 'Project Data' section with fields for Client, Trk. Seq., Date, Time, Trk. No., Dir., S.F.F., Dist., Frame, Curve, and Structure. Below this is a 'Check from top' button and a photograph of a bridge. A 'Template Build' window is open on the right, showing a table of points and various settings.

Project Data:

- Client: CUSTOMER
- Trk. Seq.: CUSTOMER SUD.
- Date: 10/13/11
- Time: 07:03:03
- Trk. No.: SMI MAIN
- Dir.: WFS
- S.F.F.: 0.8
- Dist.: 000.551
- Frame: 5
- Curve: 1.00
- Structure: 11 MH1000 (115)
- File: D:\FARIAD_IPG_001.DWG

Template Build - CLEARANCE TEMPLATE

Point	X-Coord	Y-Coord	Radius
1	00.00"	1705.01"	00.00"
2	4709.99"	1705.01"	00.00"
3	4709.99"	4708.50"	00.00"
4	5702.99"	4708.50"	00.00"
5	5702.99"	7703.48"	00.00"
6	5702.00"	7703.48"	00.00"
7	5700.20"	12703.01"	00.00"
8	5700.00"	12705.02"	00.00"
9	5700.00"	12705.02"	00.00"
10	5700.20"	12703.01"	00.00"
11	5702.00"	7703.48"	00.00"
12	5702.99"	7703.48"	00.00"
13	5702.99"	4708.50"	00.00"
14	4709.99"	4708.50"	00.00"
15	4709.99"	1705.01"	00.00"
16	00.00"	1705.01"	00.00"
17	00.00"	00.00"	00.00"
18	00.00"	00.00"	00.00"
19	00.00"	00.00"	00.00"

Template Build Settings:

- Remote Template: Remote Enable:
- Template ID: (16)
- Select template: New Equip
- Select template: New_Equip
- SD/2:
- Minus points:
- Insert Point:
- Delete Point:
- Copy Template:
- Import LDF:
- Line width: 2
- Feet only:
- X-Units: -15'0"
- Y-Units: -24'11"
- Gauge from row file:
- Factor inside (mm): 0
- Factor outside (mm): 0
- Truck Center: 58'11"
- Beginning Load: 10'00.0"
- End Load: 63'11.0"
- Save in old Template format:
- This is a fixed template:

COMPOSITE Data:

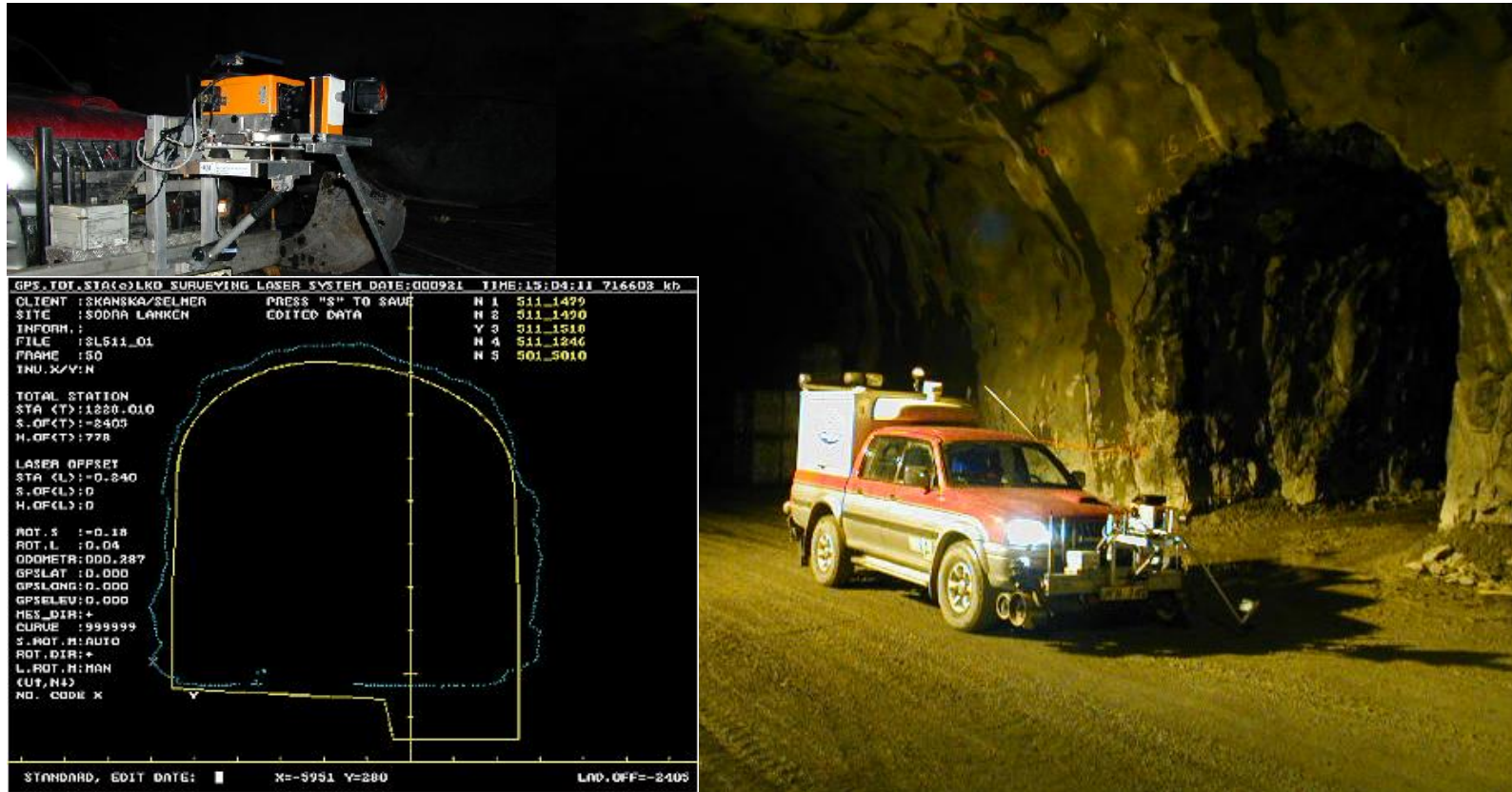
Curve Position: X= 7'03.8" Y= 41.1" Scale Offset: 0.0

Arrow Position: X= 2'01.4" Y= -05.4"

Polar Coordinates (Metric): D= 2239 A= 348.3 Z-Coord: 0.501

L-KOPIA's first ClearLoad software was developed in 1985 and is today a very advanced simulation program with pictures of structures integrated with data. Above is a sample of a transformer going through a TT Bridge.

LKO/L-KOPIA also perform non-track related projects:



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

New 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 with 100% (compared to our earlier B1 laser). The pictures are from the first project in Illinois in November of 2004.

L-KOPIA also perform 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:



Supervisor Gary Mitchell (right) is a traveling man and averages 200 field days a year. This March picture from Kansas also shows Andy Köster, LKO Sweden, who started with Gary in 2006.

LKO hires Supervisor/ Electronic 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 our electronic expert.

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



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



Above is our L-KOPIA/LKO Load Measuring System in Monterrey, Mexico.

And some more of our worldwide operations:



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



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

Now to the latest and fastest:



The NEW LKO/L-KOPIA Z+F Clearance Laser System was introduced in 2012. The new system is capable of 200 Hz scanning speed, more than 10 times faster than earlier hardware.

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.

And more tests in 2013:



Programmer Jesper Engberg of Barra and programmer Peter Einvall of 3-COMP are two very important team members for the integration of the Z+F Scanner with LKO / L-KOPIA software.

And now in full production mode:



The new 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.

And more ongoing Projects in Sweden:



A Swedish Rail Administration (Trafikverket) project in snowy Fagersta in February of 2013.

THE END!!

Thank you very much for watching our anniversary slide show and please visit our website again soon. We add news every month and do not hesitate to contact us if you have any questions:

www.lko.se



www.l-kopia.com

