

From Surveying to Geomatics 1990 - 1995

Adam Chrzanowski

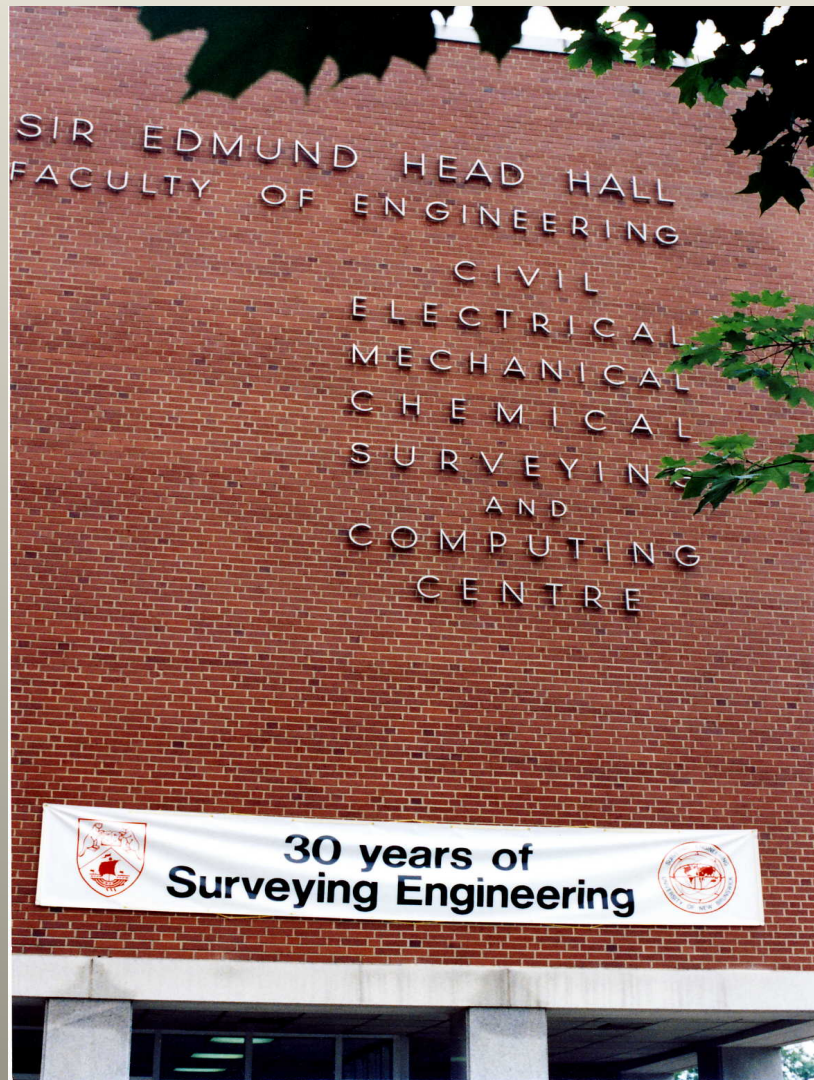
Chair 1991 - 1995



1990



30 Years of Surveying Engineering



Ceremony of Unveiling SE Monument



“Fathers” of SE Dept. unveil the SE Monument



SE Monument



Special Guests



30th Birthday Banquet



Good Old Friends and Lobsters



After the Lobster



Prof. Konecny and Marie, our “typewriter”



Gottfried Konecny was presented with a new map of Fredericton



BUSY 1990s

- **Over 70 graduate students**
- **Expansion of Research and Development in**
 - Ocean Mapping,
 - Engineering and Mining Surveys
 - GPS and Satellite Navigation,
 - Land Management
 - GIS
 - Remote sensing
- **In 1991-1994, over 30 projects in applied research**

1991 - Expansion of Ocean Mapping Group

Larry Mayer becomes Chair of Ocean Mapping



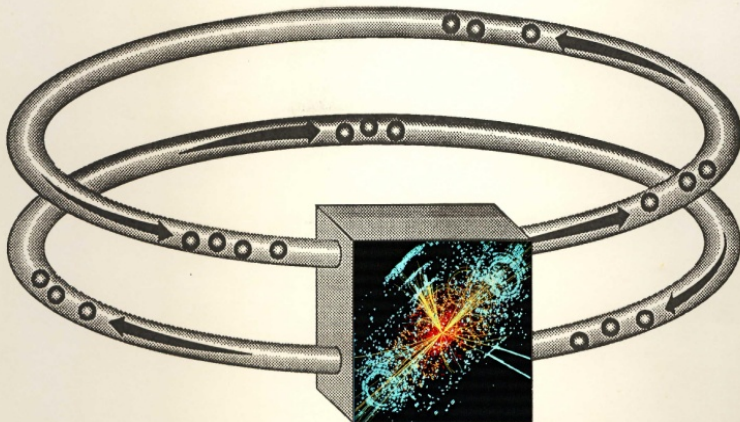
1991-1994 Superconducting Super Collider in Texas

SUPERCONDUCTING SUPER COLLIDER

U.S. Dept. of Energy \$10 billion / 10 years

The main purpose: to better understand matter and energy through a simulation of the **BIG BANG**, *the creation of our universe.*

Collision of protons at energies of 20 TeV.
100 million of collisions per second, to find the smallest (smaller than *quarks*) particles of atoms.



12000 magnets to be aligned in a perfect geometrical plane along an 87 km path in a tunnel of 4 m diameter with an accuracy of 1 ppm !!

UNB to provide design of geodetic control and tunneling Surveys



Geodetic Control for 87 km SSC Tunnel

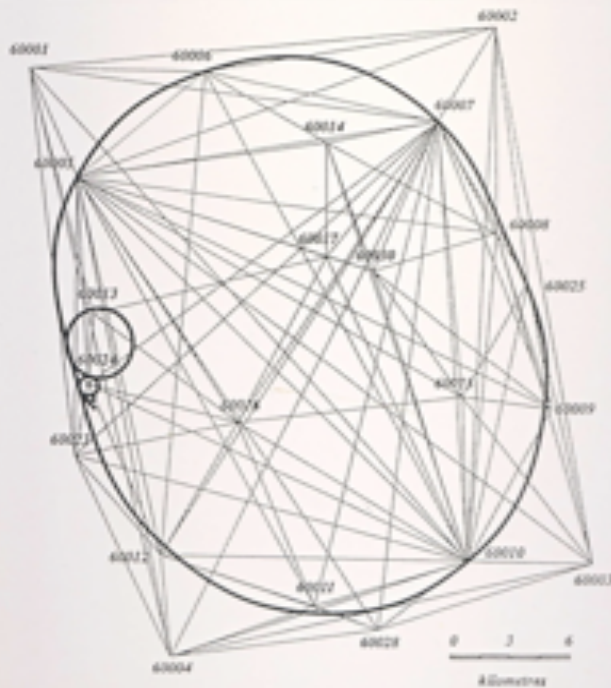
GPS PRIMARY CONTROL NETWORK

22 stations, 230 observed baselines, $df = 627$

Accuracy (st. dev.) of the observed horizontal baselines:

$$\sigma = \sqrt{(3 \text{ mm})^2 + (10^{-7} S)^2}$$

Maximum relative error ellipse (at 99%) : $a_{99\%} = 6.0 \text{ mm}$



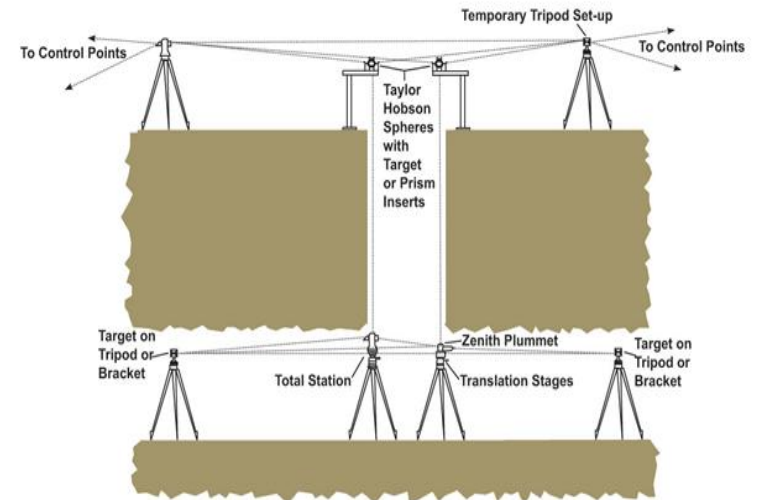
Out of a total of 18 geodetic engineers employed on the project, 14 were UNB graduates, who specialized in engineering and mining surveys

Geodetic Control for SSC Tunnelling Surveys

Unprecedented accuracy requirements of 1 ppm



Shaft Transfer

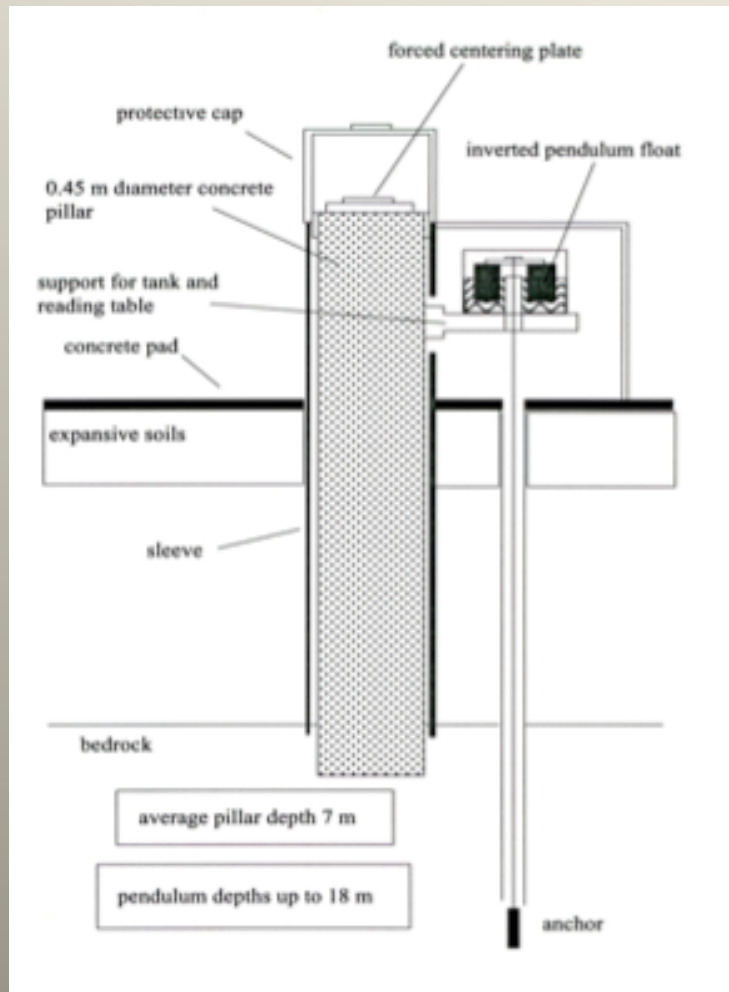


Transfer of Horizontal Control

Source: Adam Chrzanowski

www.jnei.com

Monumentation of Main Control Points with the use of inverted plumb-lines



Control monument with the inverted plumb-line at the Site of Super Conducting Collider in Texas



Canadian Centre for Geodetic Engineering

SSC Vertical Control

VERTICAL CONTROL NETWORK

(Precision levelling)

680 km • 349 BMs • $df = 450$

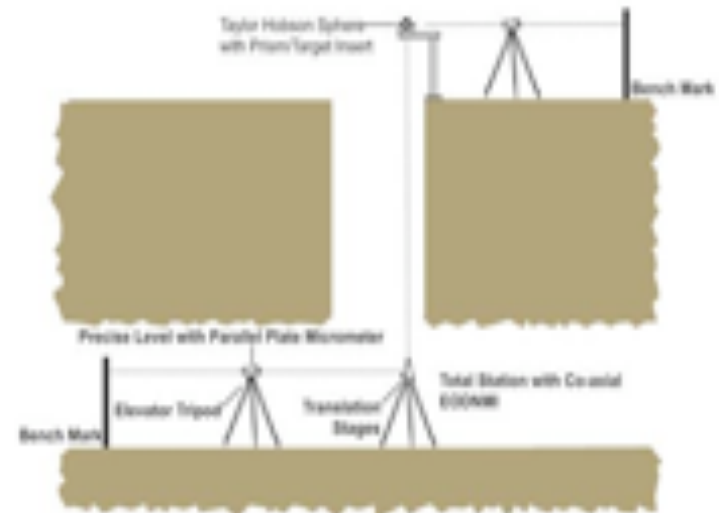
Accuracy of observations (standard deviation):

$$\sigma = \sqrt{(0.8\text{mm}\sqrt{L})^2 + (0.36\text{mm}L)^2} \quad \text{where } L \text{ in [km]}$$

Maximum relative positioning error (at 99% prob.) = 5.7 mm



Shaft Transfer



Transfer of Vertical Control

Source: Adam Chrzanowski

www.jnei.com

The First Break-through !

Tunnel of Superconducting Super Collider in Texas



SSC Tunnelling Breakthroughs



TUNNELLING BREAKTHROUGHS

SECTION	L[km]	Lateral	Longit.	Vertical
N20 – N25	4.3	17 mm	4 mm	5 mm
N25 – N30	4.3	12 mm	5 mm	6 mm
N40 – N45	4.3	18 mm	1 mm	3 mm

In 1997 (!), The Maclean's Guide to Canadian Universities gave the statement concerning UNB:

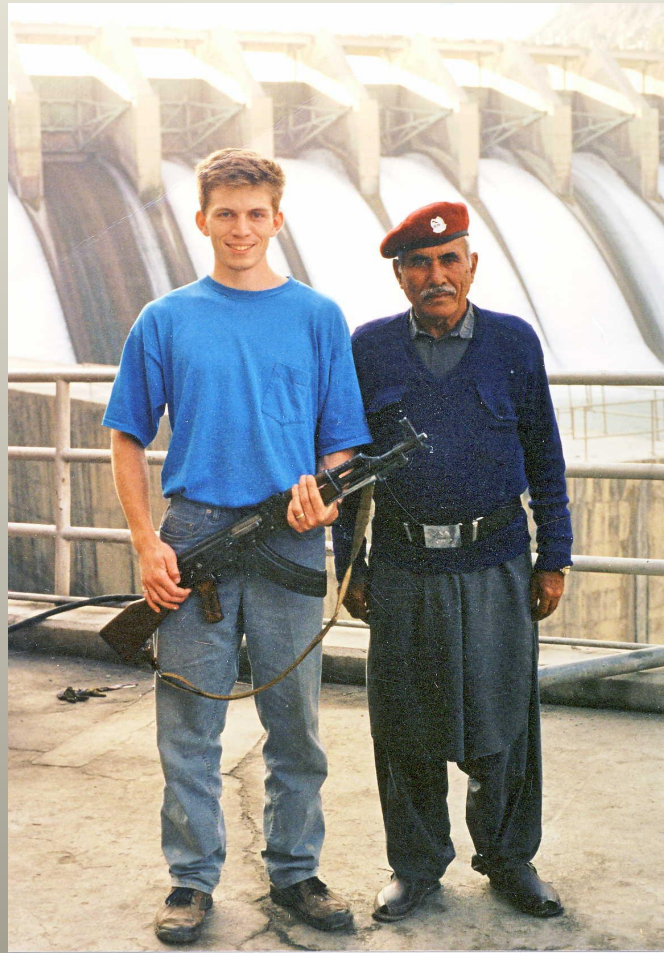
“ New Brunswick's engineering strengths are further underscored by the achievements of its geodesy and geomatics department. Five graduates of the program – which is considered to be the best in North America – worked with faculty member Adam Chrzanowski on the design of one part of the proposed supercollider that was scheduled to be finished by the end of the century in Waxahachie, Tex. at a cost of \$10 billion..... The project of that scope had never before been attempted. **As a result, the university's involvement excited international attention and raised its prestige”.**

Busy 1990s

Monitoring of deformations at Warsak Dam on Kabul River in Pakistan



Warsak Dam - Who is guarding whom?



1994 – Change of Name

Why to change? To reflect the expanding role of Surveying and Mapping, space technology, computerization of geo-information systems, automation of field surveys and data processing, etc.

SOME PROPOSED NAMES:

- Geoinformation
 - Geodetic Engineering
 - Geo-spatial Engineering
 - Geographic Engineering
- and various combinations of above

Pressure from outside: GEOMATICS!!??

- Departmental **RULE: ALL BUT ONE MUST ACCEPT**



The name Geodesy and Geomatics Engineering Approved (1994)



Preparations for the opening of “New” GGE Offices



...and from then on, they lived long and
happily...

HAPPY 50th BIRTHDAY !!!

100 years, 100 years...

see you there !