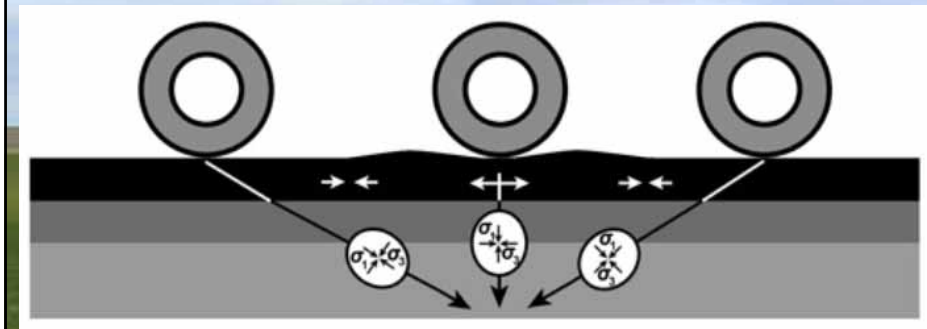
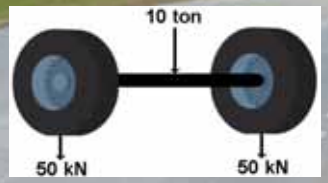
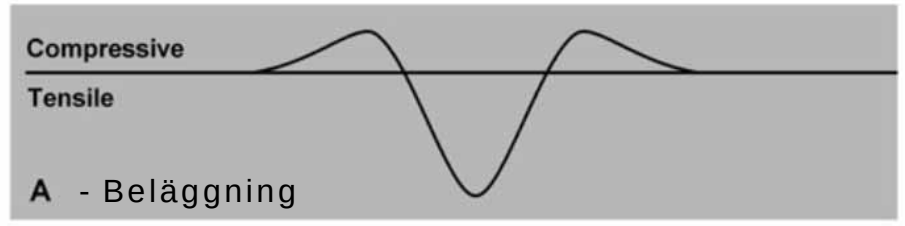
Rullande bärighetsmätning, möjligheter och utmaningar

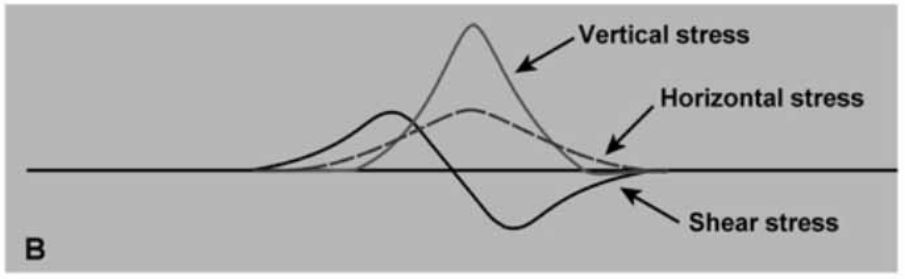
Asfaltskolan

Asfaltdagarna
2022-11-23/24
Martin Wiström

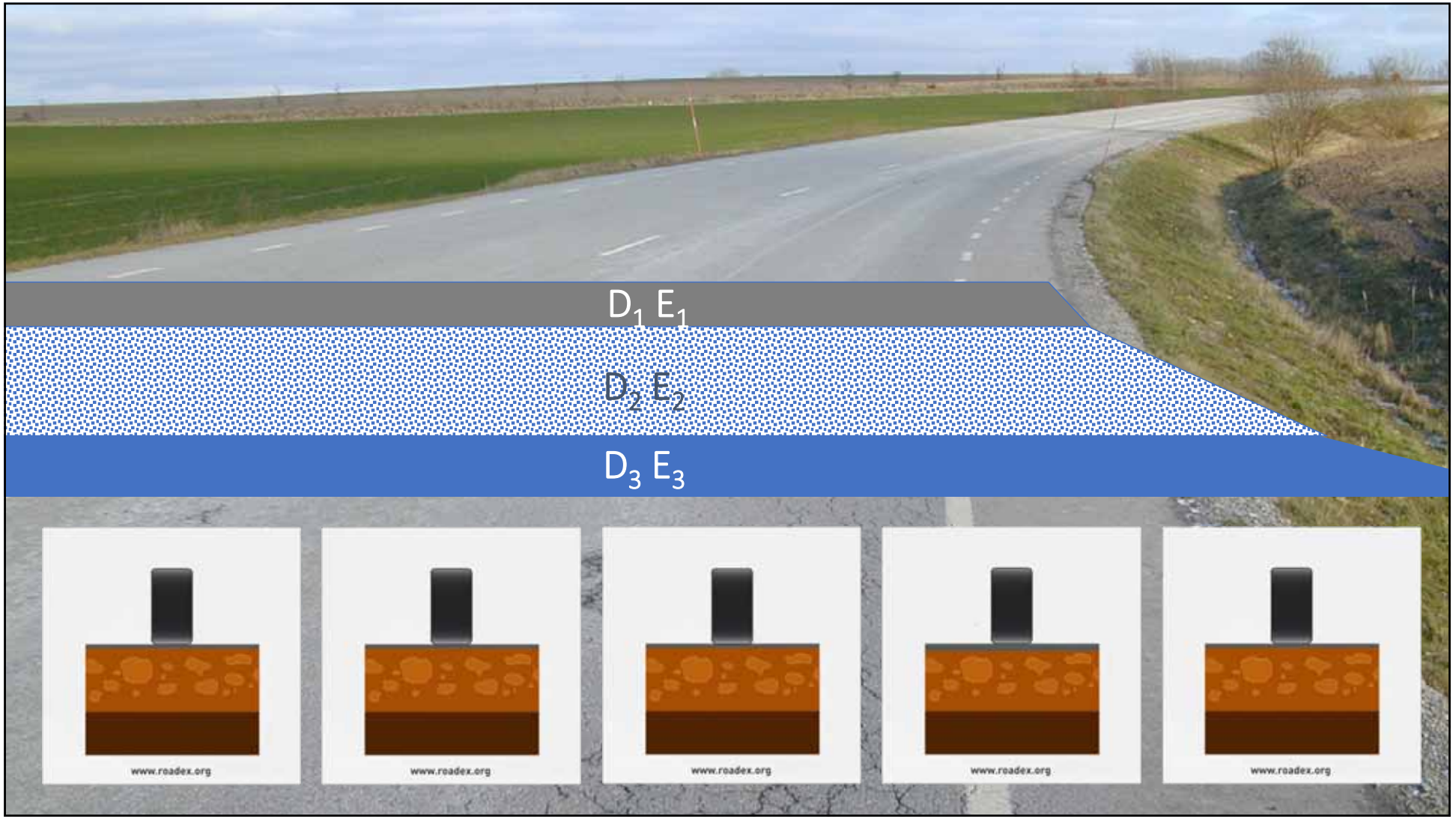








Dynamiska laster i en överbyggnad


D_1 E_1
D_2 E_2
D_3 E_3
www.roadex.org
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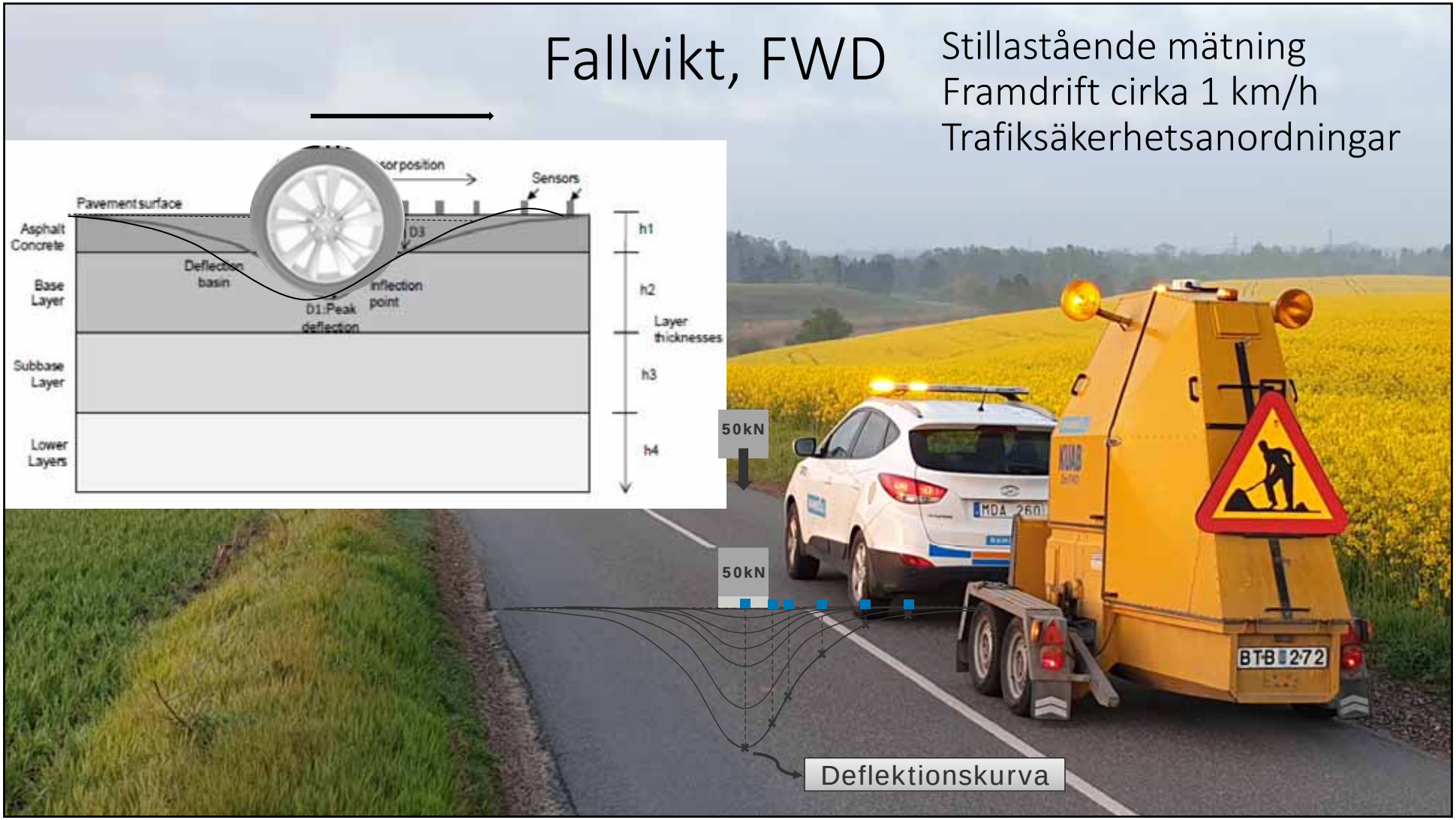
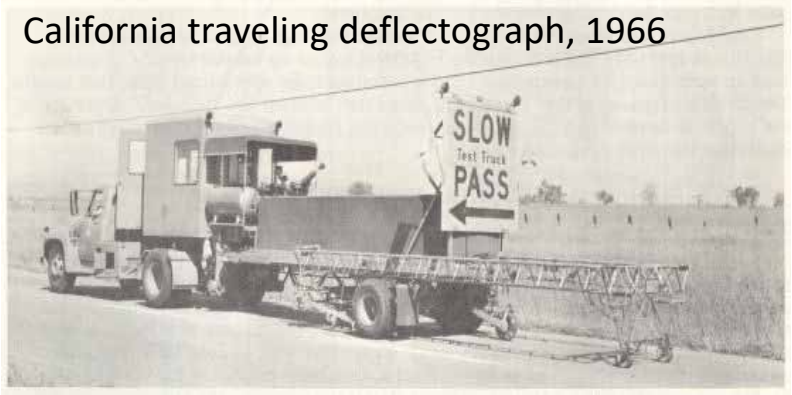
Fallvikt, FWD

Stillastående mätning
Framdrift cirka 1 km/h
Trafiksäkerhetsanordningar



En historisk återblick

California traveling deflectograph, 1966



Quest Qi2 RWD, 1990's

French Curviameter, 1977

Rolling Wheel Deflectometer (RWD)

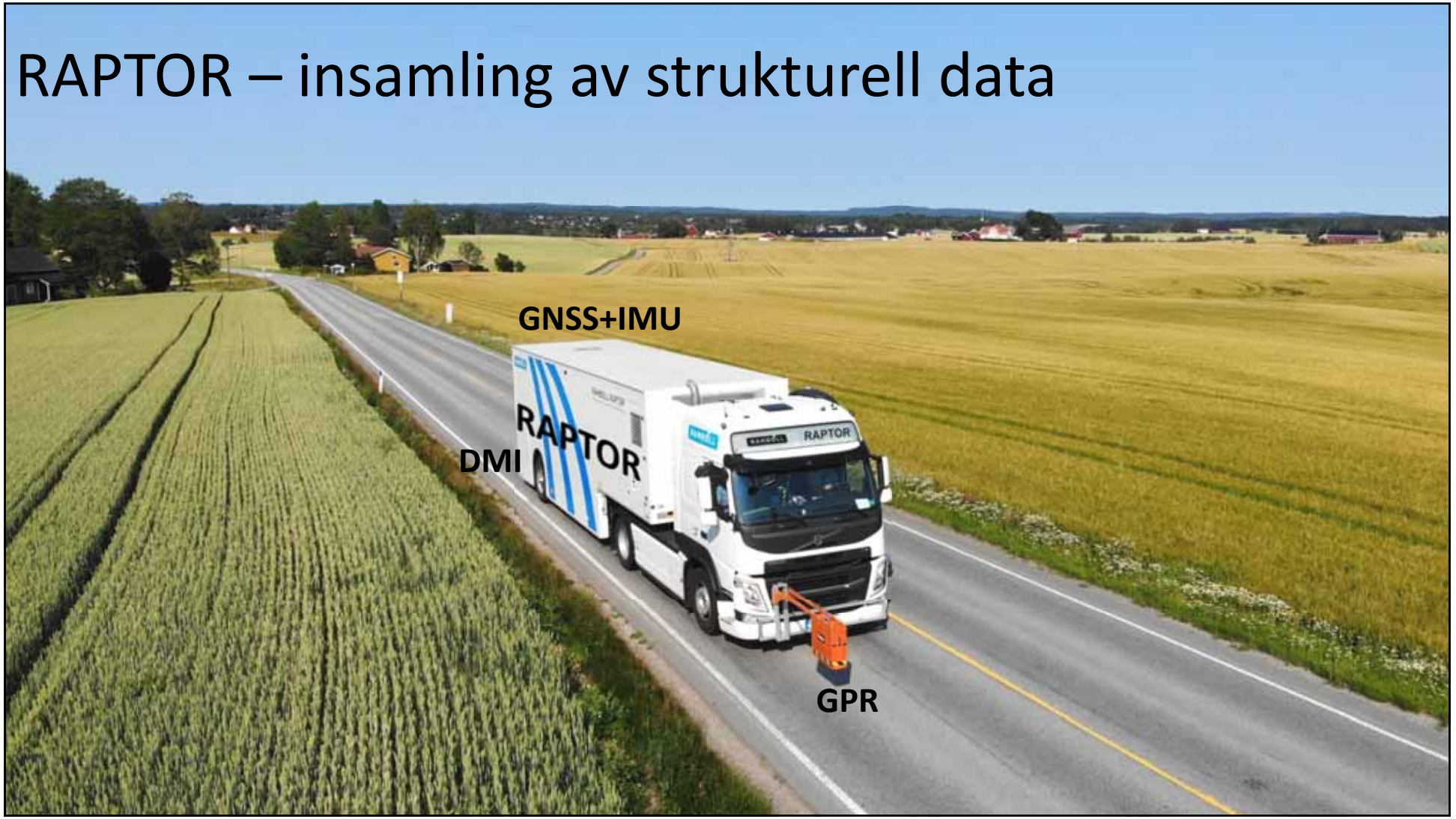
90 km/h

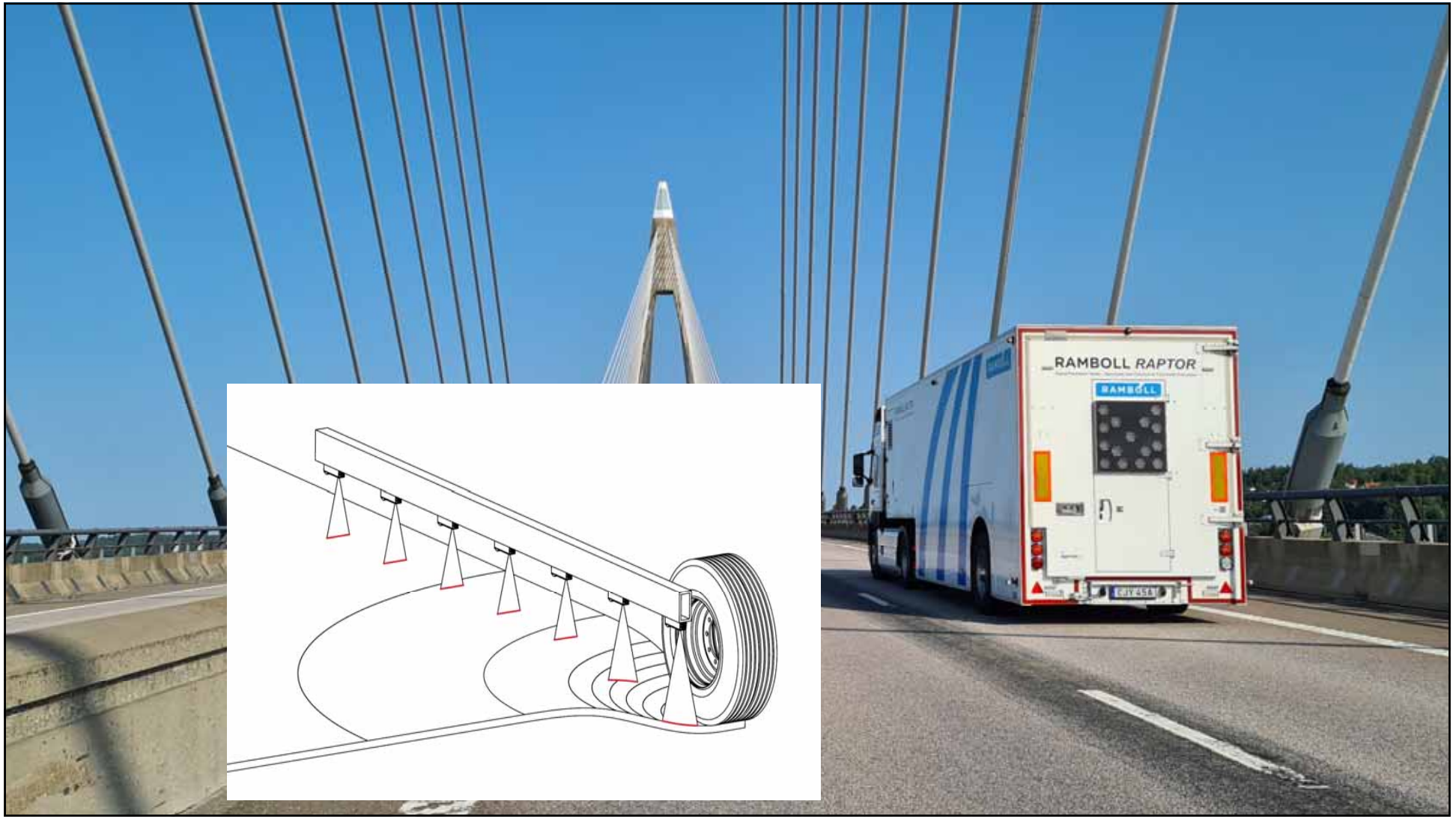
RWD – Rolling Weight Deflectometers

Doppler-laser, mäter ytans hastighet
Kalibreras mot broytor
Integrerad GPR mm

Linje-laser, mäter avstånd/yta
Inbyggt kalibreringssystem
Integrerad GPR mm

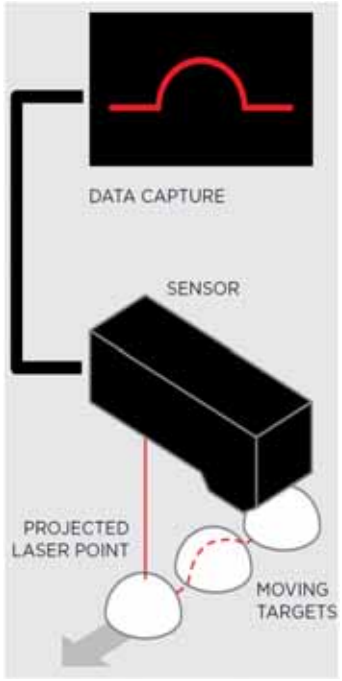
RAPTOR – insamling av strukturell data

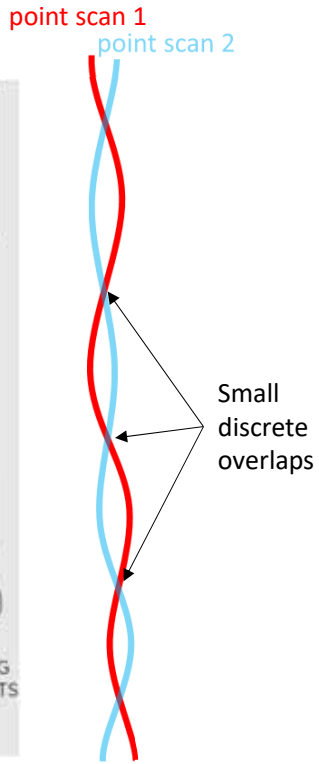



RAMBOLL RAPTOR
RAMBØLL

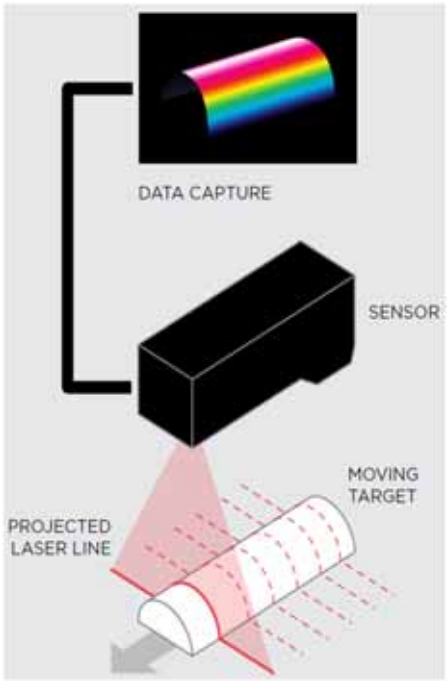
The Raptor technology

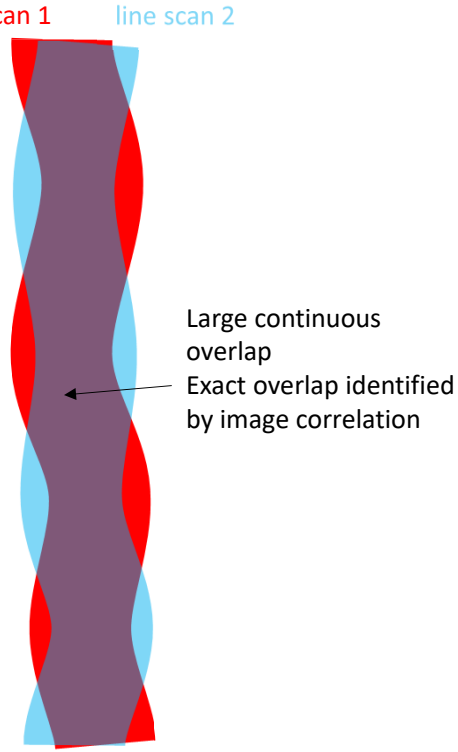
Point laser





Line laser





The Raptor technology

Image *i*

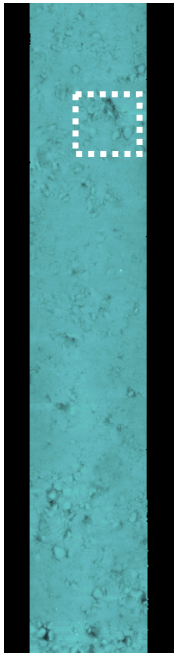
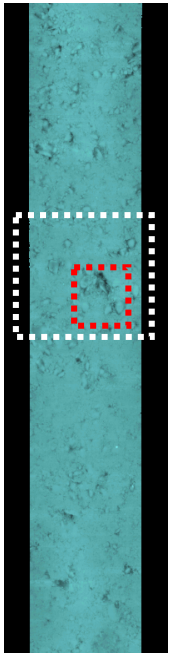
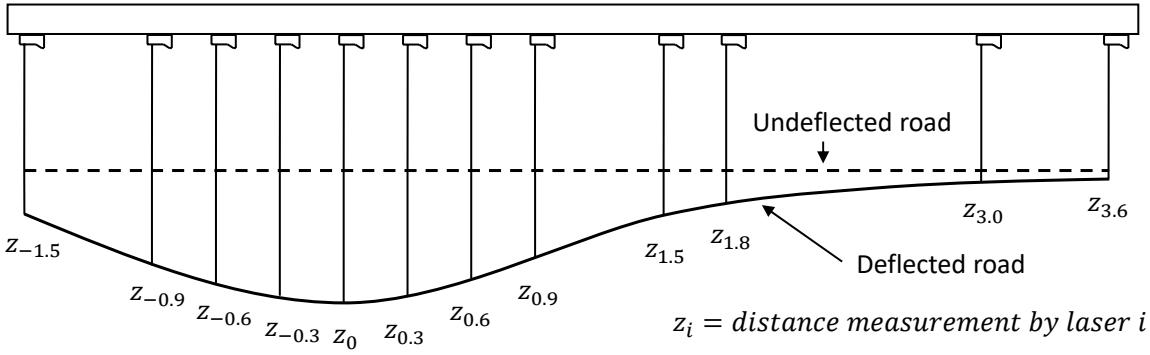


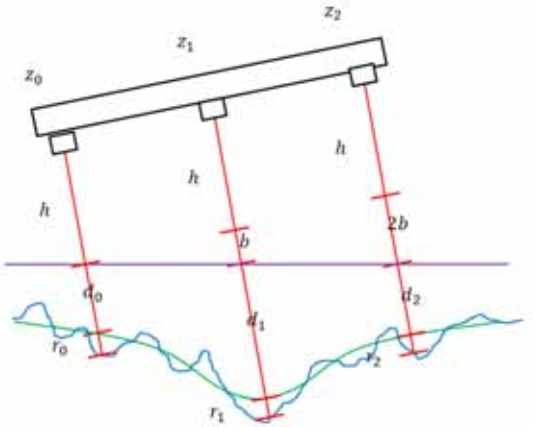
Image *i + 1*

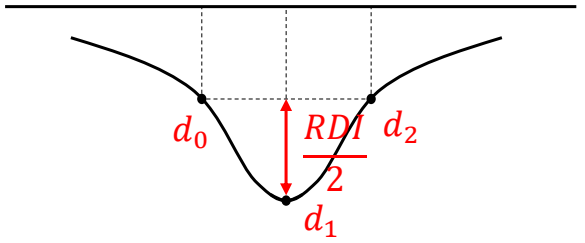


Carbon fiber beam carrying 12 line lasers



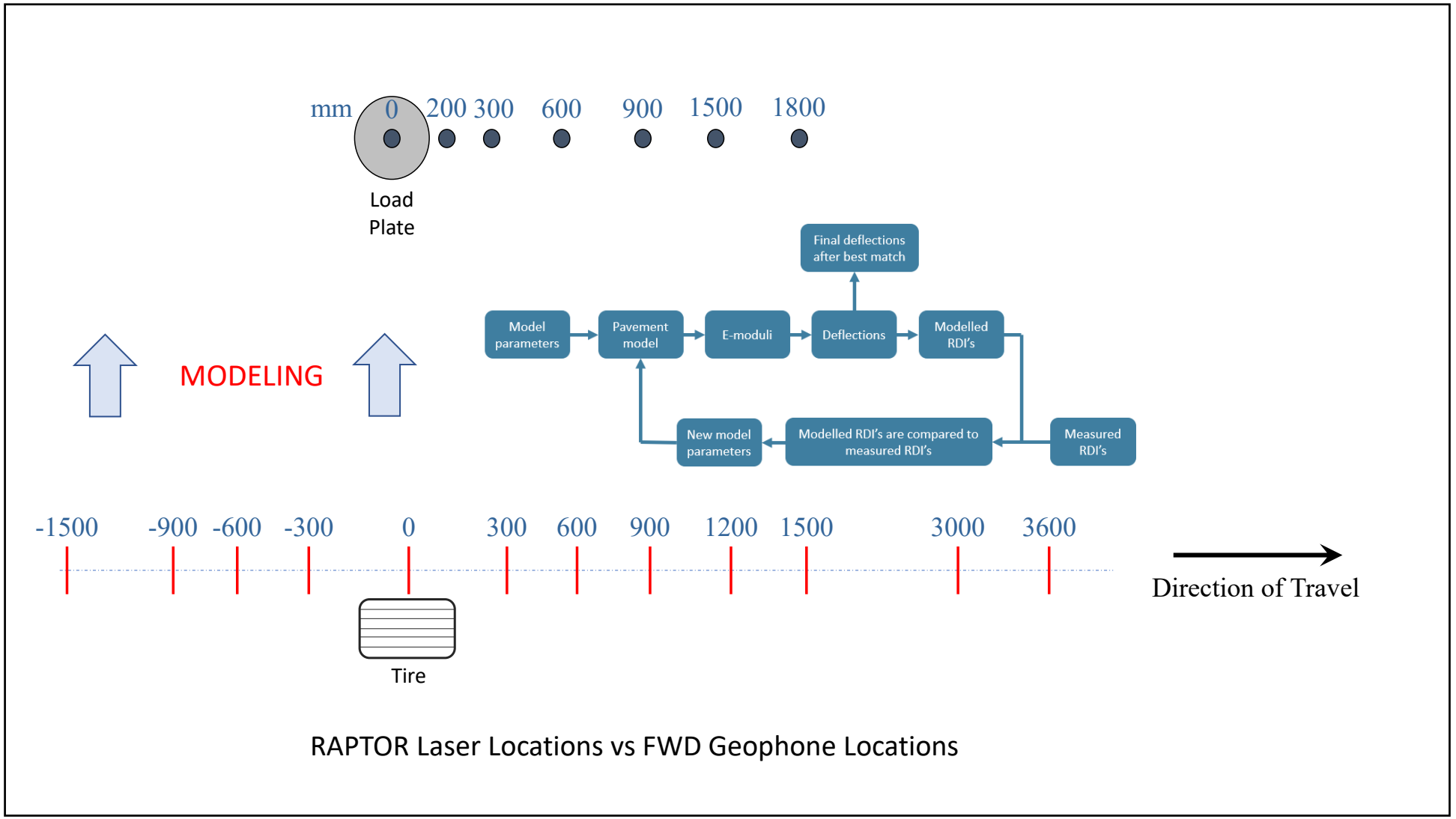
$z_i = distance\ measurement\ by\ laser\ i$



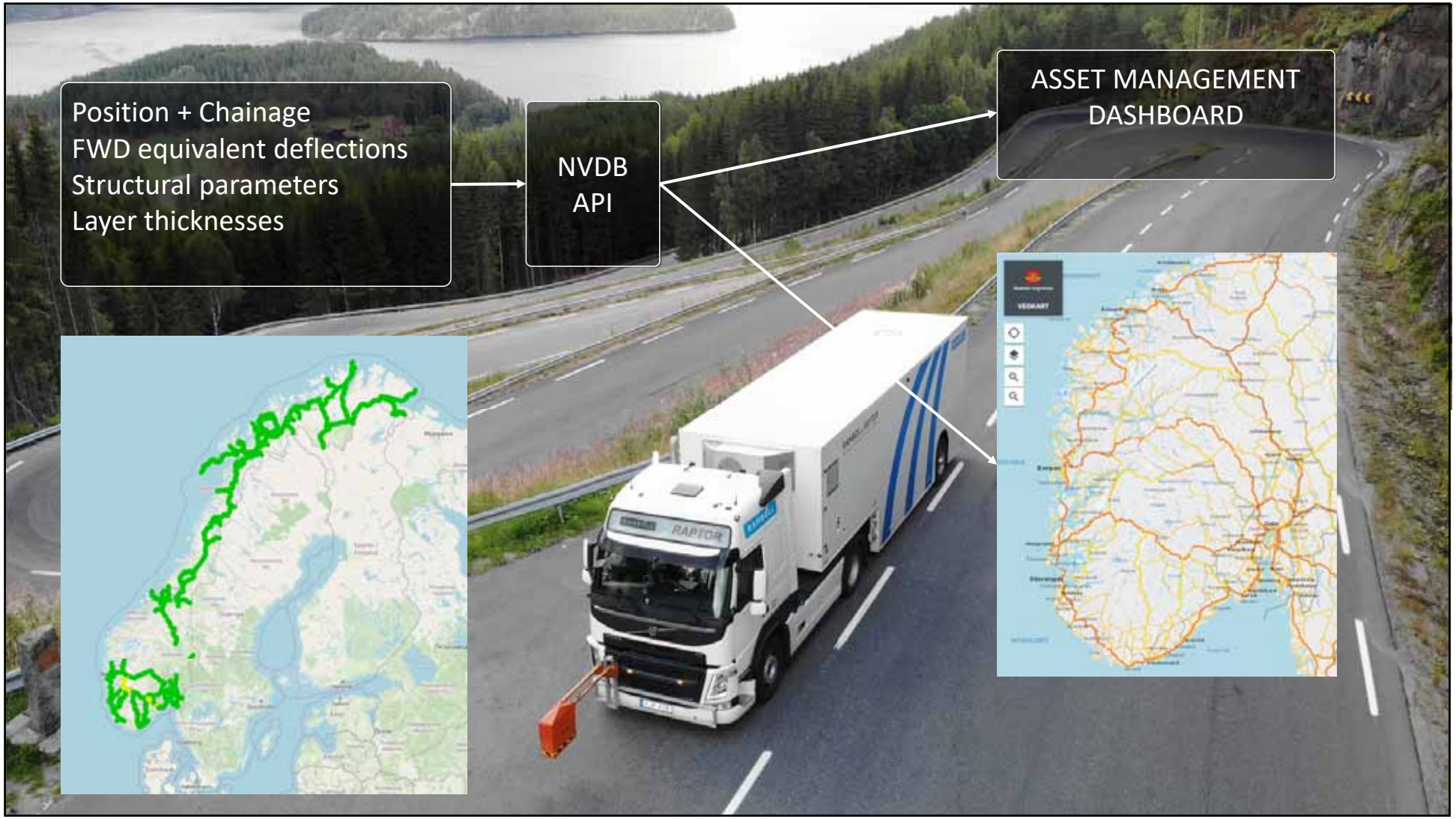


$Raptor\ Deflection\ Index, RDI = d_0 - 2d_1 + d_2$

Data from 12 sensors is combined to calculate 22 different RDI´s



RAPTOR Laser Locations vs FWD Geophone Locations


Position + Chainage
FWD equivalent deflections
Structural parameters
Layer thicknesses
NVDB
API
ASSET MANAGEMENT
DASHBOARD
RAPTOR

FWD
- 400 Punkter
- c/c 50 m
- 10 h mätning

Raptor
- 2000 Punkter
- c/c 10 m
- 20 min mätning

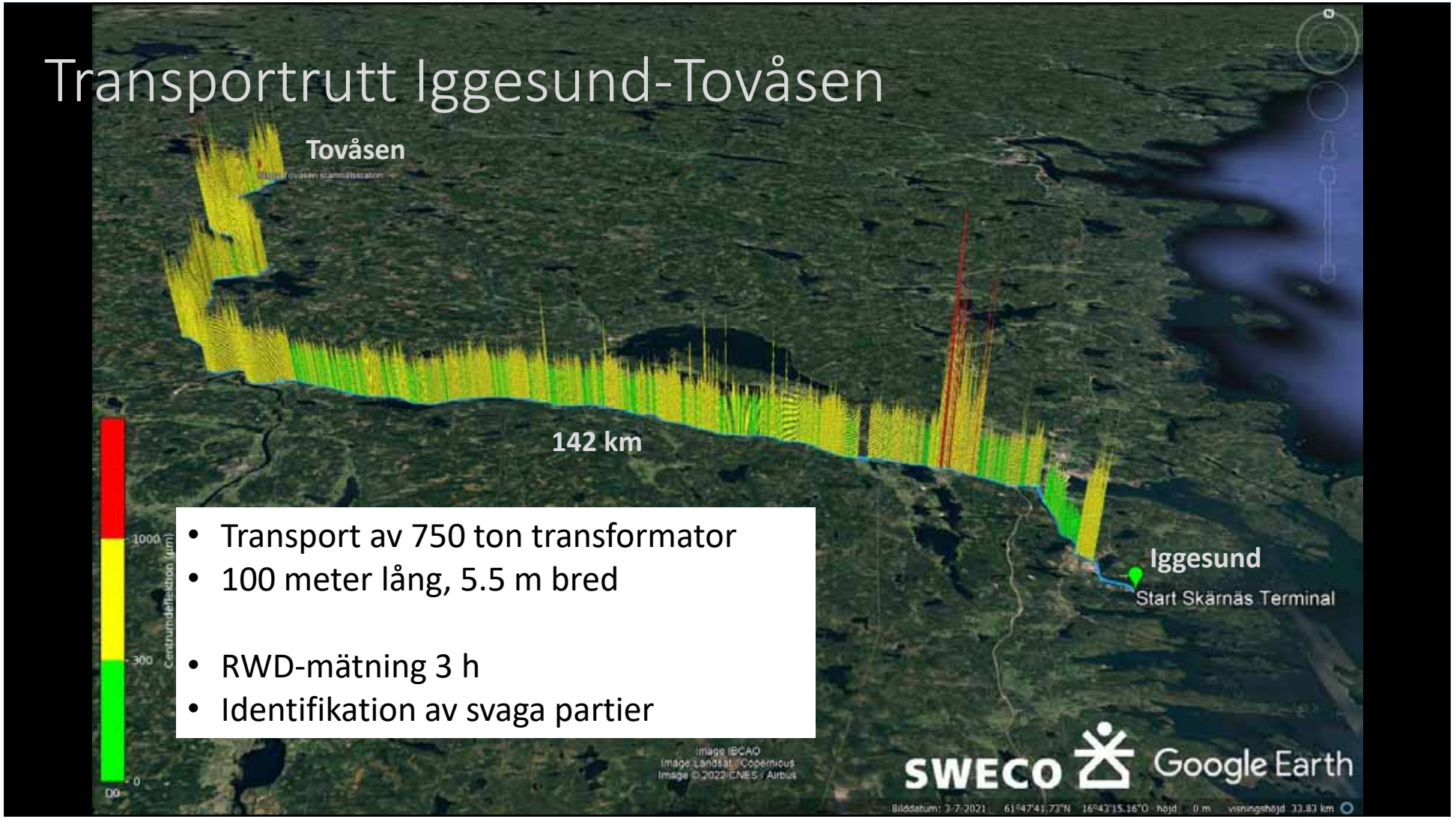
E4 Arlanda - Glädjen

Ursprunglig fältplan

- FWD: K1, K2, VR
- 40 h mätning, 5 nätters avstängning
- 3-4 TMA + störning tredje man

Justerad fältplan

- FWD gles mätning + Raptor
- 6 h mätning, 1 nätters avstängning
- 3-4 TMA + störning tredje man



- Transport av 750 ton transformator
- 100 meter lång, 5.5 m bred

- RWD-mätning 3 h
- Identifikation av svaga partier


Rullande bärighetsmätning, möjligheter och utmaningar
RAPTOR
RAMBOLL