



Digitalisering av anleggsbransjen

Øyvind Engelstad
EVP Technical Operations
SN Power AS



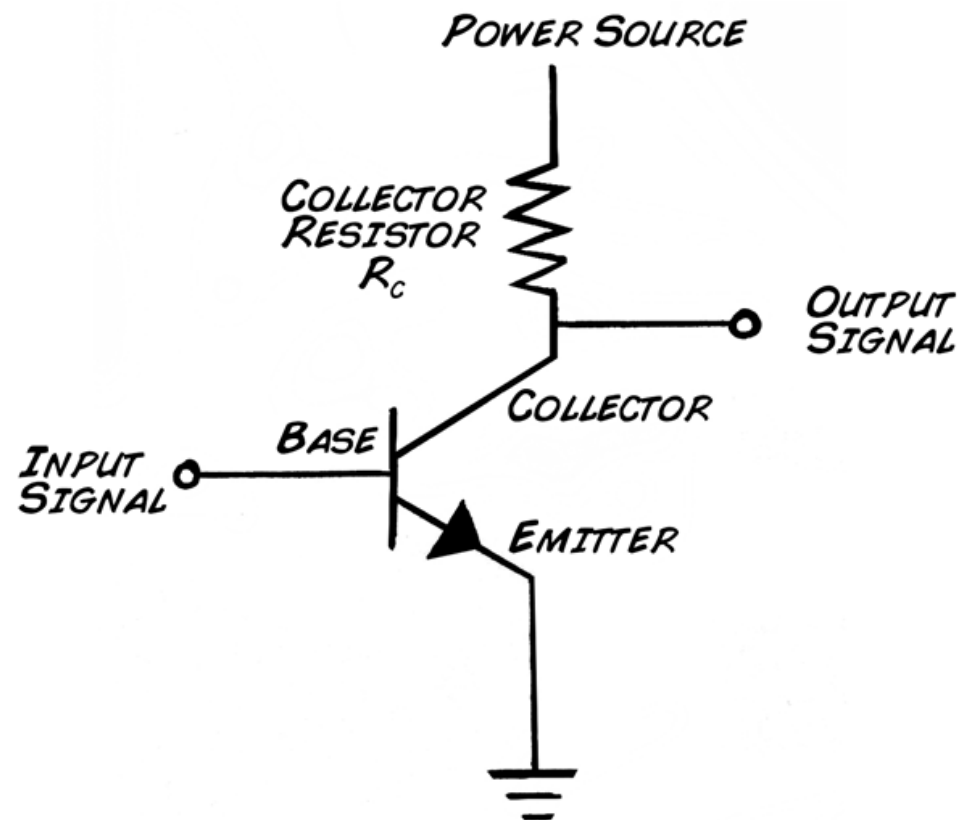


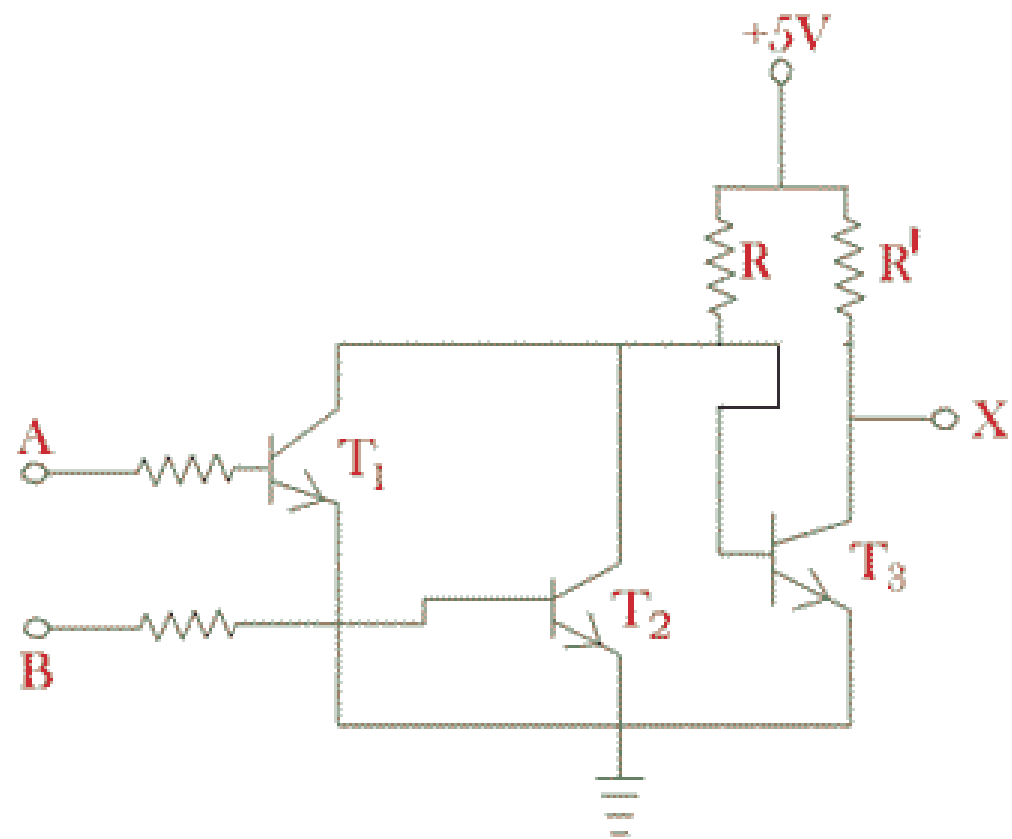
Joseph Marie Jacquard in 1804



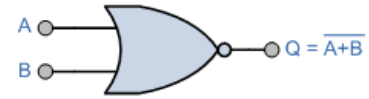
JACQUARD MARCHINE 1804



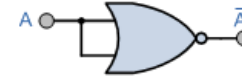




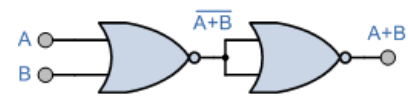
NOR Gate Symbol



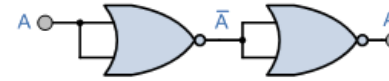
NOT Gate
(Inverter)



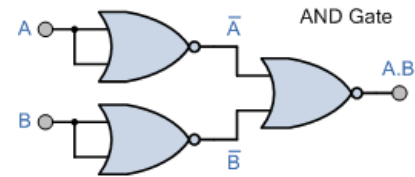
OR Gate



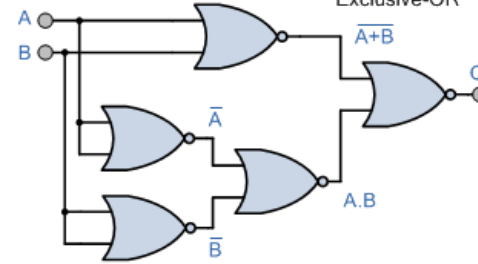
Buffer



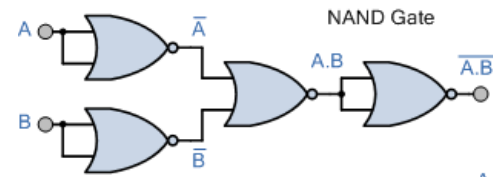
AND Gate



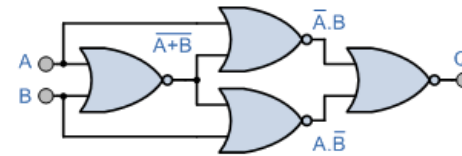
Exclusive-OR

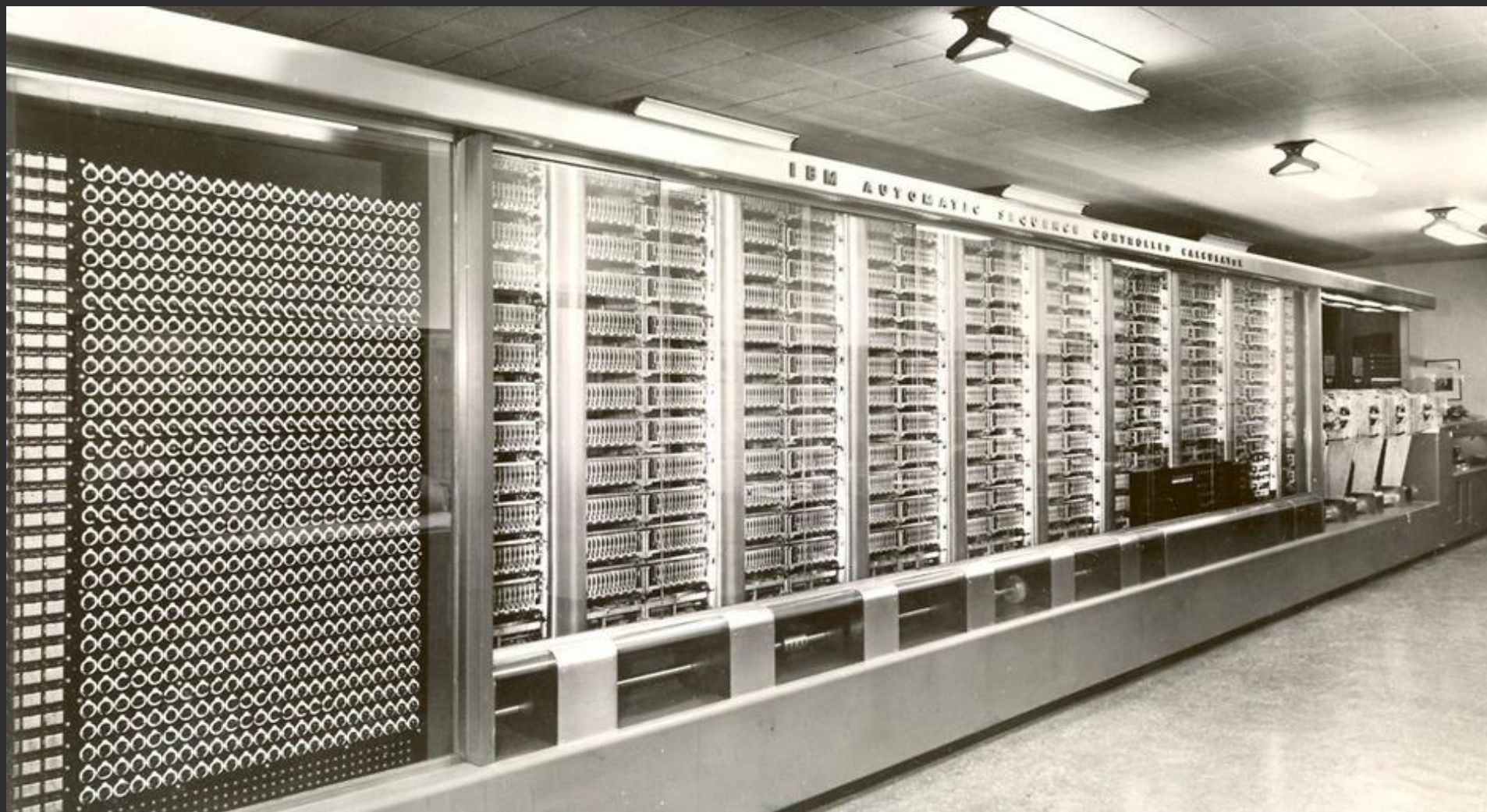


NAND Gate

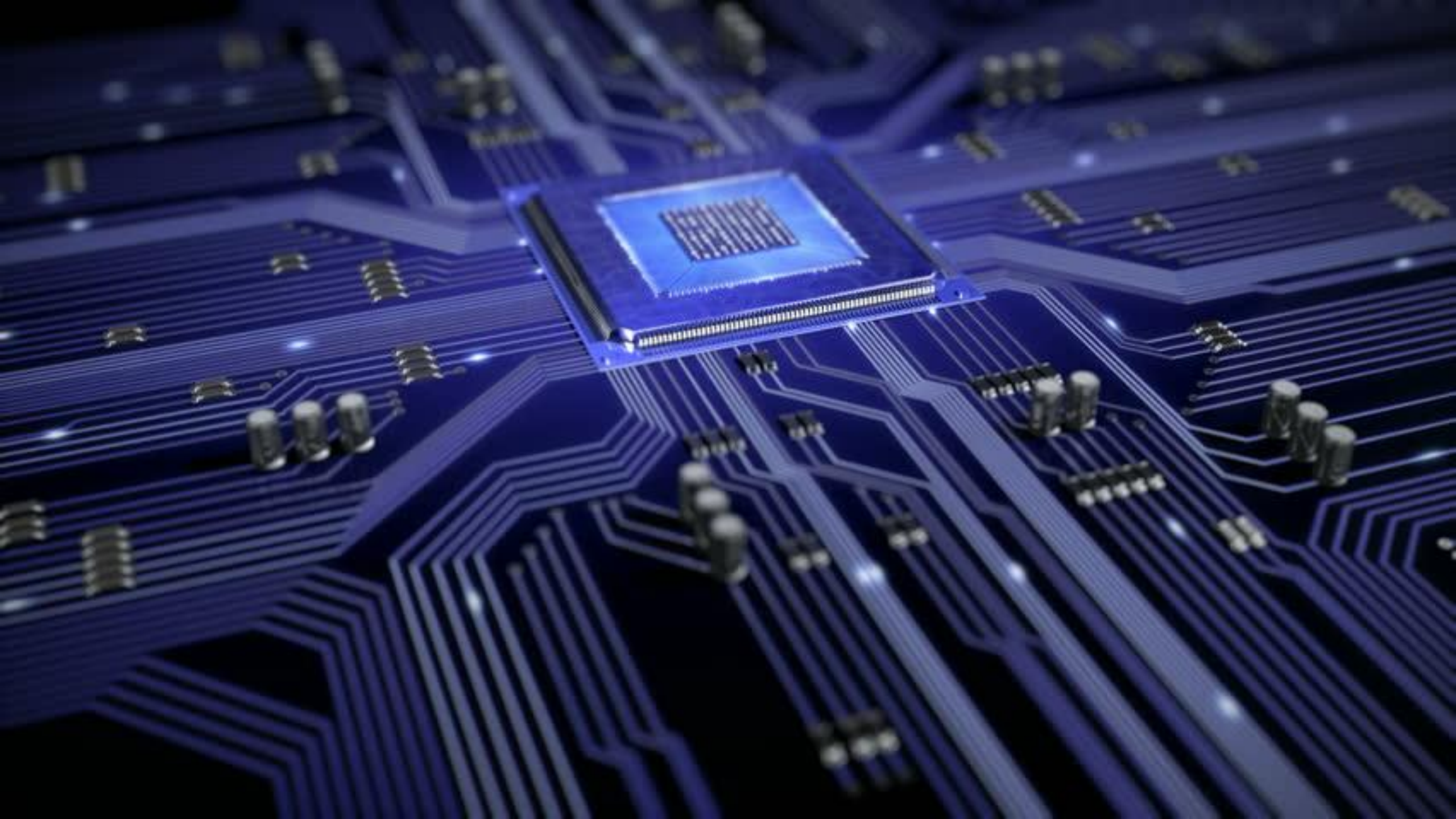


Exclusive-NOR



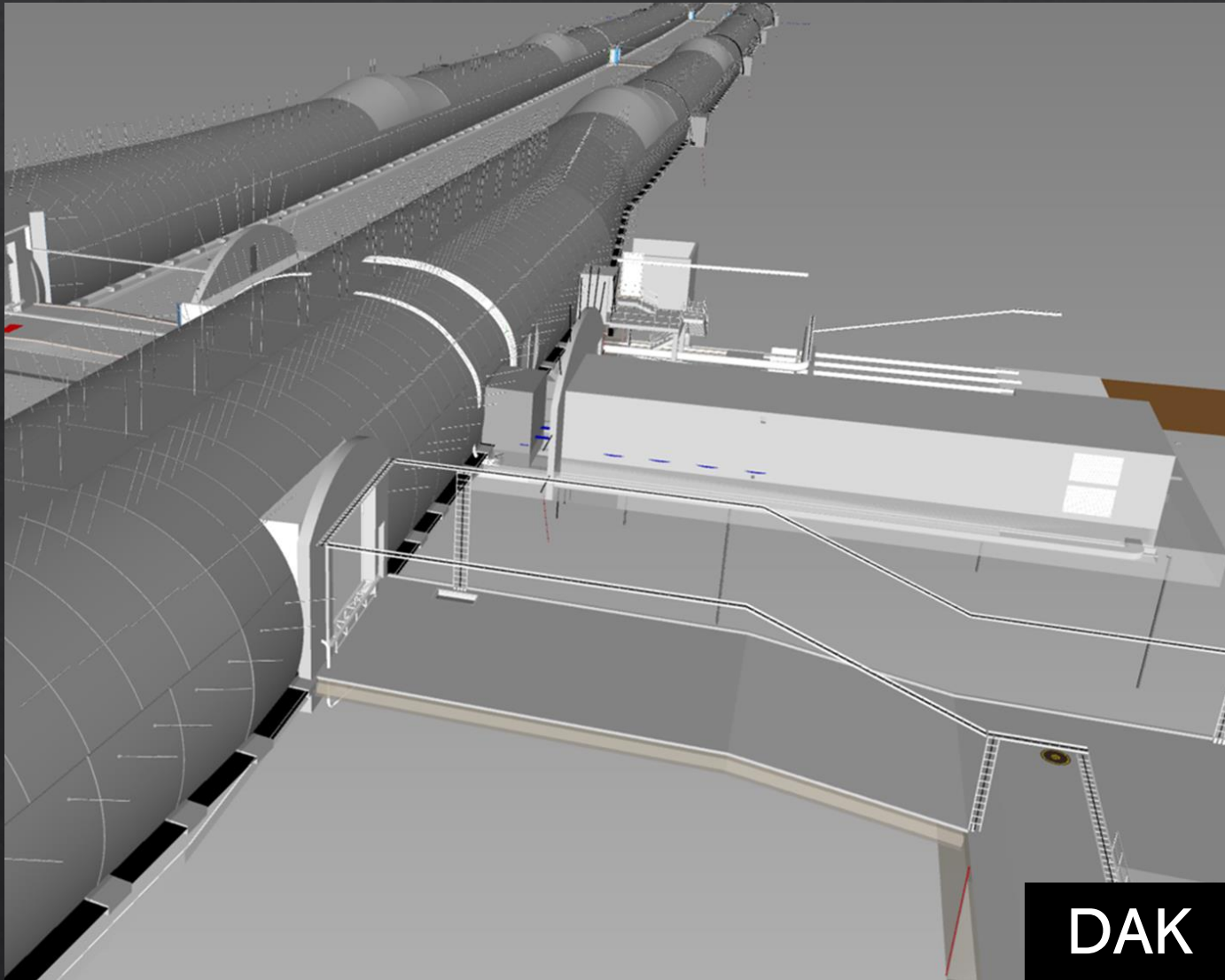


MARK 1 - 1944

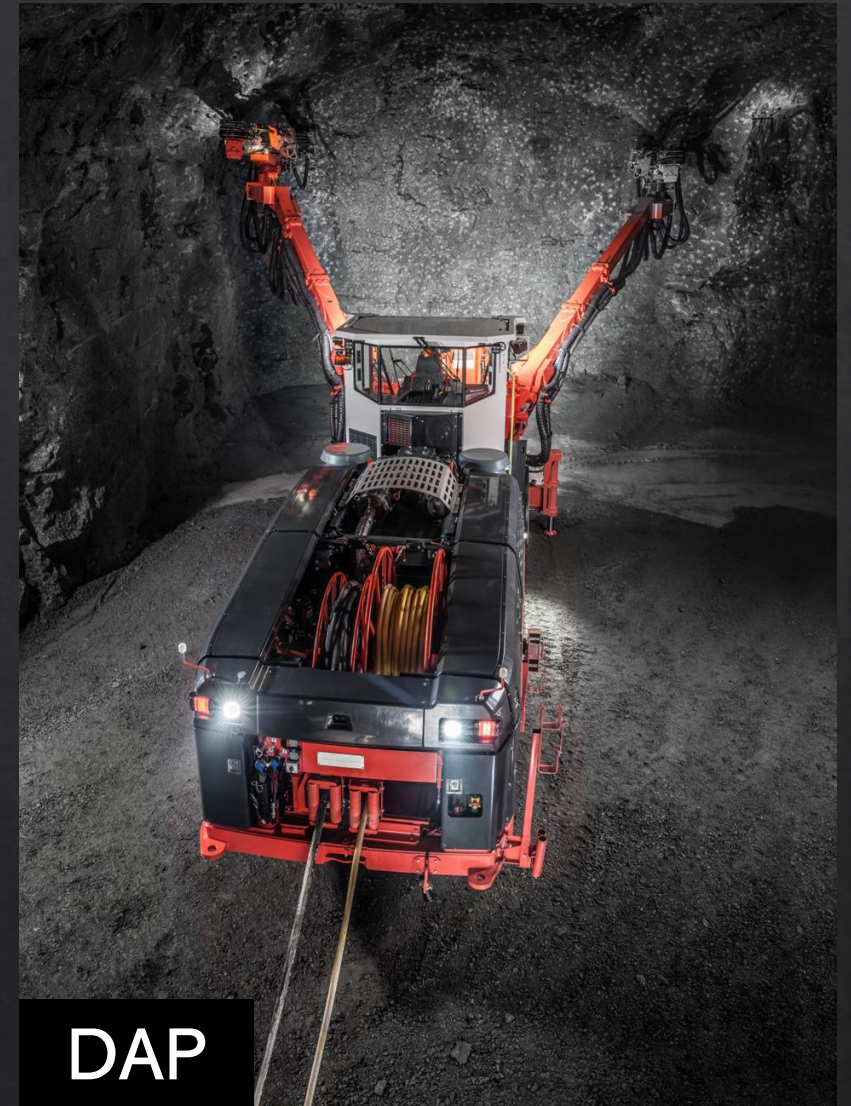




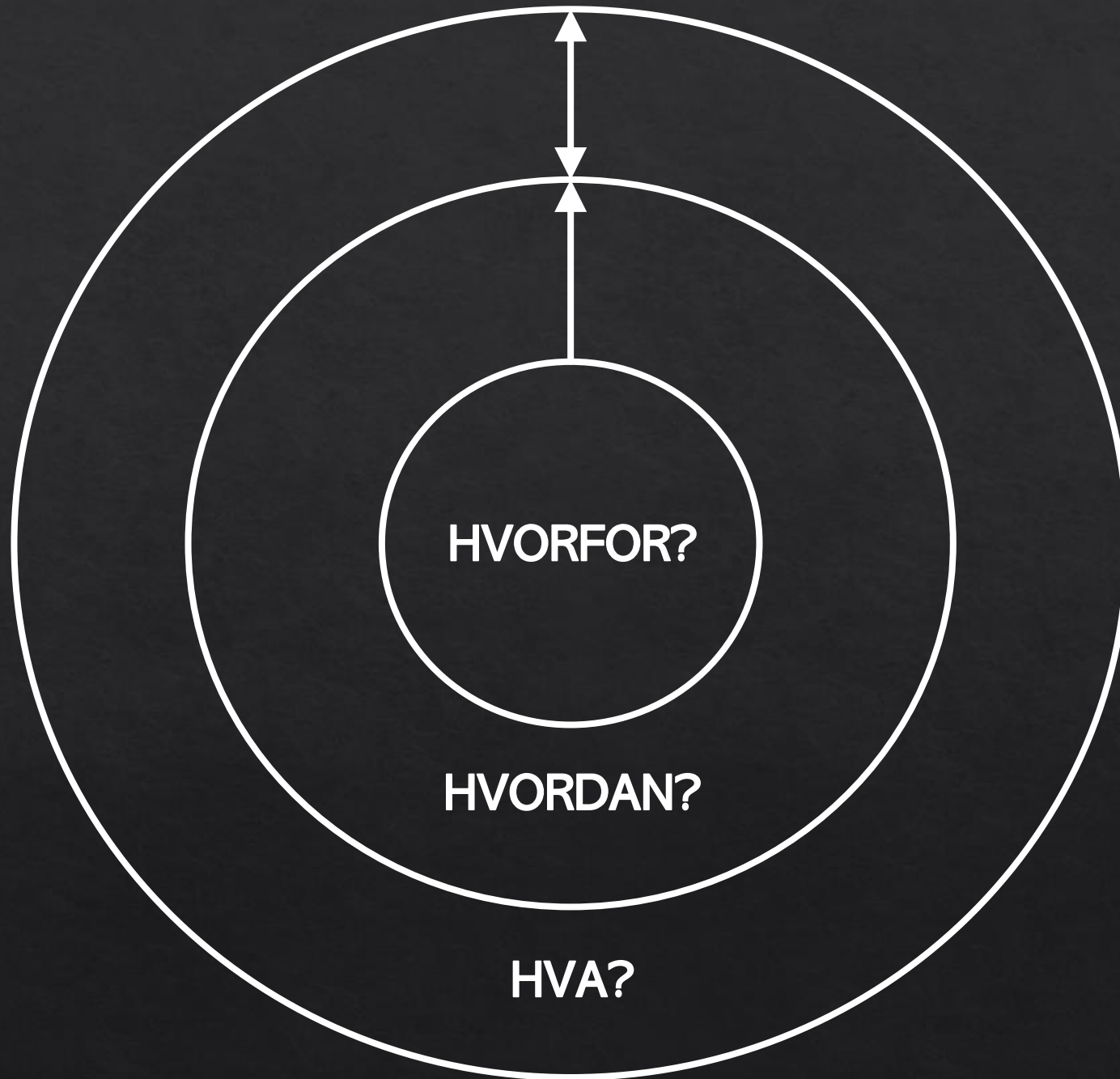
DIGITALISERING AV ANLEGGSTRANSJEN



DAK



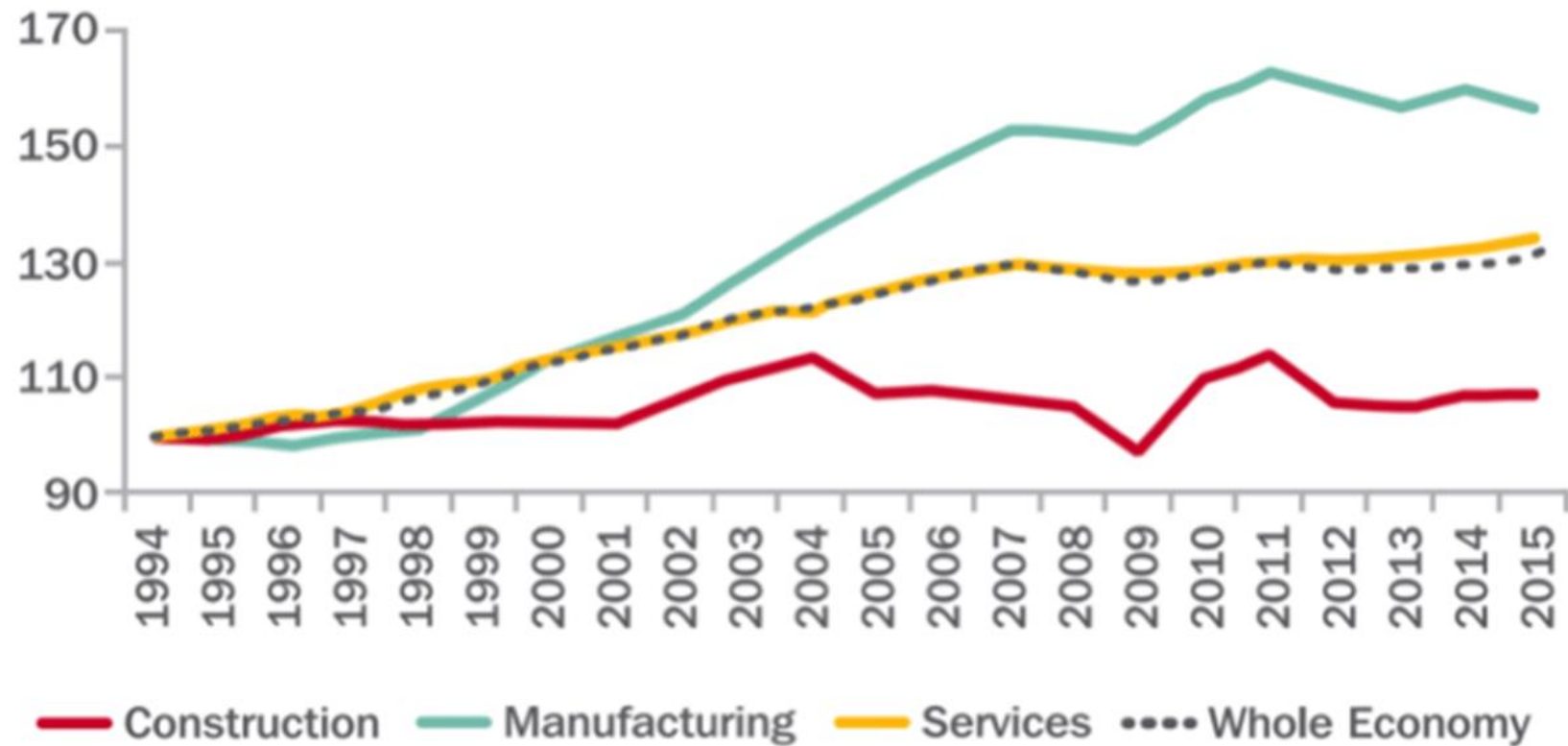
DAP



HVORFOR



Productivity Index Output per hour worked, Index (1994 = 100)



Over **60%** of major capital programs fail to meet cost and schedule targets¹



30% of construction cost is rework²



55% of maintenance remains reactive³

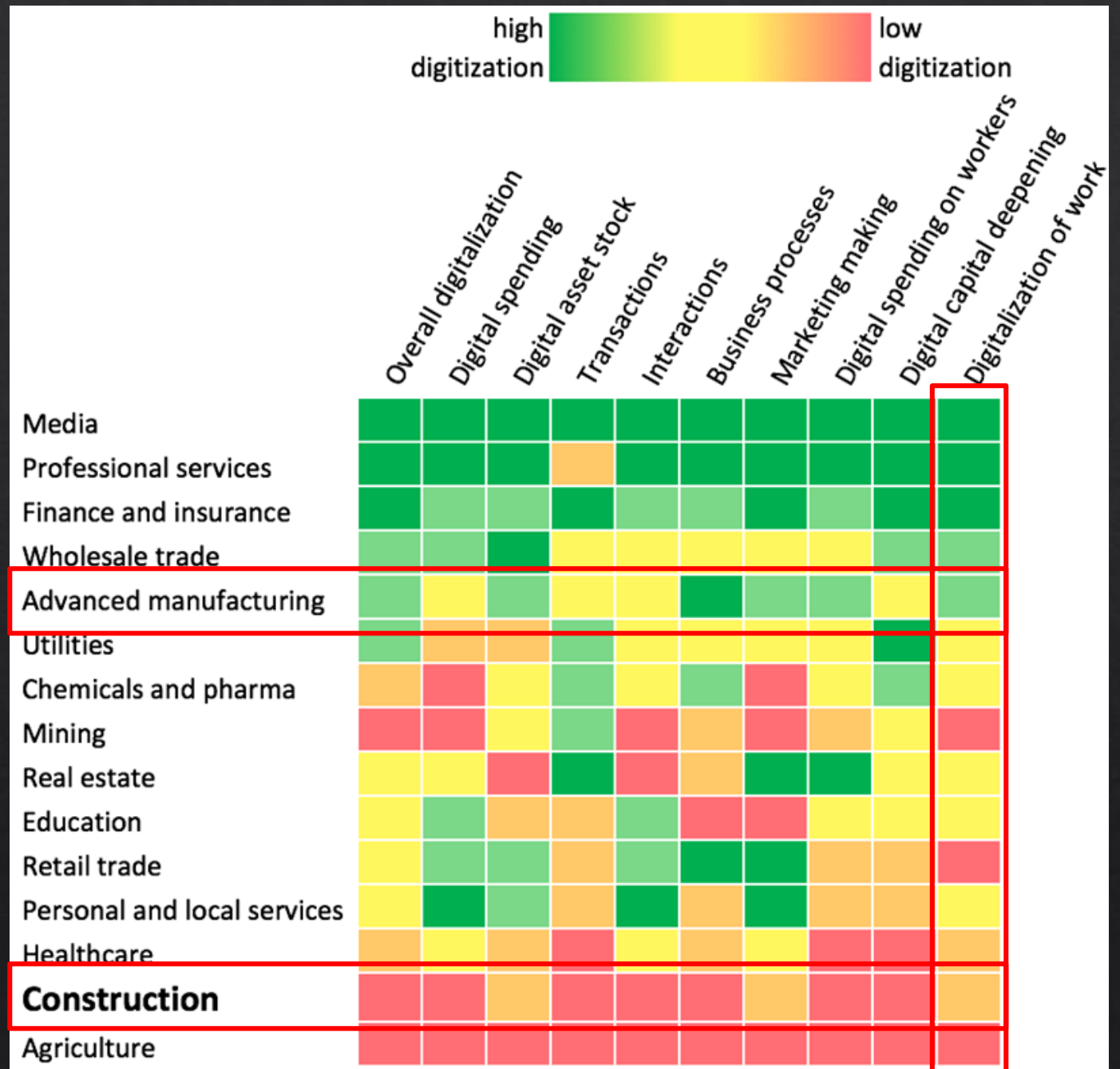




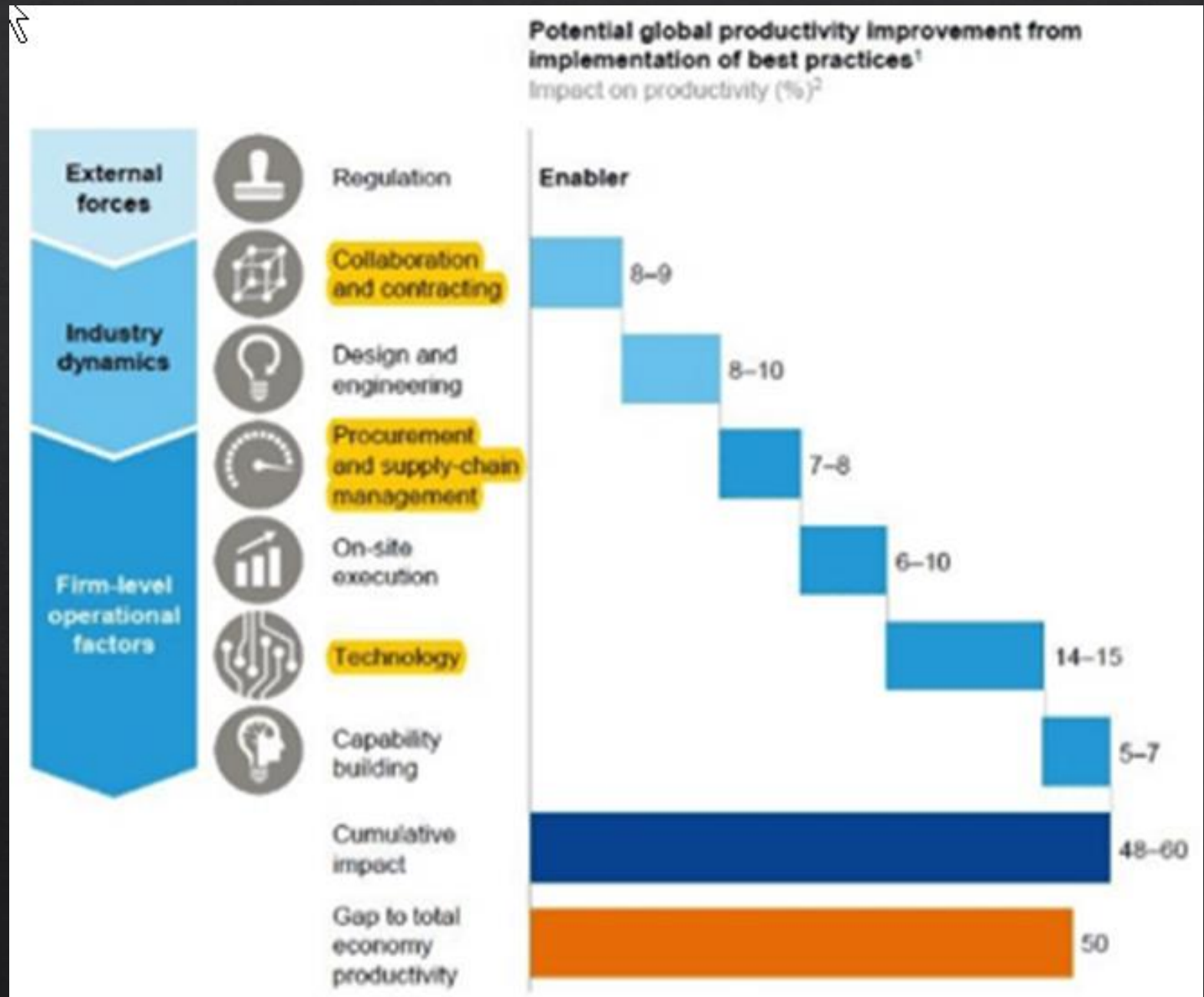




DIGITALISERINGSNIVÅ



LUKKE GAPET?





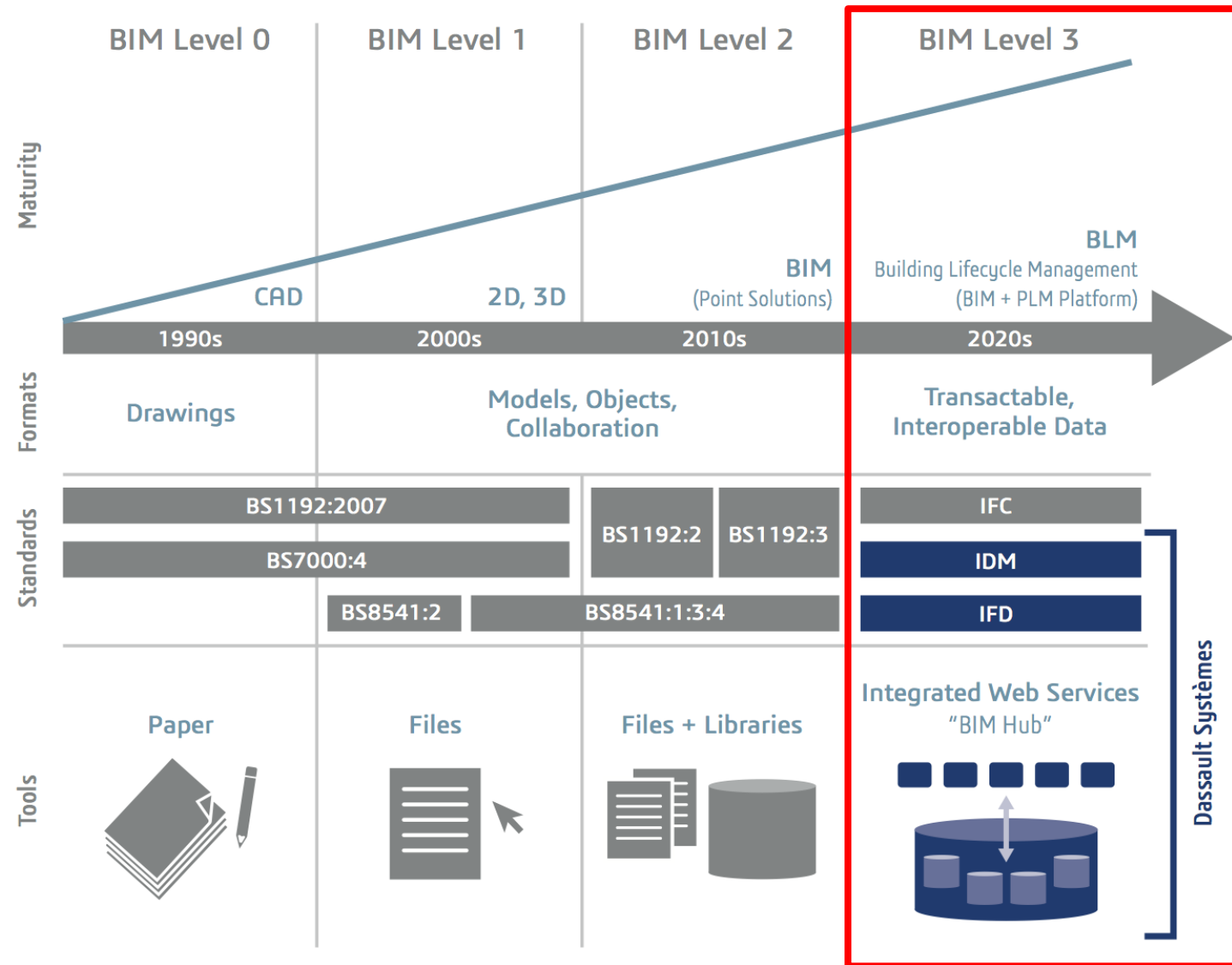
- ◆ LAVERE KOSTNADER
- ◆ RASKERE LEVERING
- ◆ BEDRE KVALITET
- ◆ REDUSERT RESSURSFORBRUK
- ◆ BEDRE FORUTSIGBARHET
- ◆ MINDRE KONFLIKT
- ◆ BEDRE MOTIVASJON
- ◆ ADRESSERER MANGEL PÅ FAGARBEIDER



- ◆ OMSTILLING
- ◆ USIKKERHET
- ◆ INVESTERINGER
- ◆ DIGITAL SÅRBARHET
- ◆ FÆRRE JOBBER FOR FAGARBEIDERE

HVA





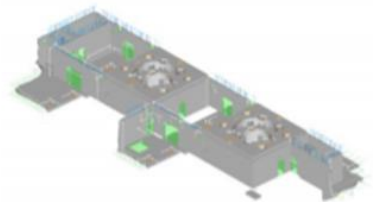
The BIM Maturity Model by Mark Bew and Mervyn Richards adapted to reflect BLM's relationship to Level 3.



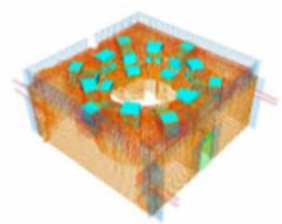
Terrain and Geotechnics



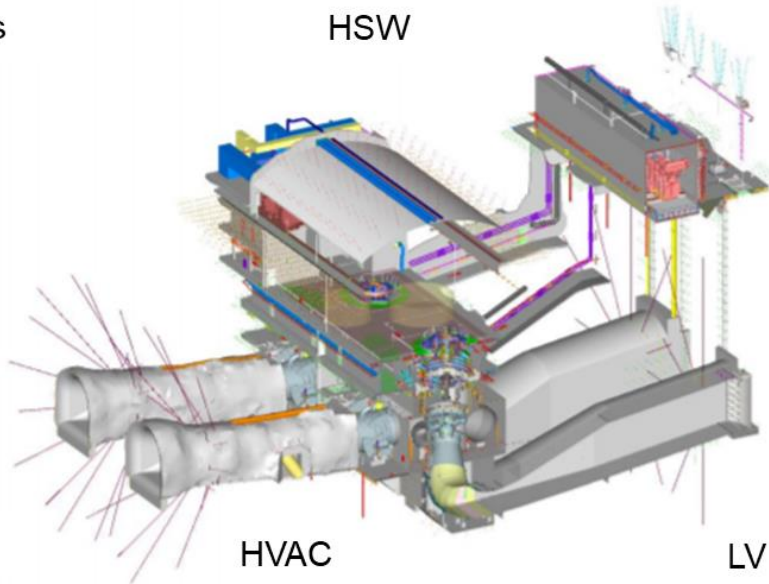
Tunnels and cavers



Civil Works



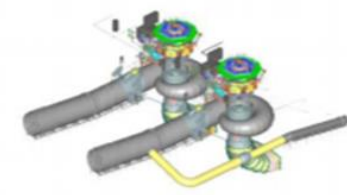
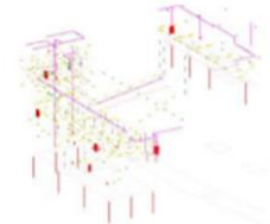
HSW



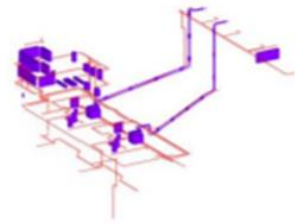
HVAC



LV EI.

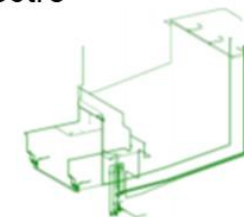
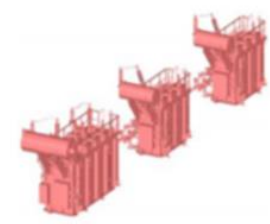


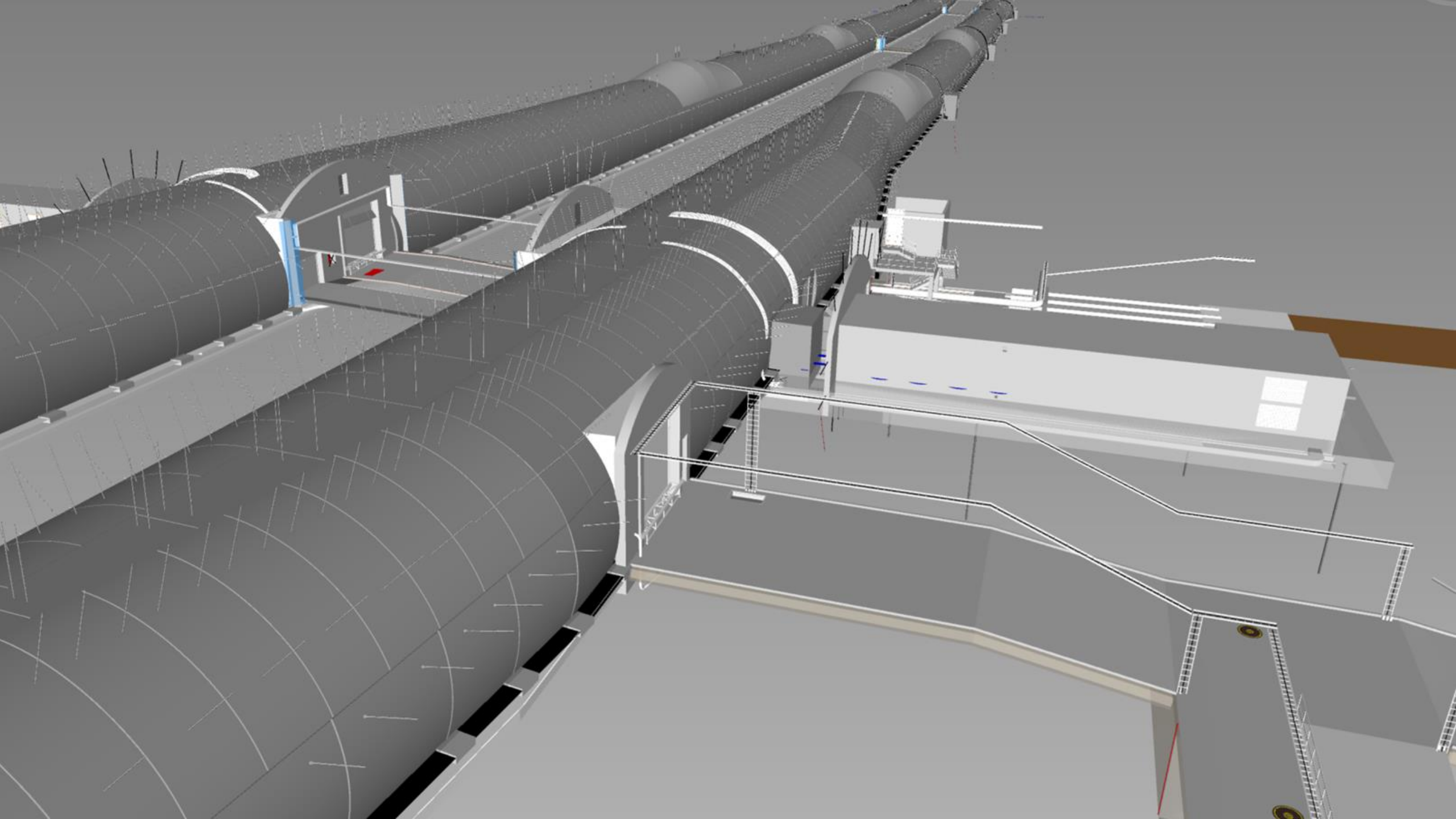
Elmech

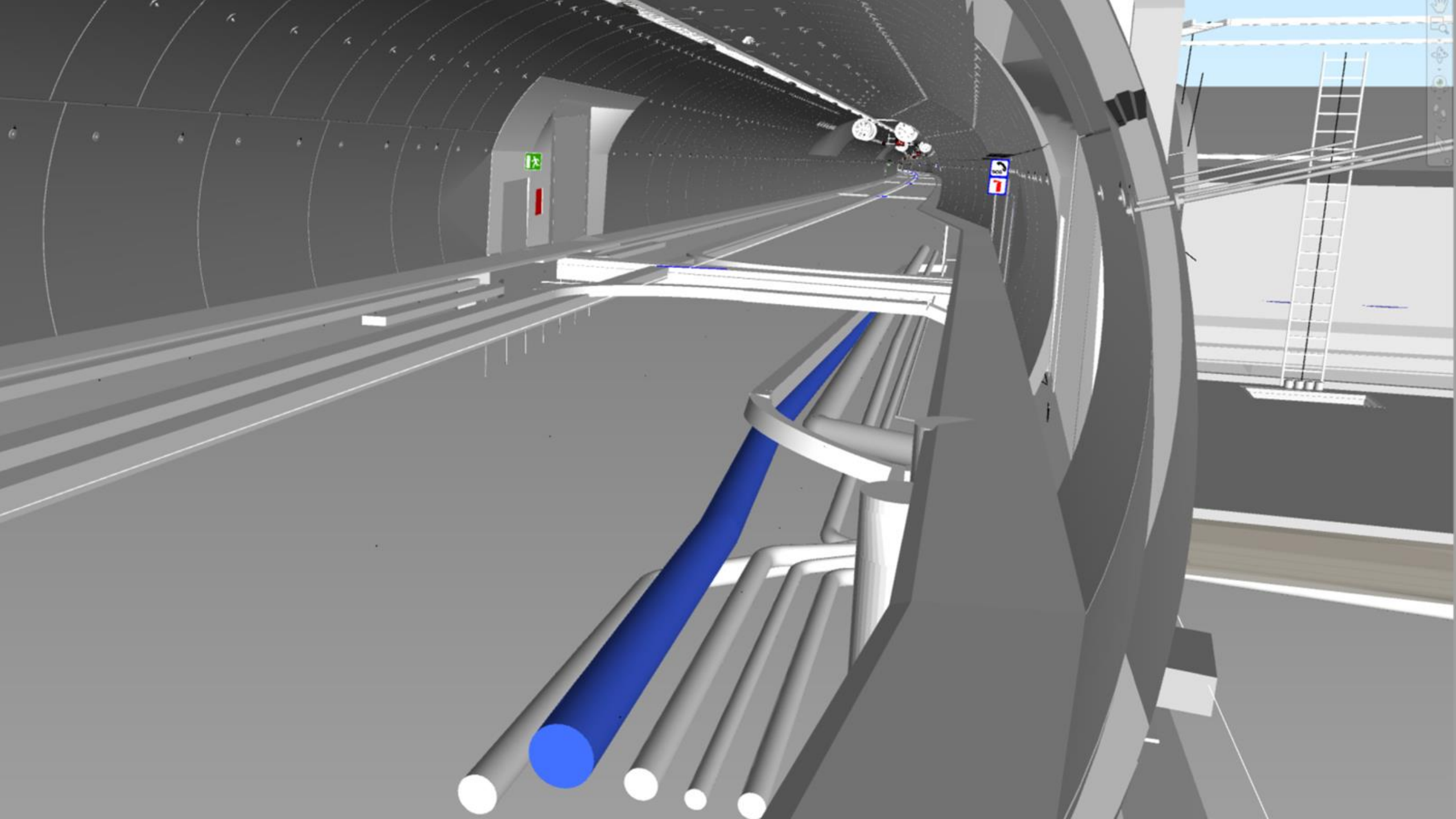


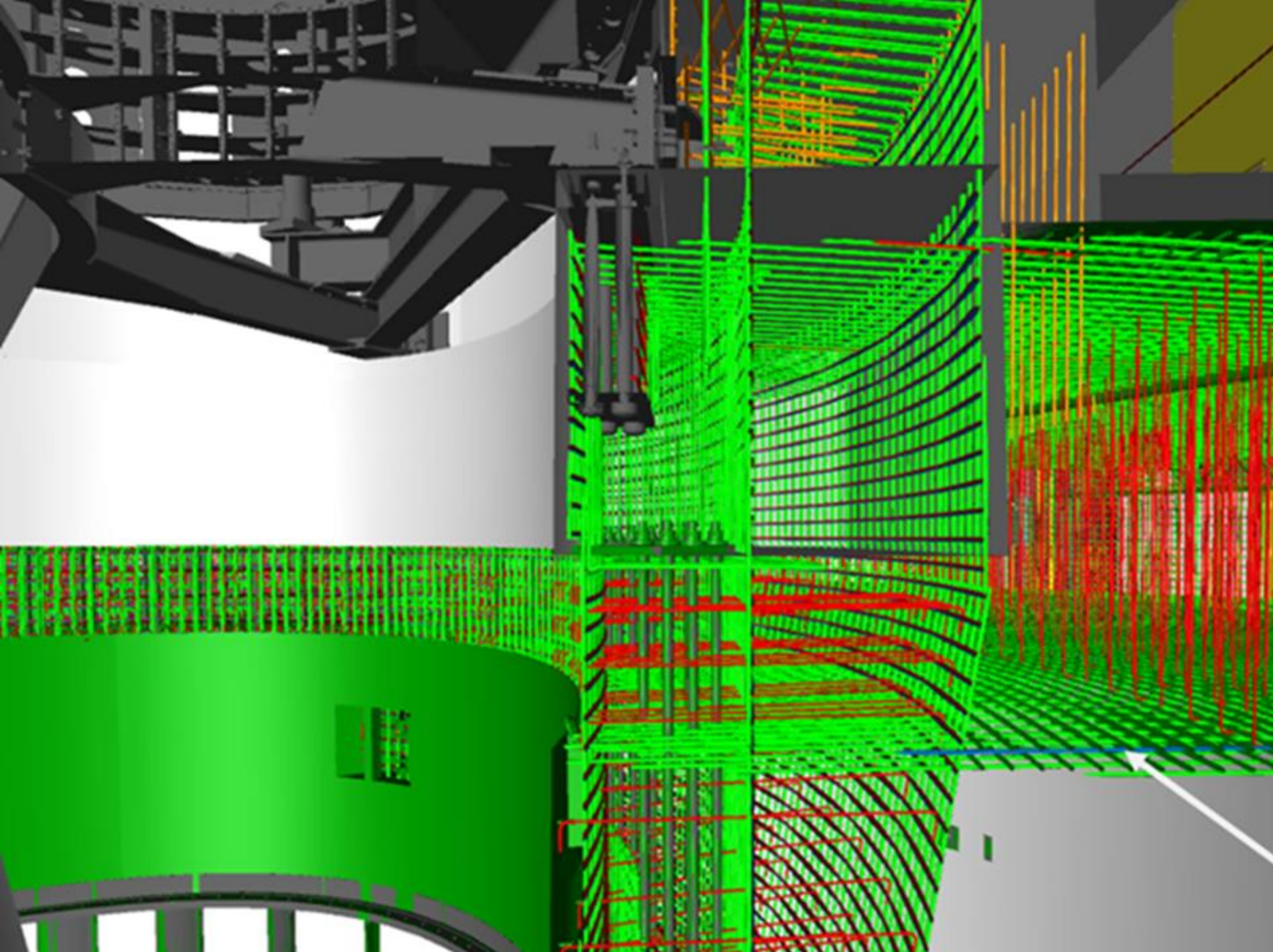
Cooling water and drainage

HV Electro









Properties	
Item	IConstruct Material
Property	Value
Område	Kraftstasjon
Delområde	Tromme
Aktivitet	Armering
Aktivitetsinnd...	TT1
Statusidentifik...	H
Revisjon	2
Kommentar	Armering UK trommetak. Senteravstand 150 ...
Dato publisert	2017-03-23
Dato revidert	2017-04-06
ISY NS Post	05.06.3.33
ISY NS Code	LC1.1303A
Material	B500NC
Anvisninger	Senteravstand 150mm måles ved trommeve...
Posisjonsnu...	121
Diameter	25 mm
Formkode	LM
Senteravstand	150.000
Total Bar Len...	11240 mm
Quantity	1
GUID	74df93c-f1eb-4f24-8823-5cddbfa9e339

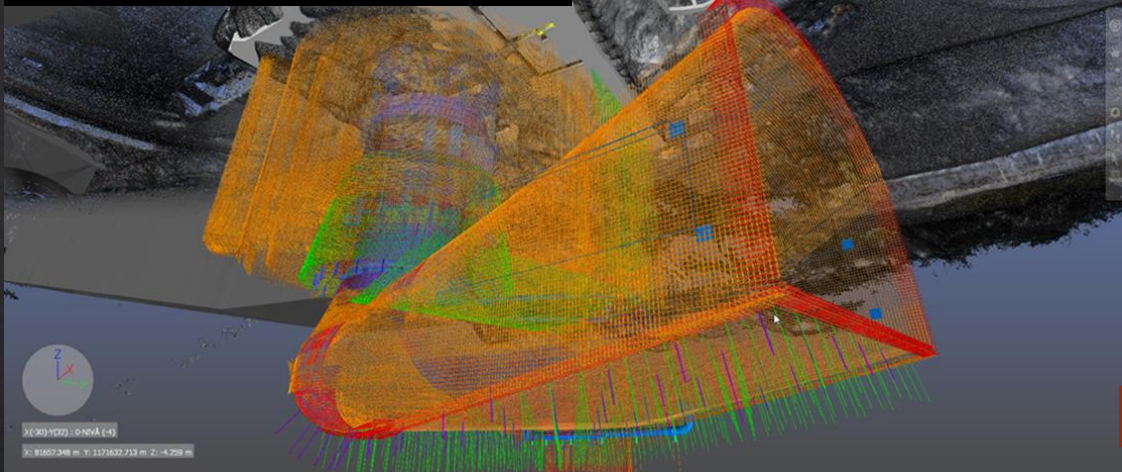
DATAKVALITET OG TILGJENGELIGHET



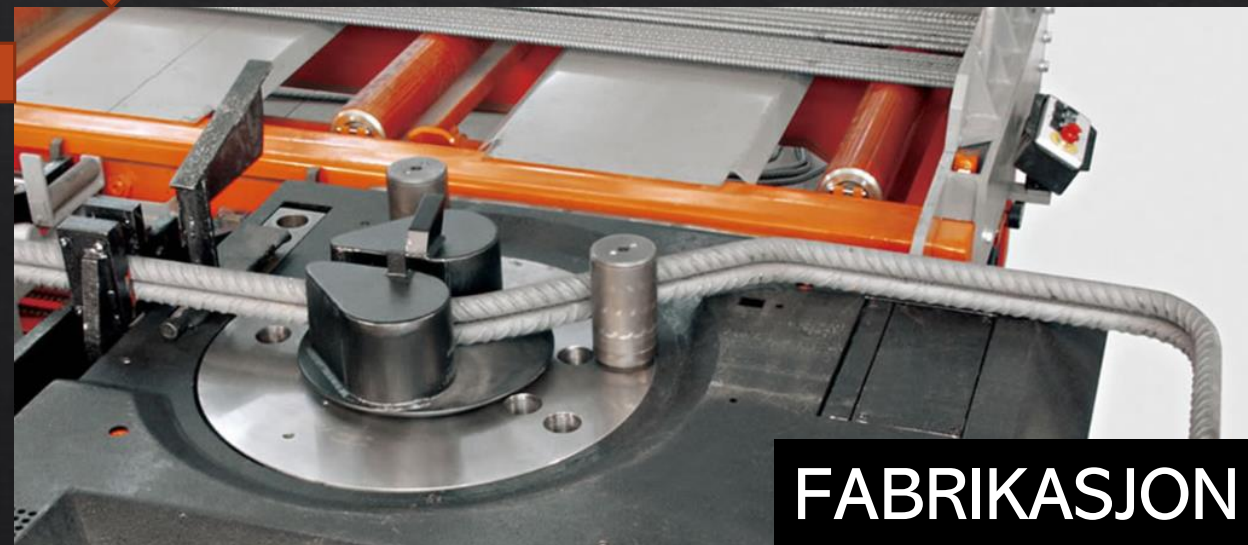
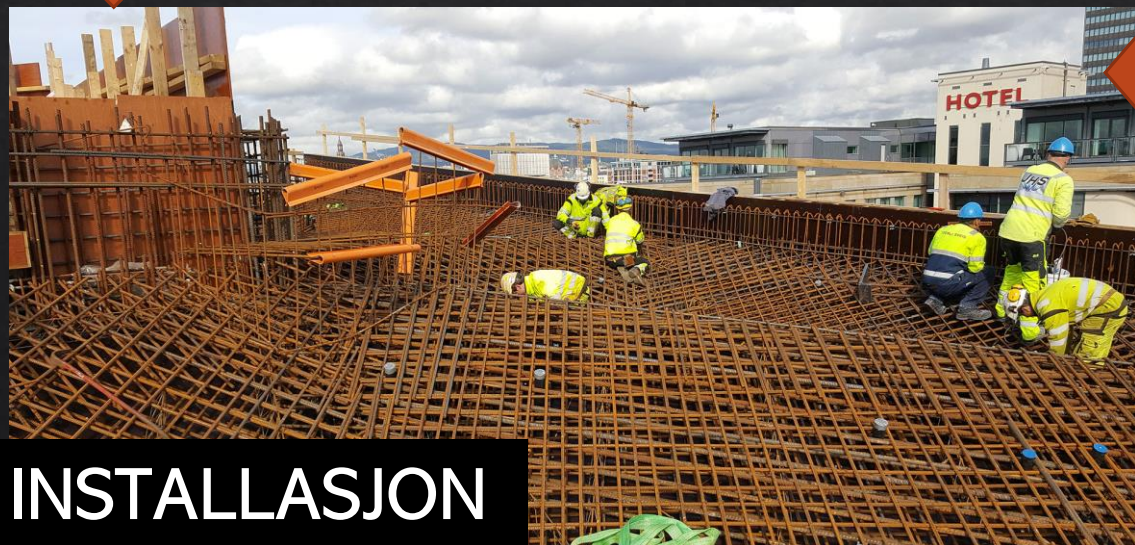
VIRTUAL DESIGN AND CONSTRUCTION



PROSJEKTERING

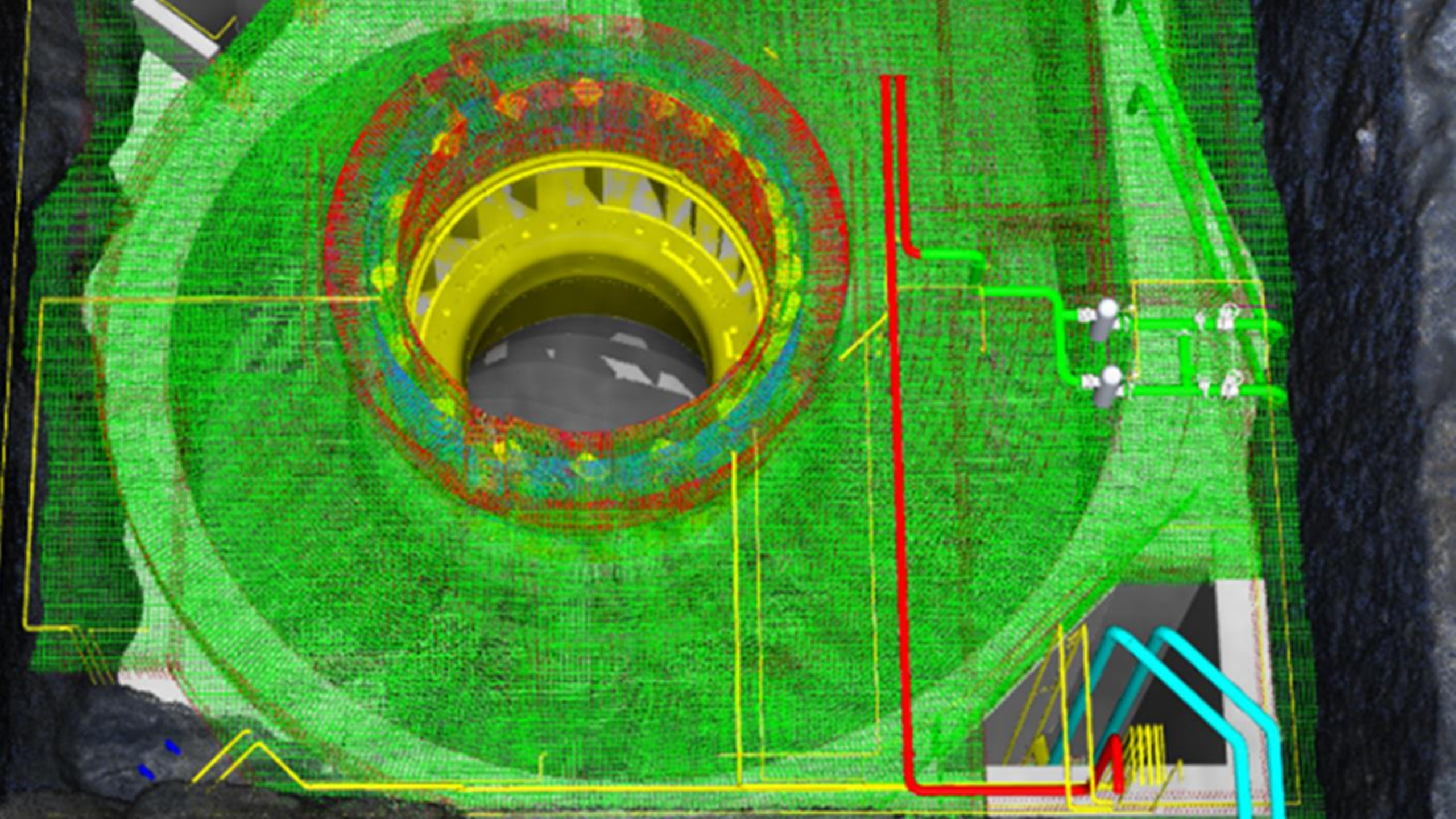


DATA OVERFØRING



INSTALLASJON

FABRIKASJON







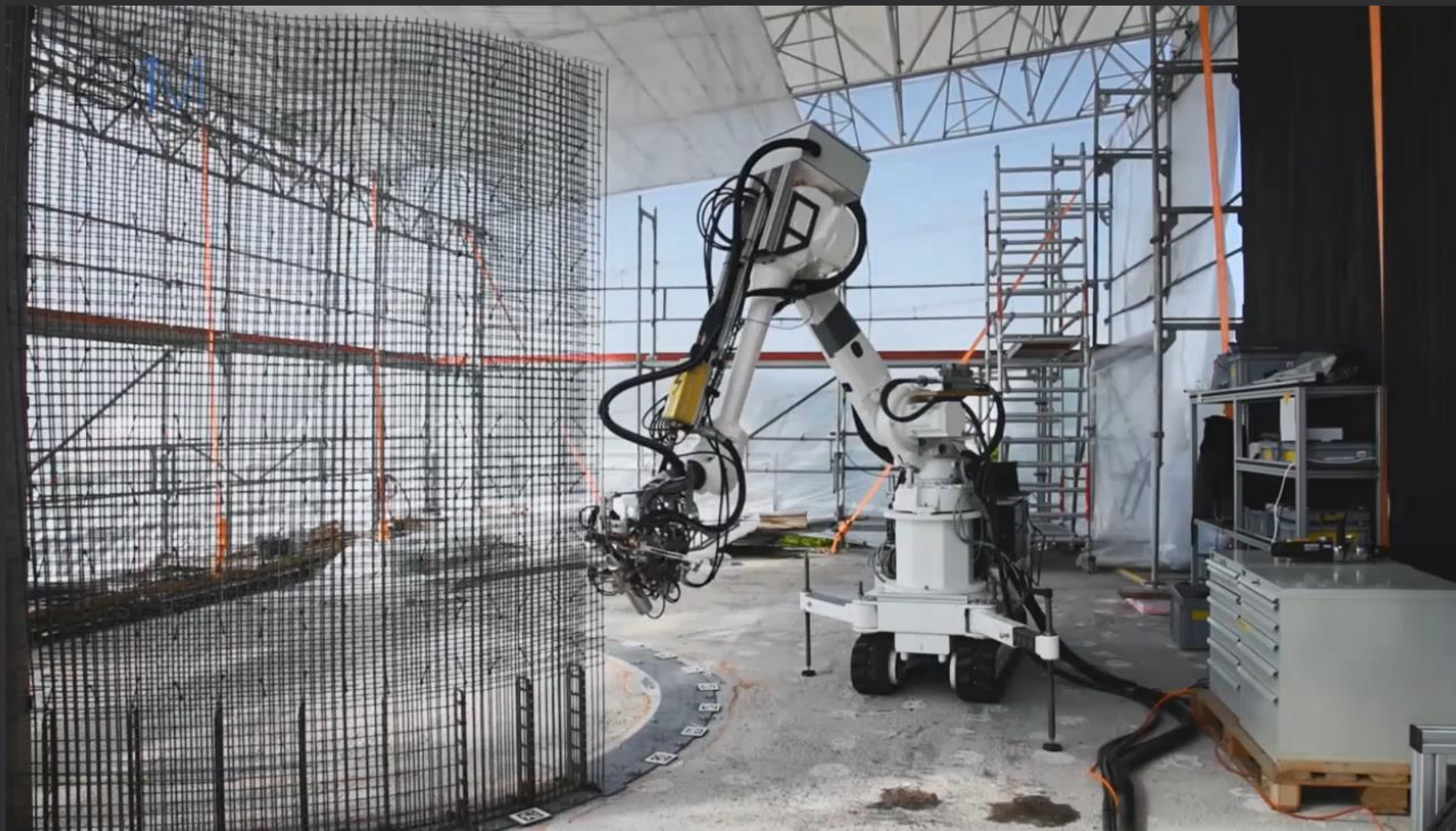
BIM KIOSK



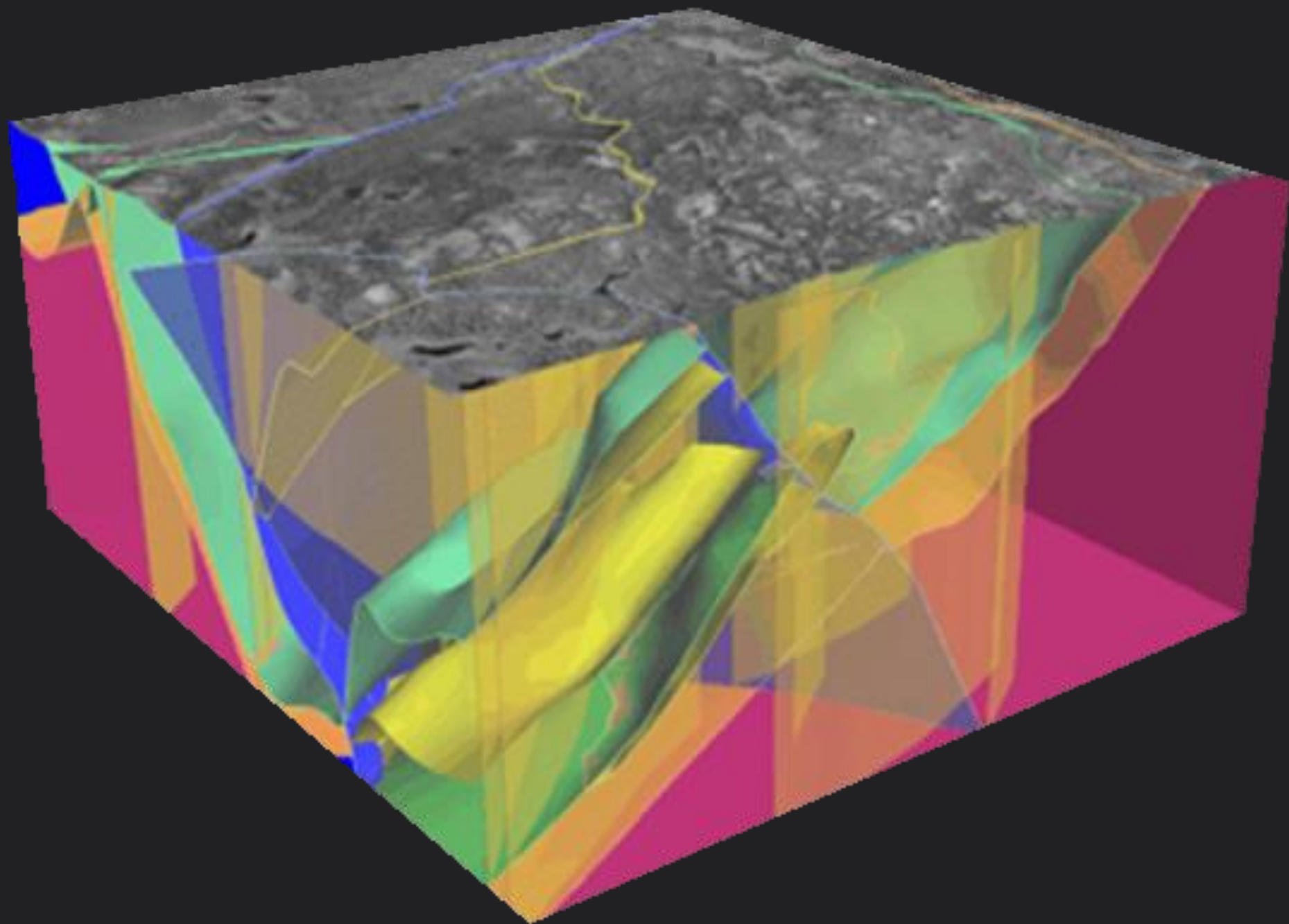
AUGMENTED REALITY

ROBOTISERING

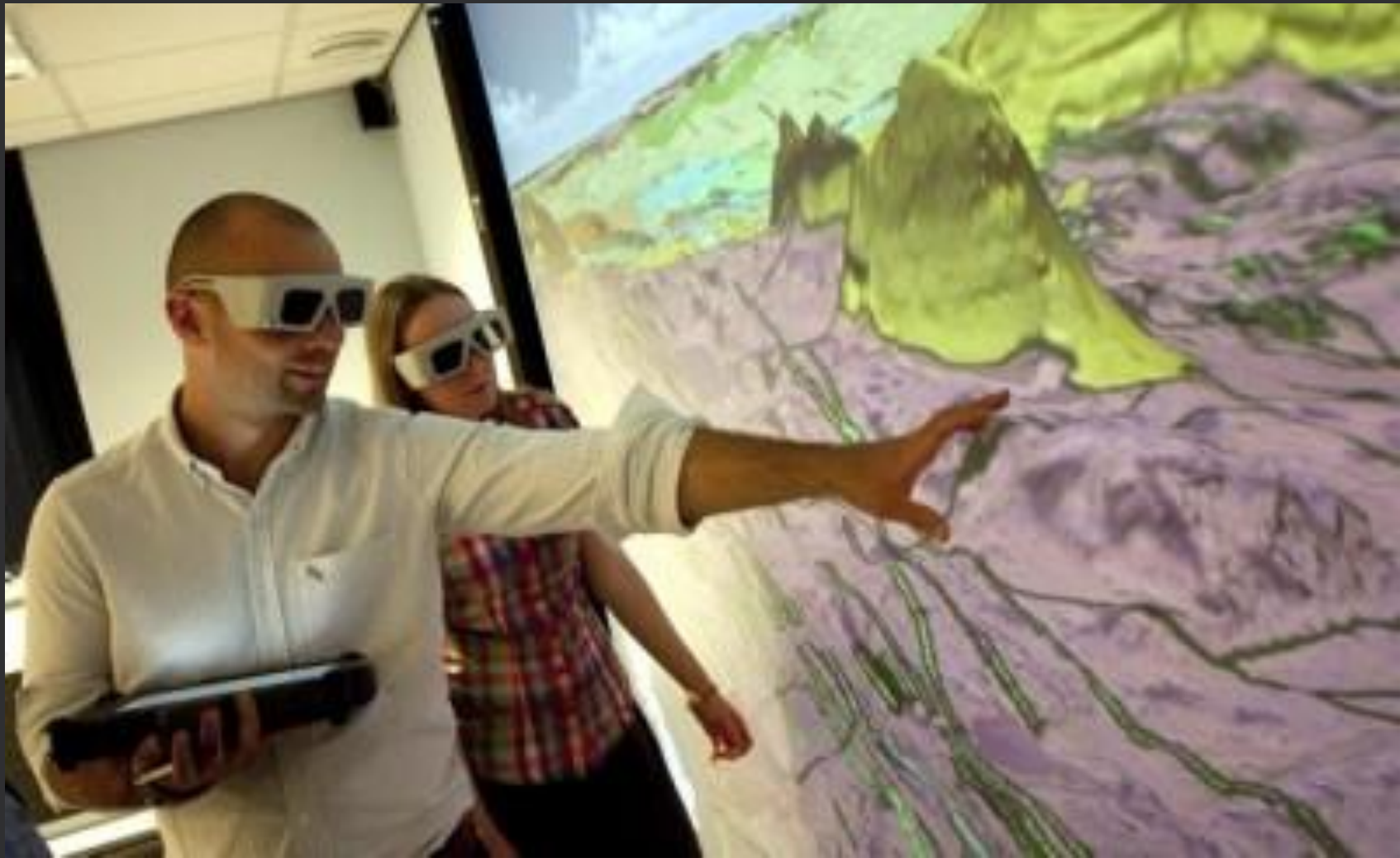






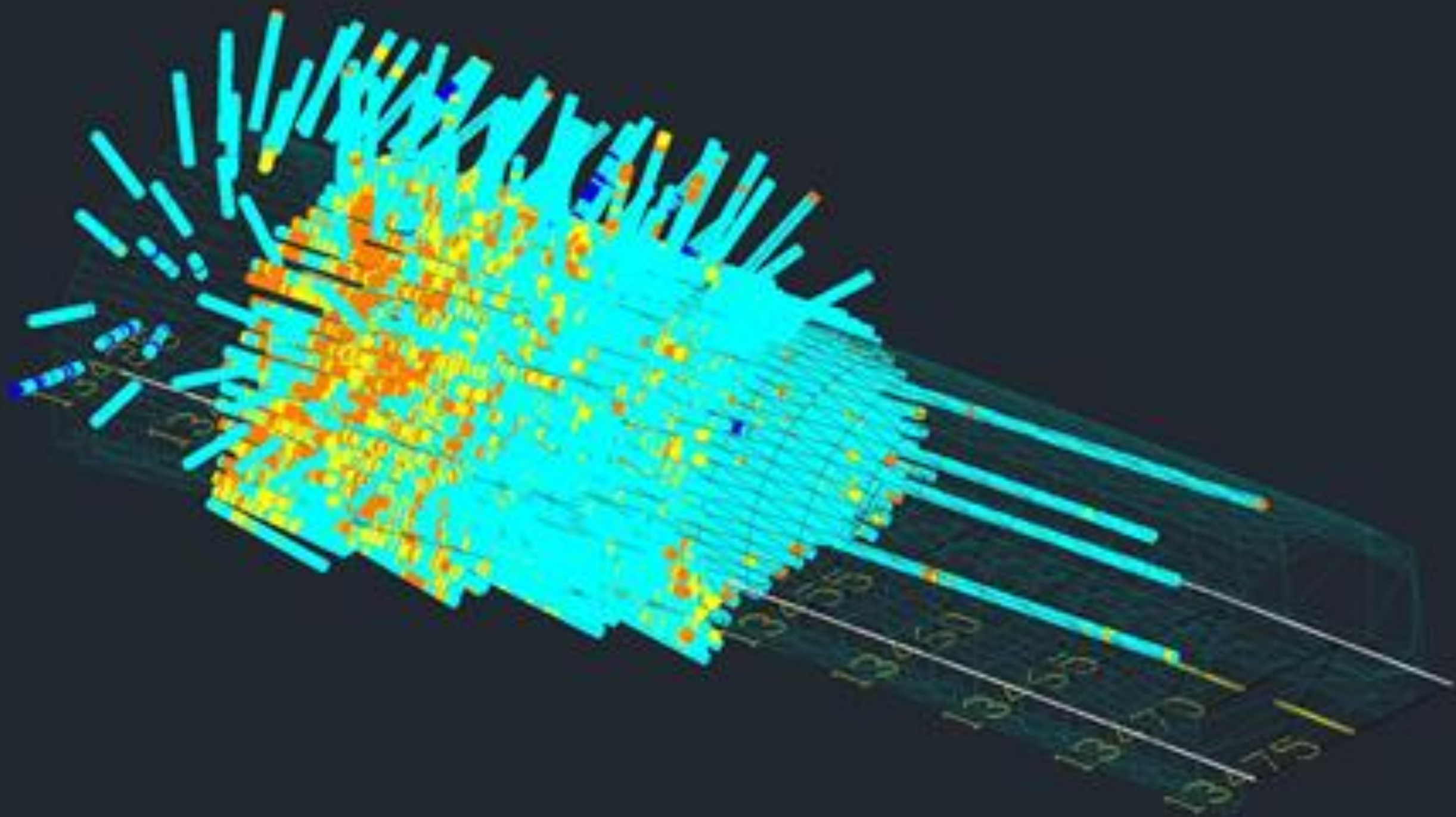


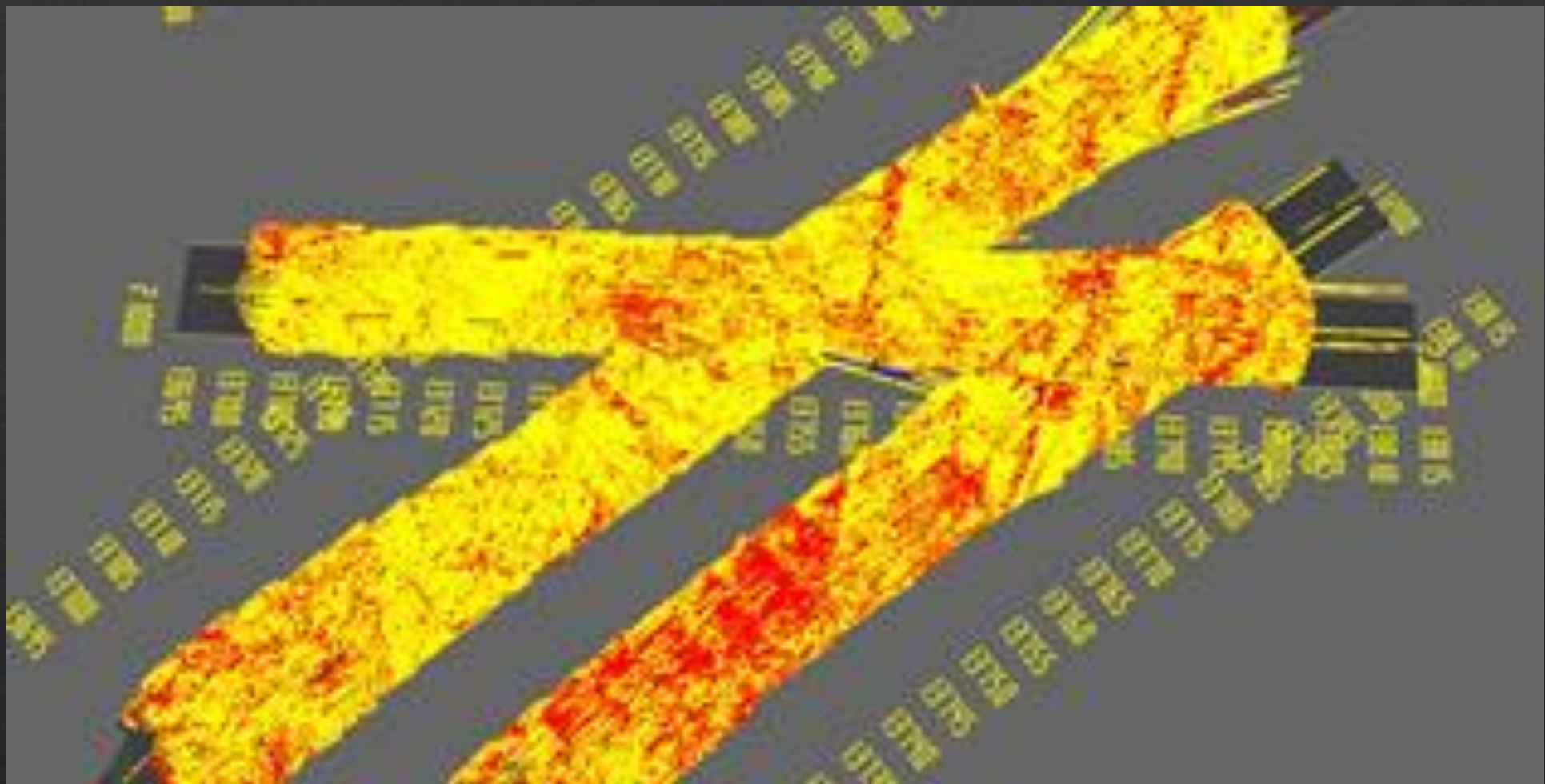


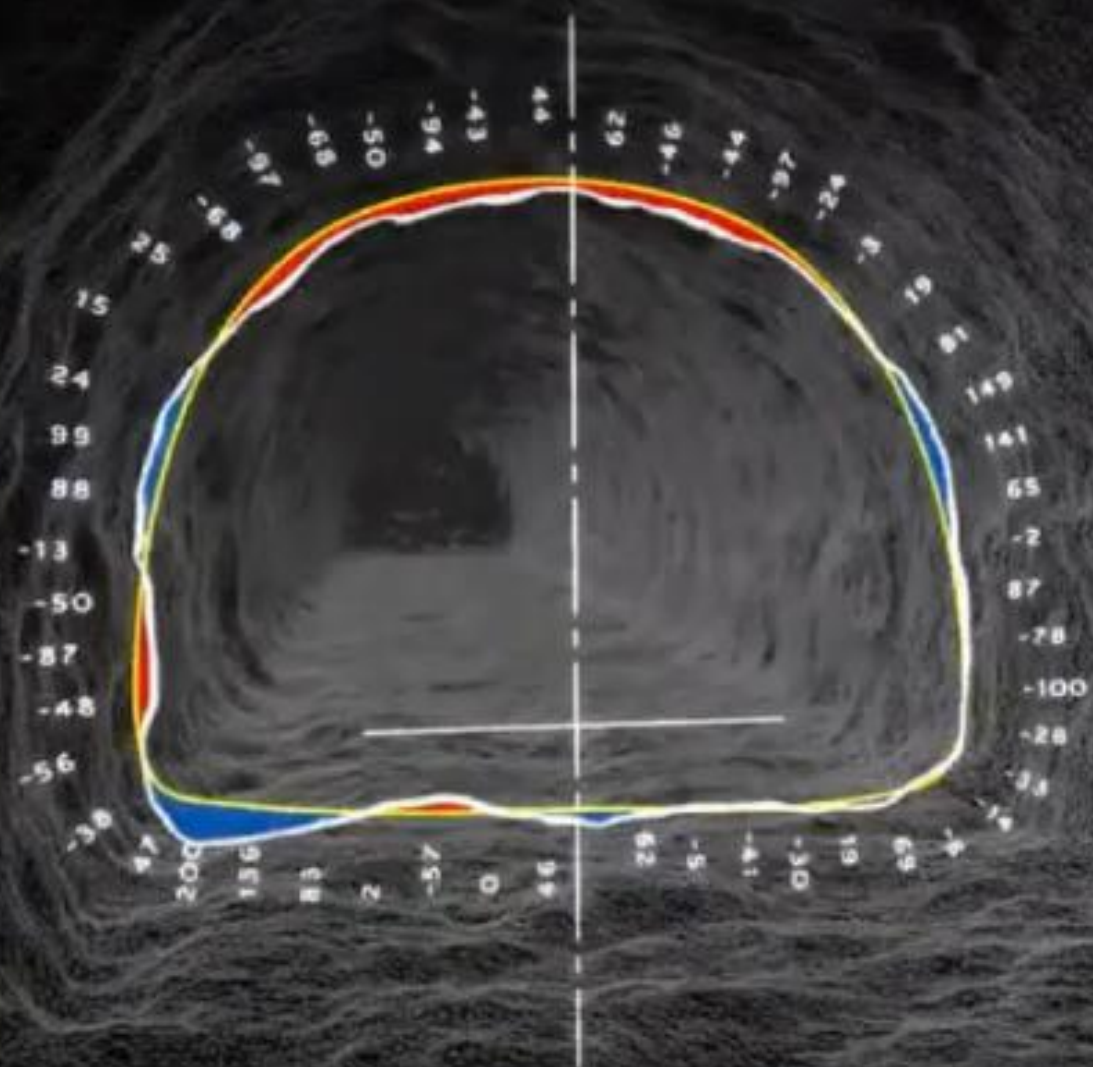










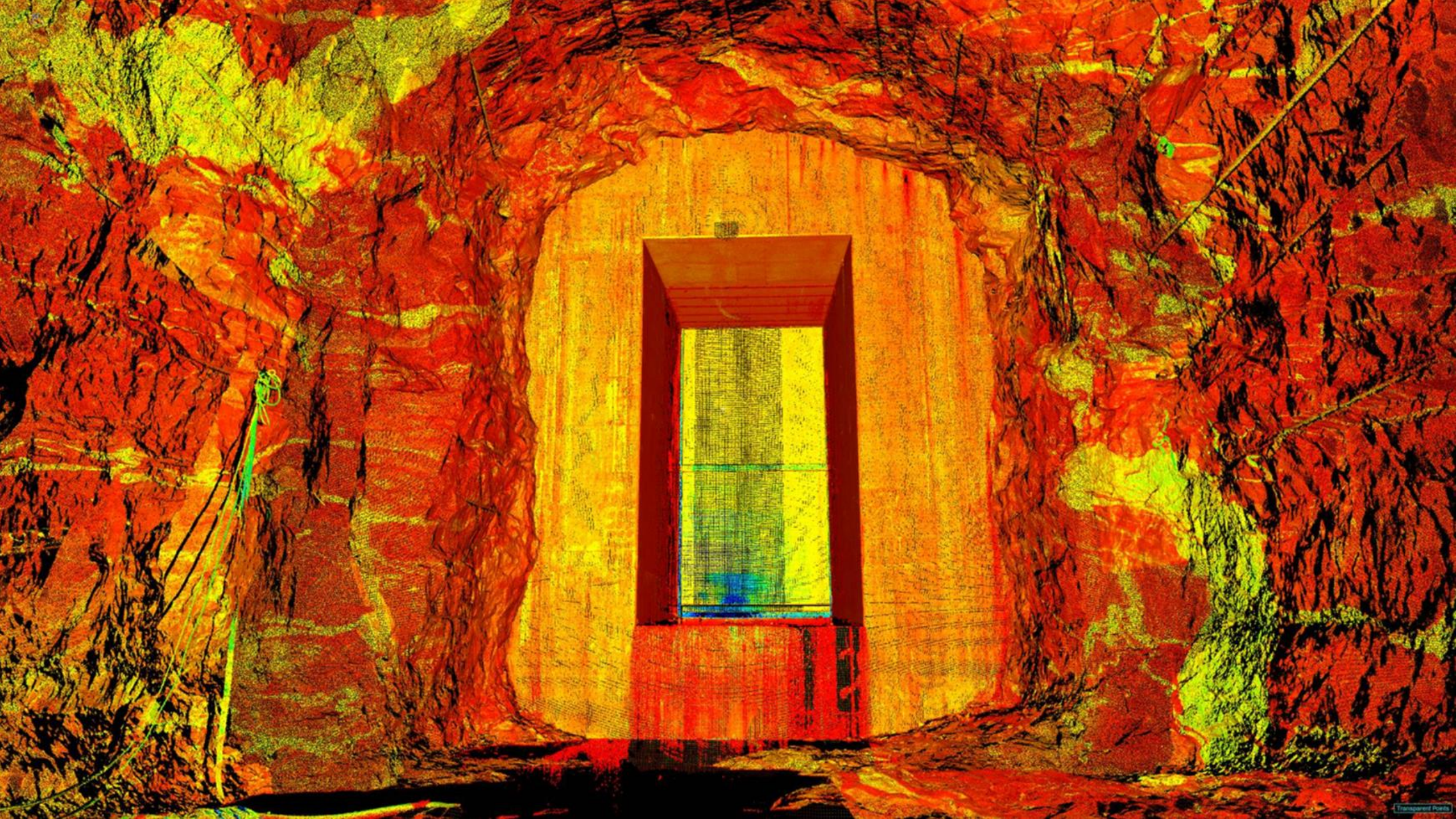












EXOSCELLETON





AUTONOME ANLEGGSMASKINER



3D - PRINTING





FORNYBAR ENERGI



ELEKTRIFISERING



NYE MATERIALER OG GJENBRUK



NYE SAMMARBEIDSFORMER

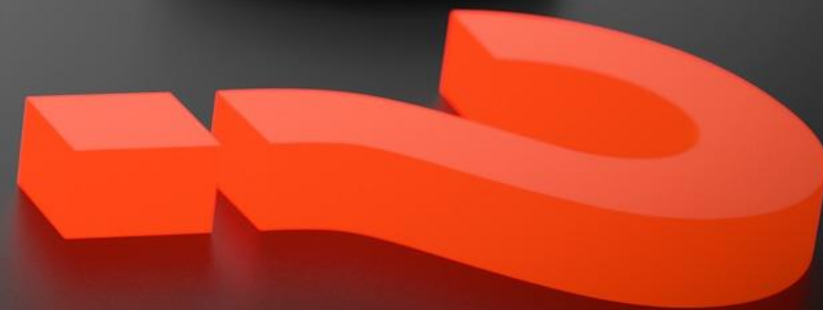


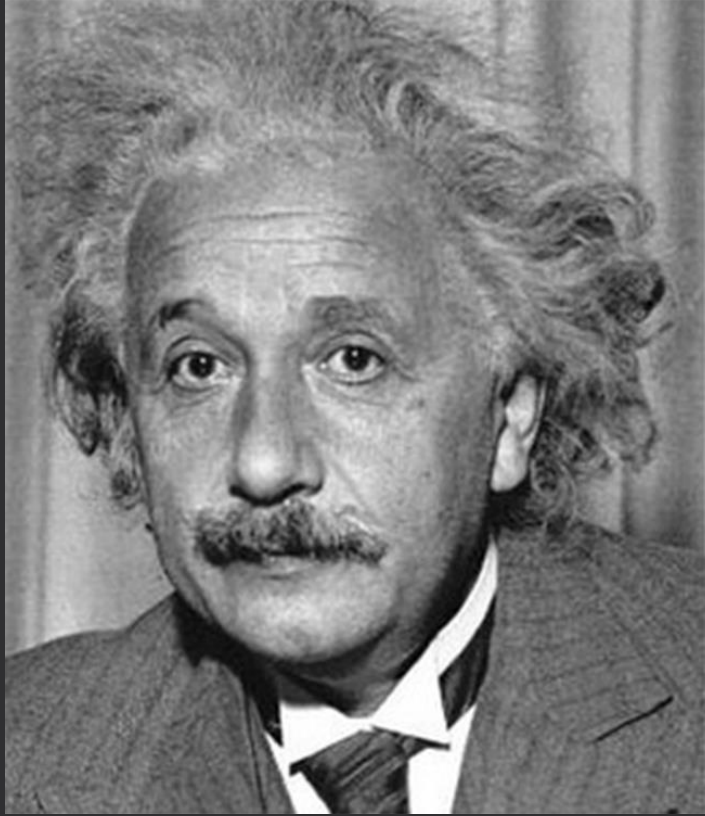
FREMTIDEN?





HVORDAN





**The purest form of insanity
is to leave everything the
same and the same time
hope that things will
change.**

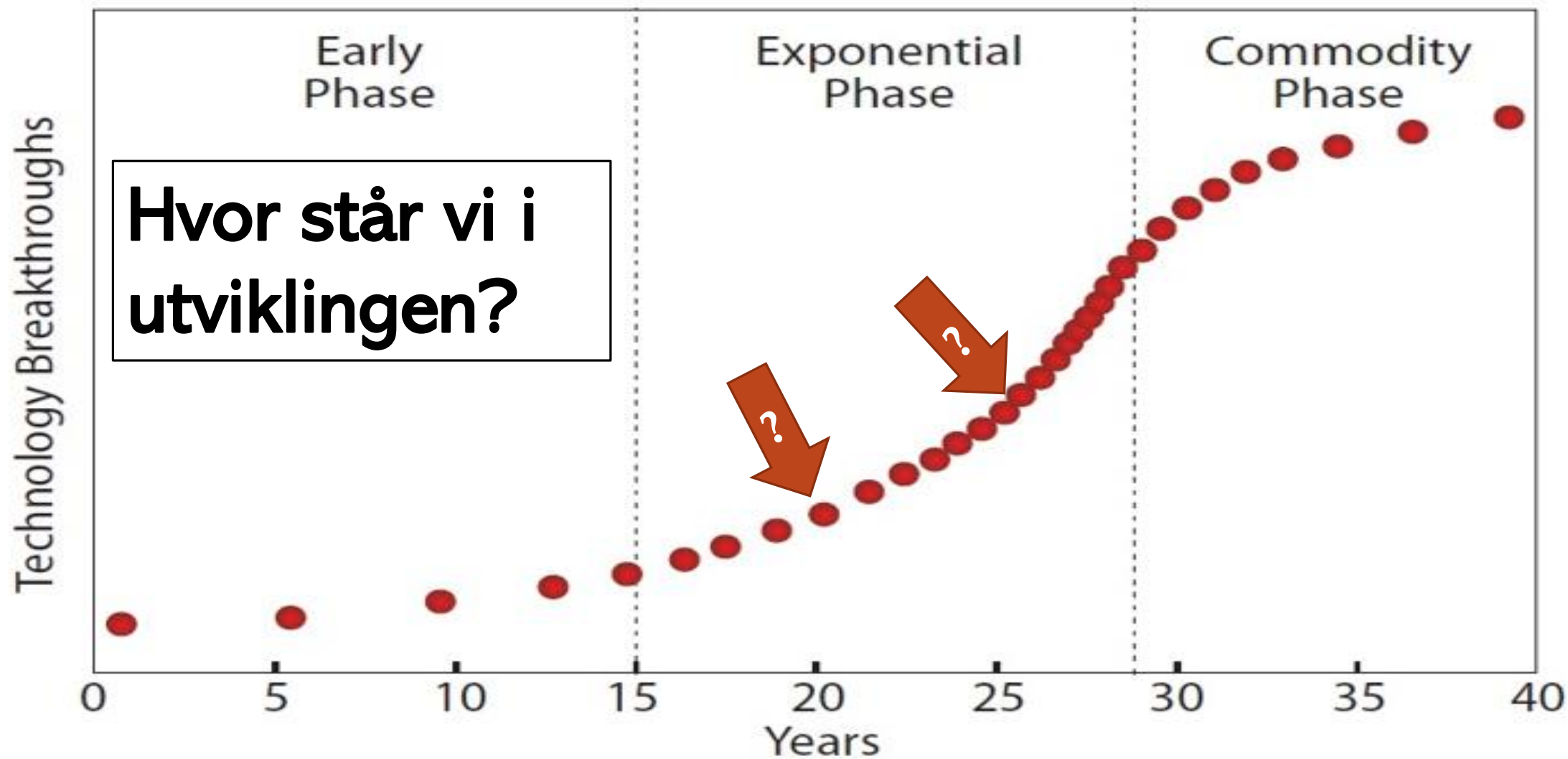
Albert Einstein





For å være med på den digitale revolusjonen må vi;

1. Samarbeide på tverrs av tradisjonellen skillelinjer
2. Satse på disruptiv innovasjon
3. Digitalisere hele virksomheten og verdikjeden
4. Utvikle en smidig arbeidsstyrke med nye ferdigheter
5. Bli i stand til å behandle og bruke enorme data mengder (AI?)
6. Prioritere digital infrastruktur
7. Oppmuntre og støtte innovasjon
8. Løpende tilpasse lover og forskrifter
9. Håndtere personvern ved økte datamengder
10. Dele data mens vi samtidig varetar datasikkerhet
11. Være i stand til å integrere ny og gammel teknologi



Technology Development Phases

The background of the image is a dark blue gradient. On the left side, there are vertical columns of binary code (0s and 1s) in a lighter blue, slightly blurred font. On the right side, there are out-of-focus, circular bokeh lights in various shades of blue.

Ingen vet med sikkerhet hvor den «digitale revolusjonen» vil bringe oss, men den har et enormt potensiale for å transformere både industrien og miljøet vi lever i.