

VLTI current state & opportunities

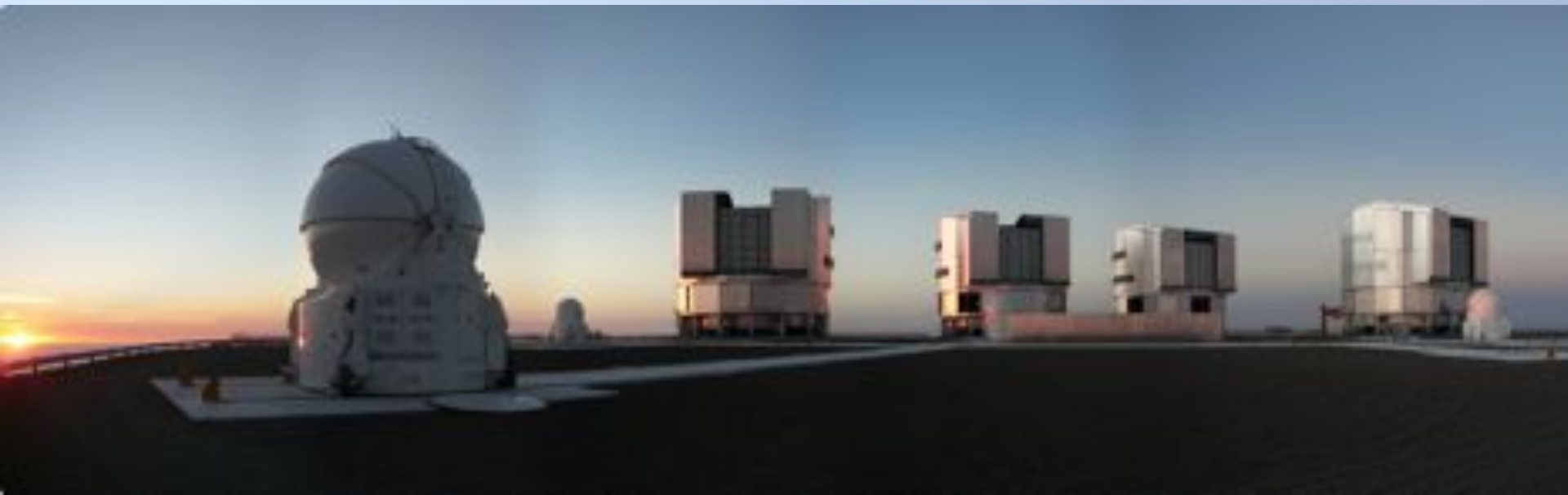
F. Millour

with help from JP Berger, A. Merand



VLT1

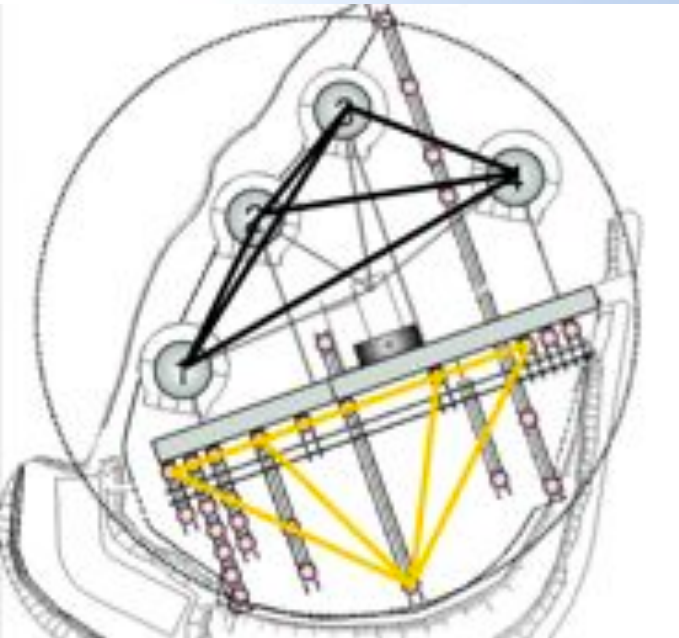
- 4 UTs
- 4 ATs (30 stations, 8 used)
- 6 DLs (space for 8)
- 4 instruments (2 open, 1 testing, 1 visitor)



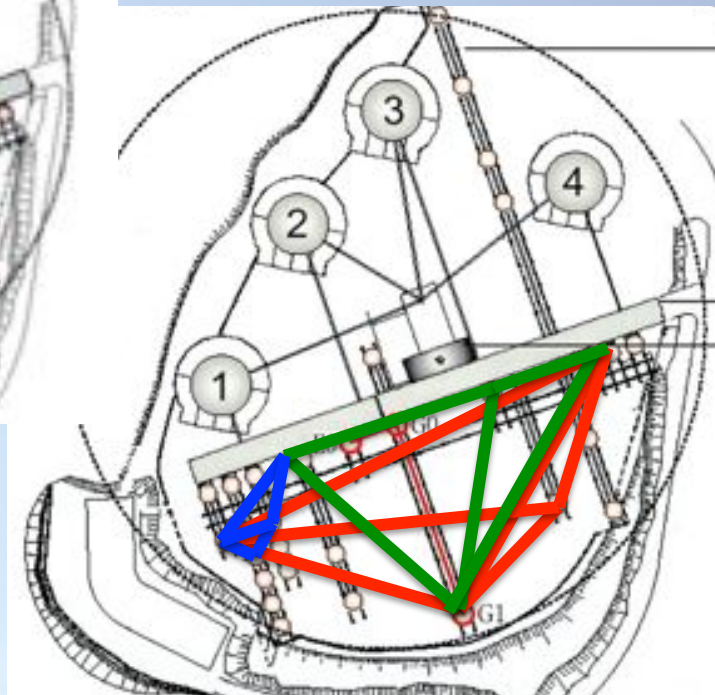
VLTi timeline

- 1980s: VLT project started, including interferometry
- 1993: ESO council stalls the VLTi
- 1996: MPG/CNRS/ESO agreement: VLTi starts again
- 1998: MIDI and AMBER instruments started
- 2001: VLTi first light
- 2001: First interferometric combination of two UTs
- 2002: MIDI first light
- 2003: FINITO installed at Paranal
- 2004: First AT installed at Paranal
- 2004: AMBER first light
- 2007: FINITO offered
- 2005: Fourth AT installed at Paranal. AT array is complete.
- 2008: PRIMA first light
- 2010: PIONIER first light

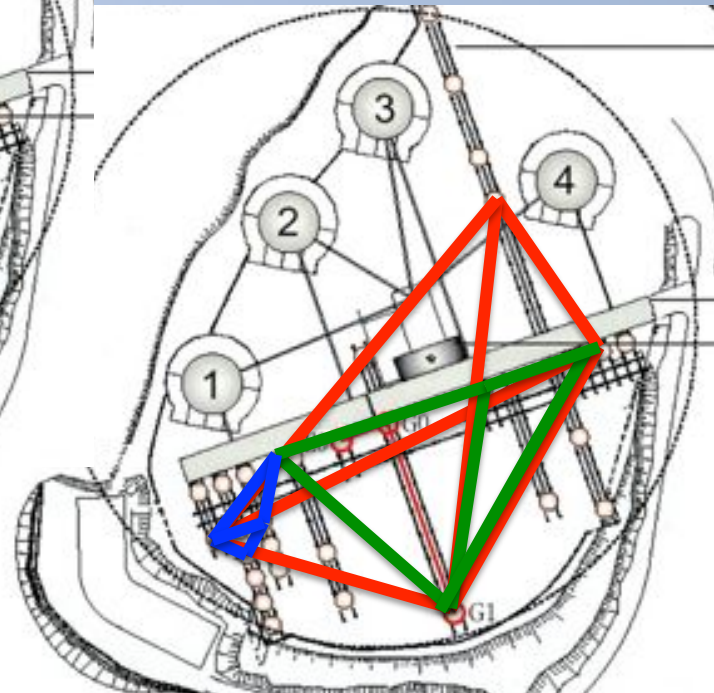
New stations config for imaging



2008 (Schoeller pres.)



2009-2012



2013-

Vibrations

Main corrective actions:

- Manhattan2 (MN2): brings 80-150 nm RMS improvement.
- New cyclo-coolers suspension for CRIRES (OK) and HAWK-I (lower impact).
- Optimization of the Cassegrain and Nasmyth rotators (parking)
- Damping of pumps (FLAMES).
- Modification M4 mount and damper for M5 mount.
- Modification of fans and auxiliary cooling fluid pumps and piping (ongoing).

Baseline	OPD amplitude
UT1-2	250 nm
UT2-3	270-410 nm
UT2-4	410 nm
UT1-3	270-410 nm
UT1-4	270-410 nm
UT3-4	380-400 nm

Measured
Estimated

Future: MAMMUT (2-arm interferometer) to directly measure vibrations

Recombineurs



VINCI

- 2 télescopes
- Bande K ($2\mu\text{m}$)
- Large bande



AMBER

- 3 télescopes
- J, H & K simultanés ($1-2\mu\text{m}$)
- Résolutions spectrales
R=35, 1500 &
12000



MIDI

- 2 télescopes
- Bande N ($8-13\mu\text{m}$)
- Résolutions spectrales
R=30 & 300

Recombineurs



PIONIER

- 4 télescopes
- Bande H ($1.65\mu\text{m}$)
- Large bande



AMBER

- 3 télescopes
- J, H & K simultanés ($1-2\mu\text{m}$)
- Résolutions spectrales
R=35, 1500 & 12000



MIDI

- 2 télescopes
- Bande N ($8-13\mu\text{m}$)
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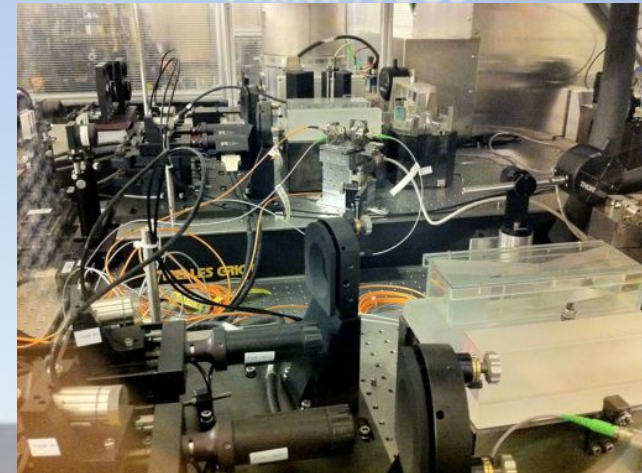
PRIMA

- 2 télescopes
- Bande K ($1.65\mu\text{m}$)
- Astrométrie

PRIMA DDLs



PRIMA FSUs



2^{nde} génération du VLT

• GRAVITY

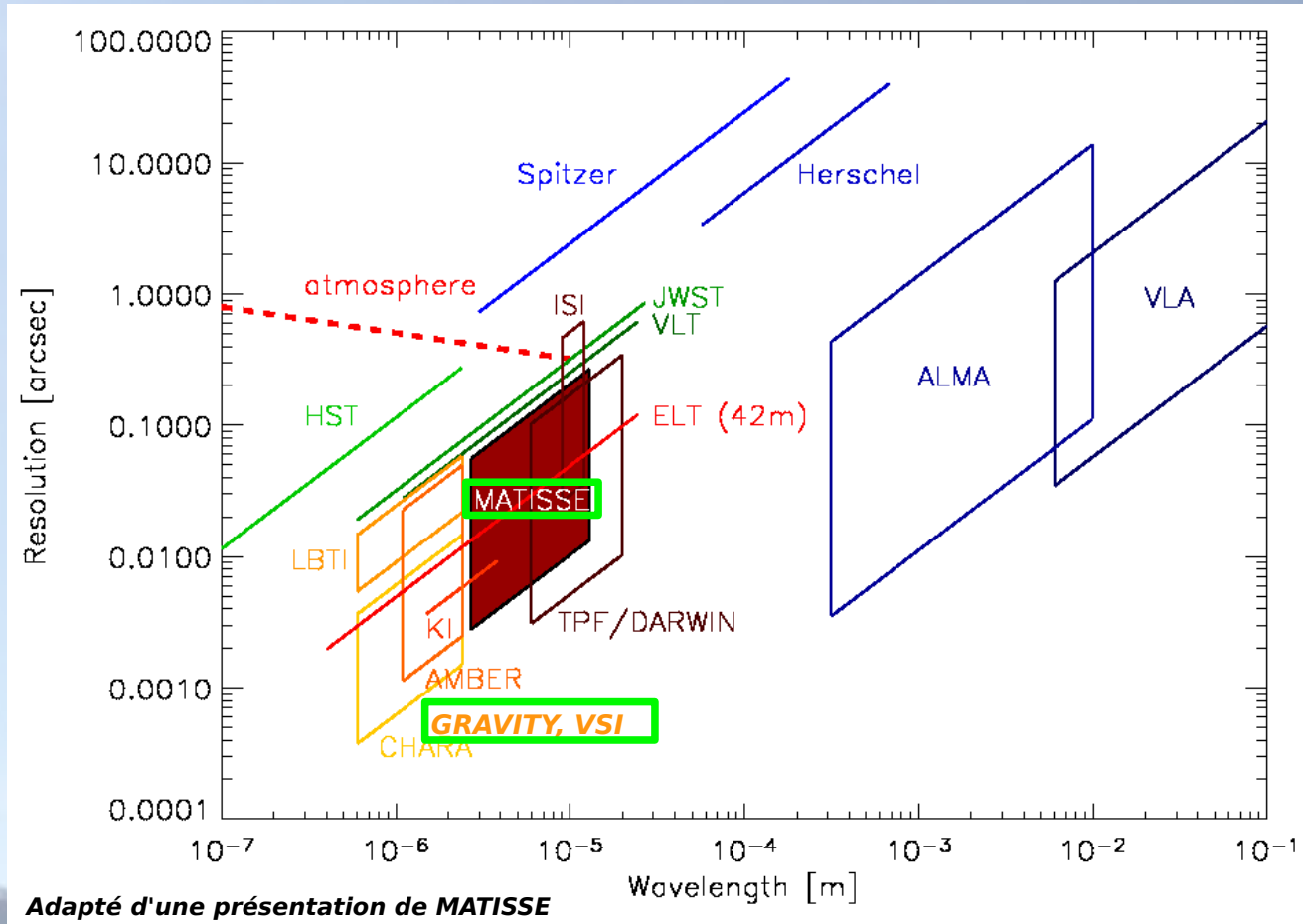
- 4T, bande K
- R=30, 300, 4500
- Double champ
- Le centre Galactique

• VSI

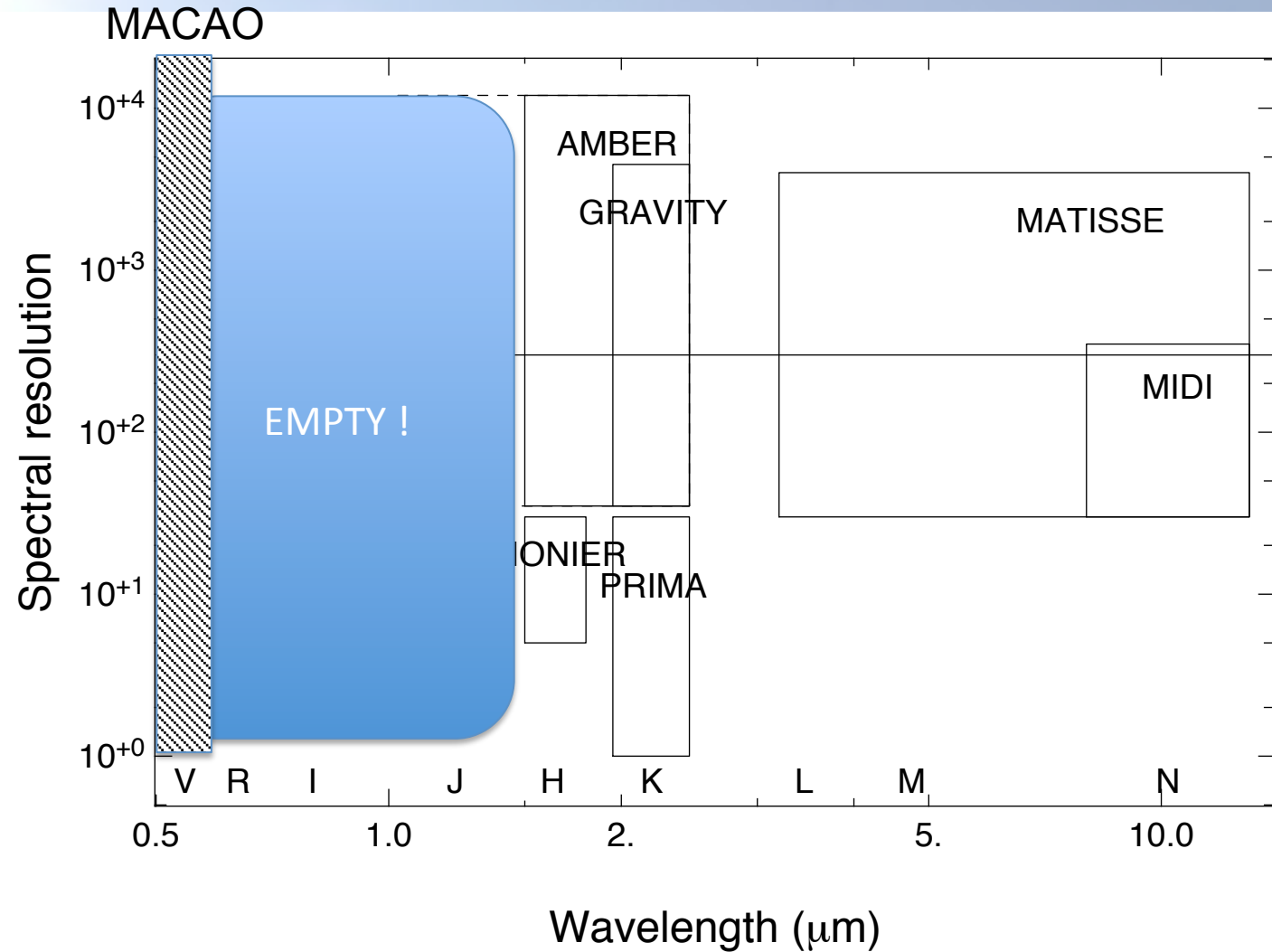
- 1-6T, J, H ou K
- R=30, 1500, 12000
- Meilleures images que AMBER

• MATISSE

- 4T, bandes L, M et N
- R=30, 300, 4500
- Des images dans l'infrarouge thermique



VLT-I for visible & J band

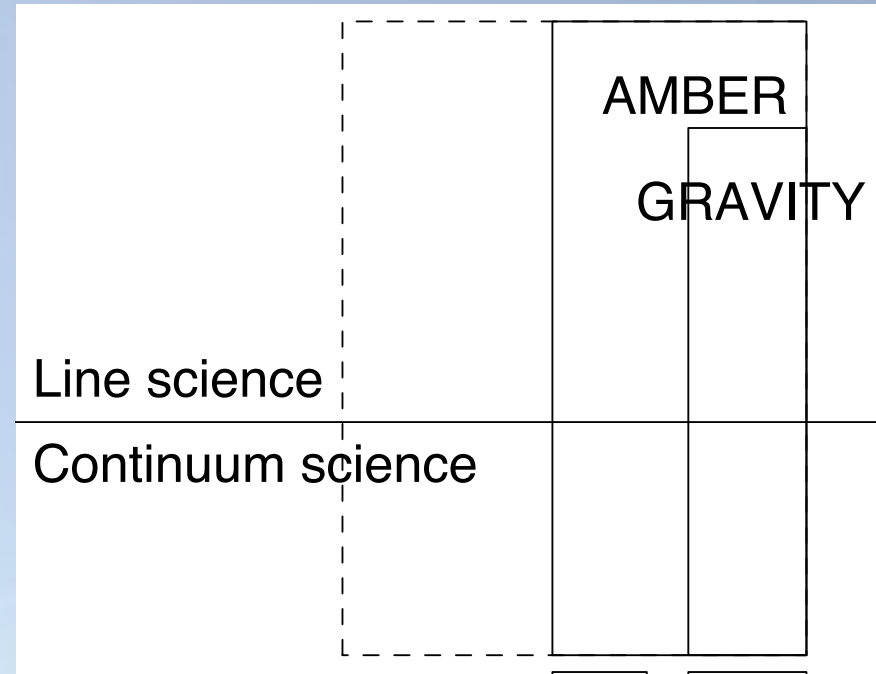


Instrument VLTI visible ?

- 4T, high spectral resolution, adapted for AO
- Techniquement faisable
(dichroïque MACAO/STRAP à changer)
- Sur les UTs ??
- Optique adaptative sur les ATs programmée
(NAOMI)
- JP Berger : « révision du plan VLTI avec une question ouverte sur la nécessité d'aller vers le visible. »

What about J ?

- Strongest infrared hydrogen line Paschen Beta
- Shocks diagnostic line He 1.080
- Factor 2 resolution vs K band
- AMBER never worked properly in J
- GTO AMBER (VLT-LIS-AMB-15830-0007)
 - 87 programs
 - 754 targets (repeated for different modes)
 - 93 targets priority J-MR or J-HR



2005, 2 ATs



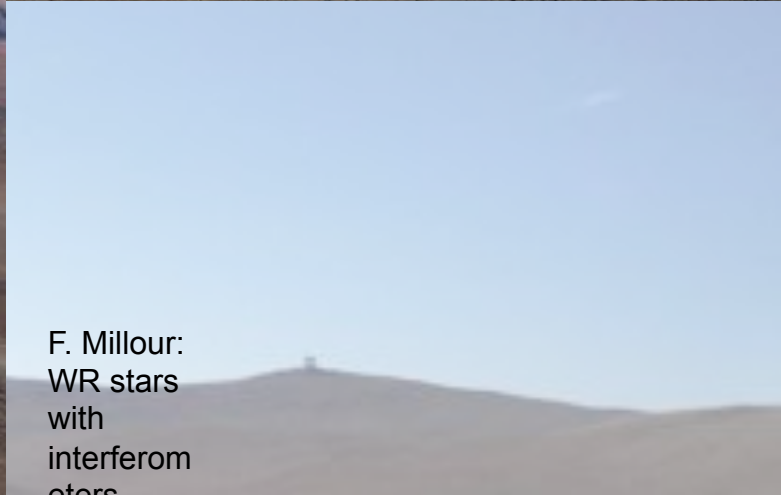
2009, 4 ATs



2015, 6 ATs?

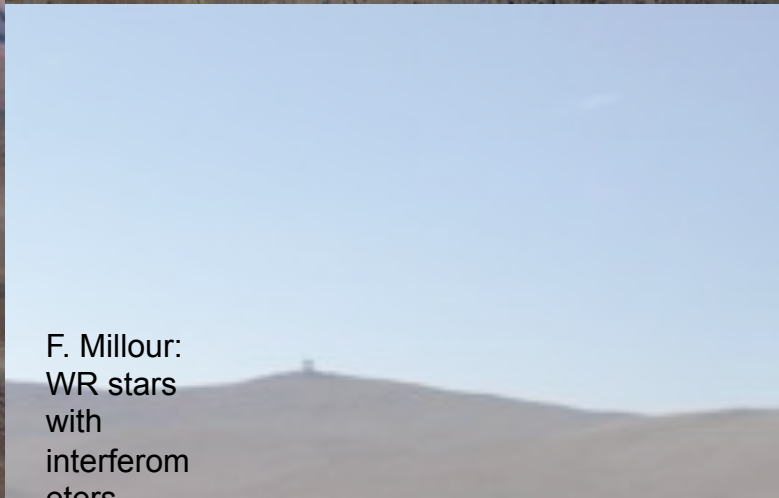
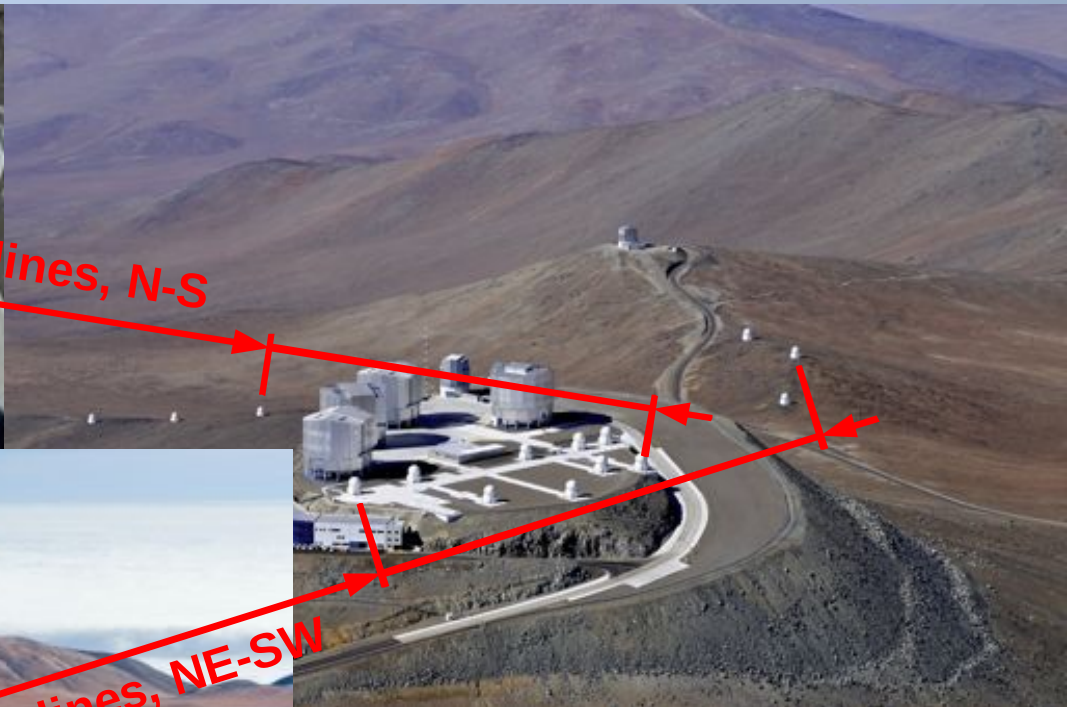


2020, 10 ATs?



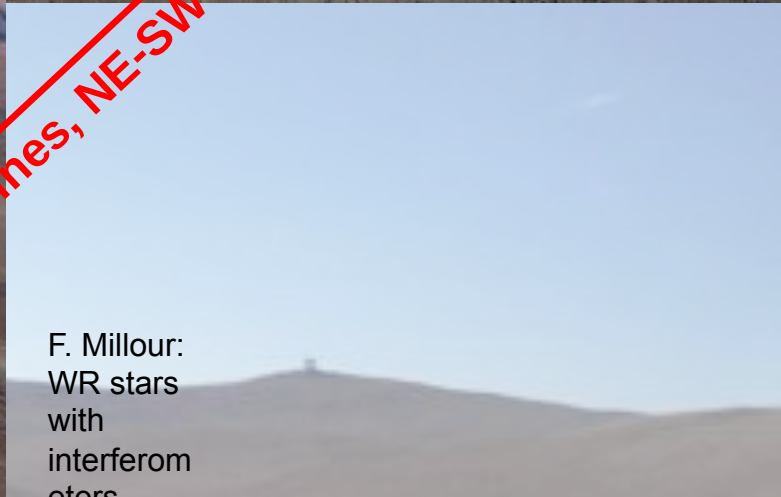
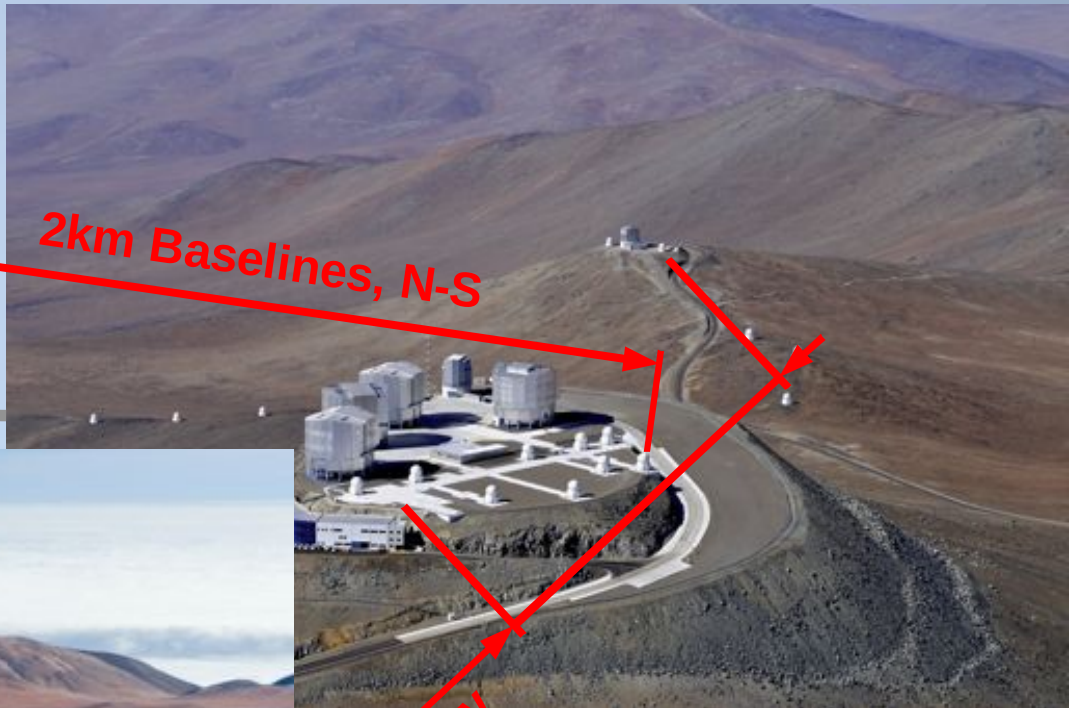
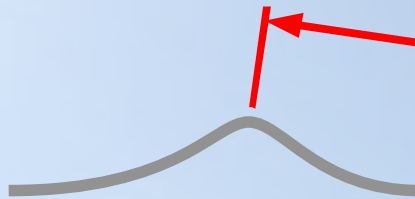
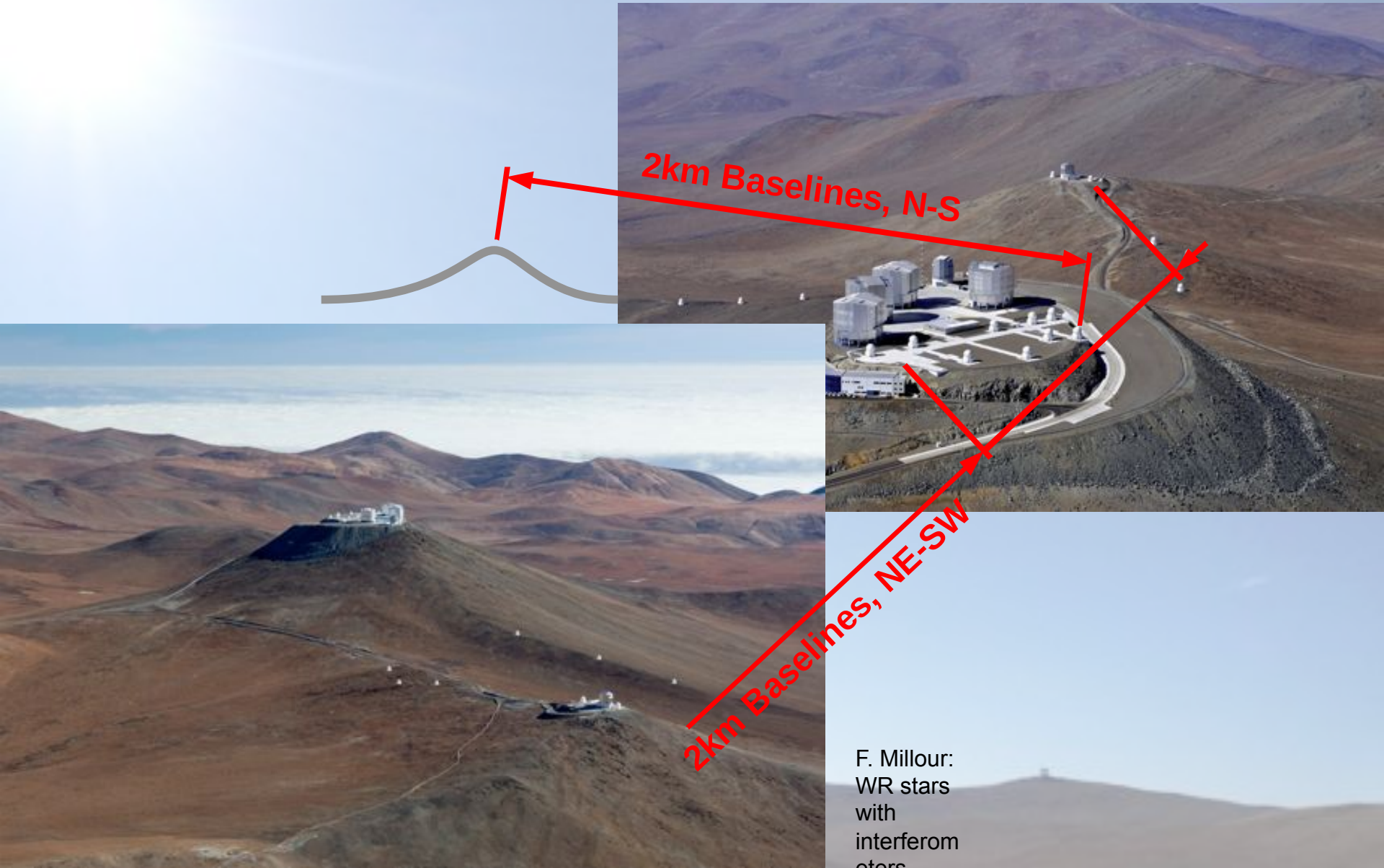
F. Millour:
WR stars
with
interferom
eters

2025, extension to 1km baselines



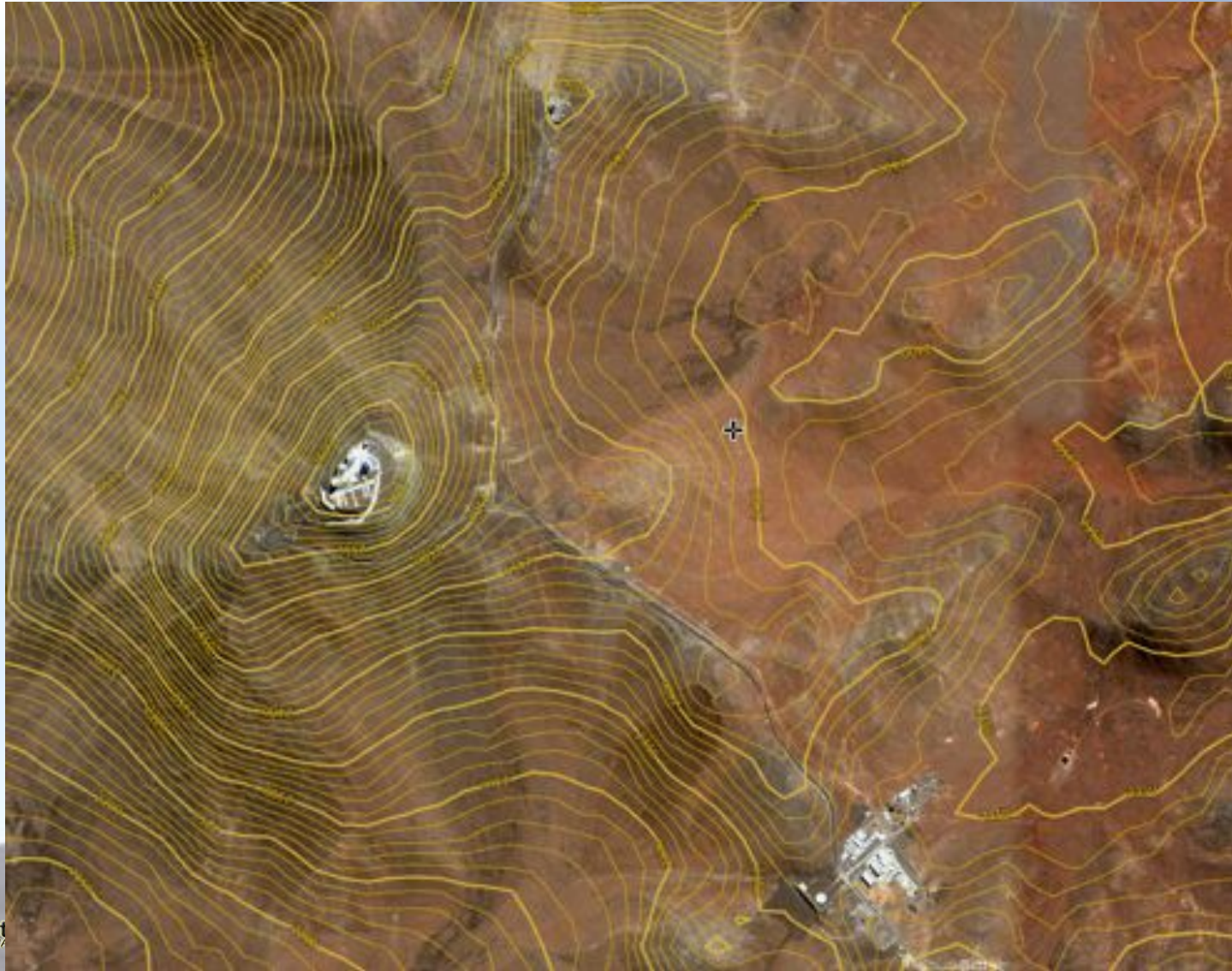
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2030: 2km baselines?

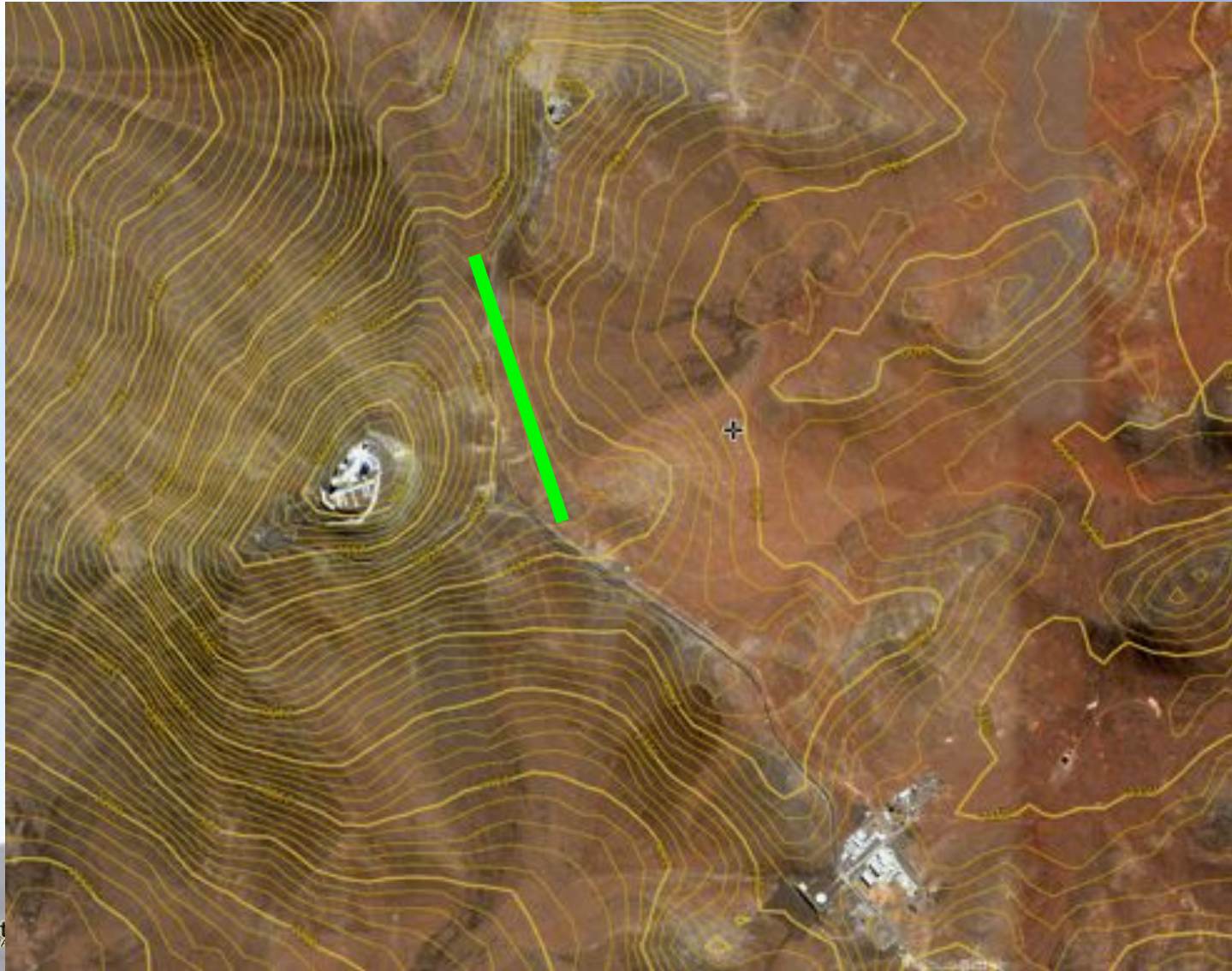


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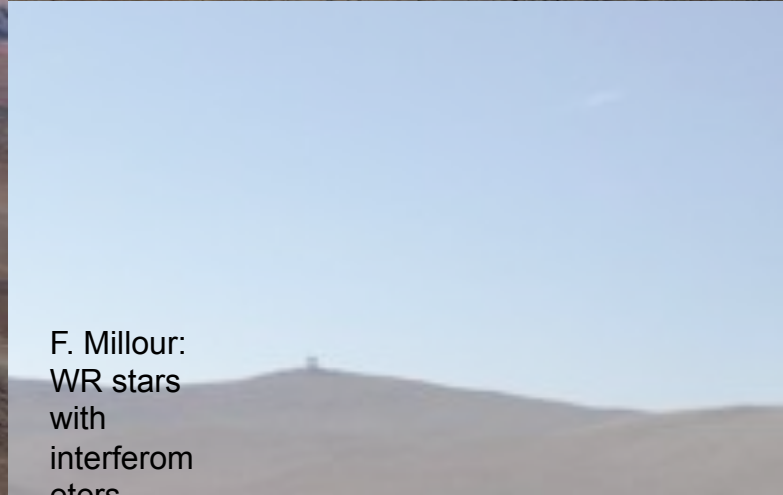
Where to put the DL?



Where to put the DL?



Where to put the DL!



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