21 July 2020

Ministry of Defence

Defence aspirations to sense through scattering media

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DSTL/PUB124657

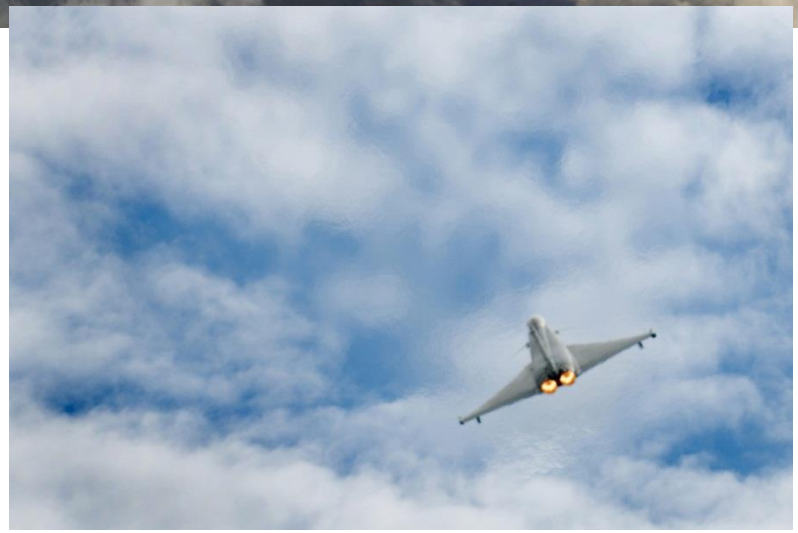
Background

- Focussed area of research for Dstl since 2016 through ITO (Imaging Through Obscurants) project
  - CDE/DASA call (phase 1 / phase 2 projects)
  - Quantum PhDs
  - UDRC project with Exeter/Glasgow
- Scenarios
  - Natural obscurants (Mist, Fog, Clouds (Water, Dust, Ice)
  - Man-made obscurants (Smoke, oil, brown-out, white-out)
  - Imaging through foliage and camouflage
  - Domains Maritime / Land / Air
  - Visible through to far infrared (14 μm) / Active and Passive

Mist / Fog

Courtesy of defence images
http://www.defenceimagery.mod.uk

Water clouds



Courtesy of defence images

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Dust storm

Courtesy of defence images

Smoke – man-made (mounted)

Courtesy of defence images

Brown-out

Courtesy of defence images

White-out

Courtesy of defence images

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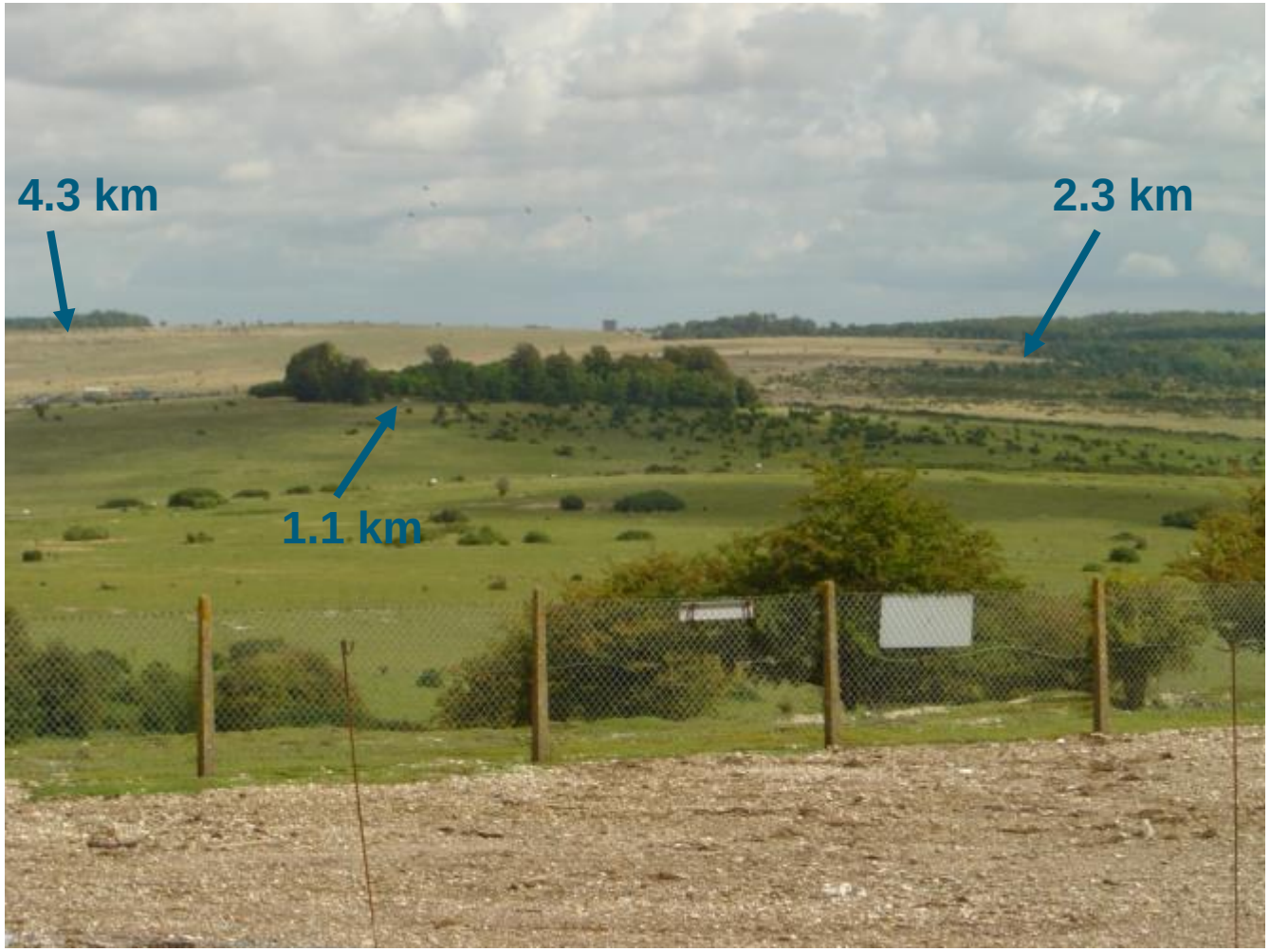
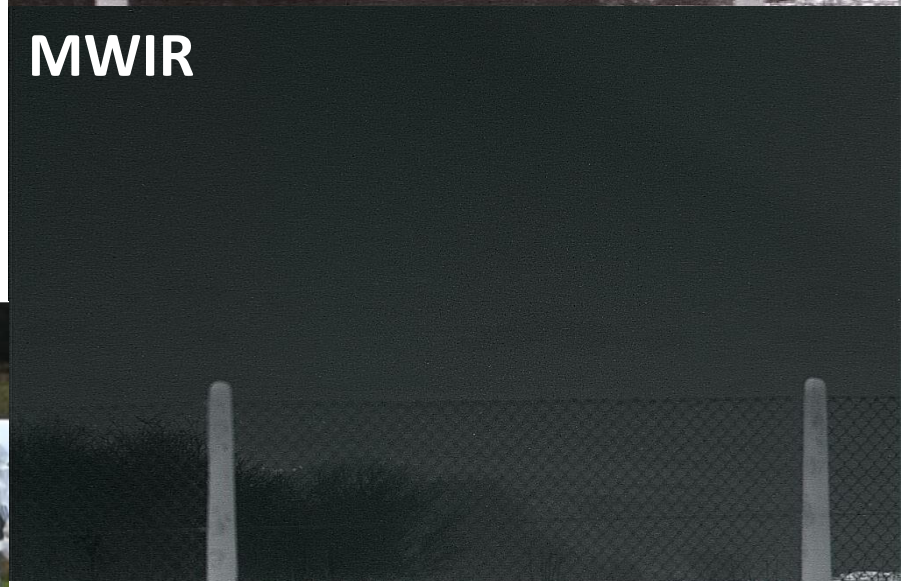
Porton Down range

Battery Hill Laboratory

Porton Down - 1.1 - 4.3 km ranges



Occasionally quite foggy

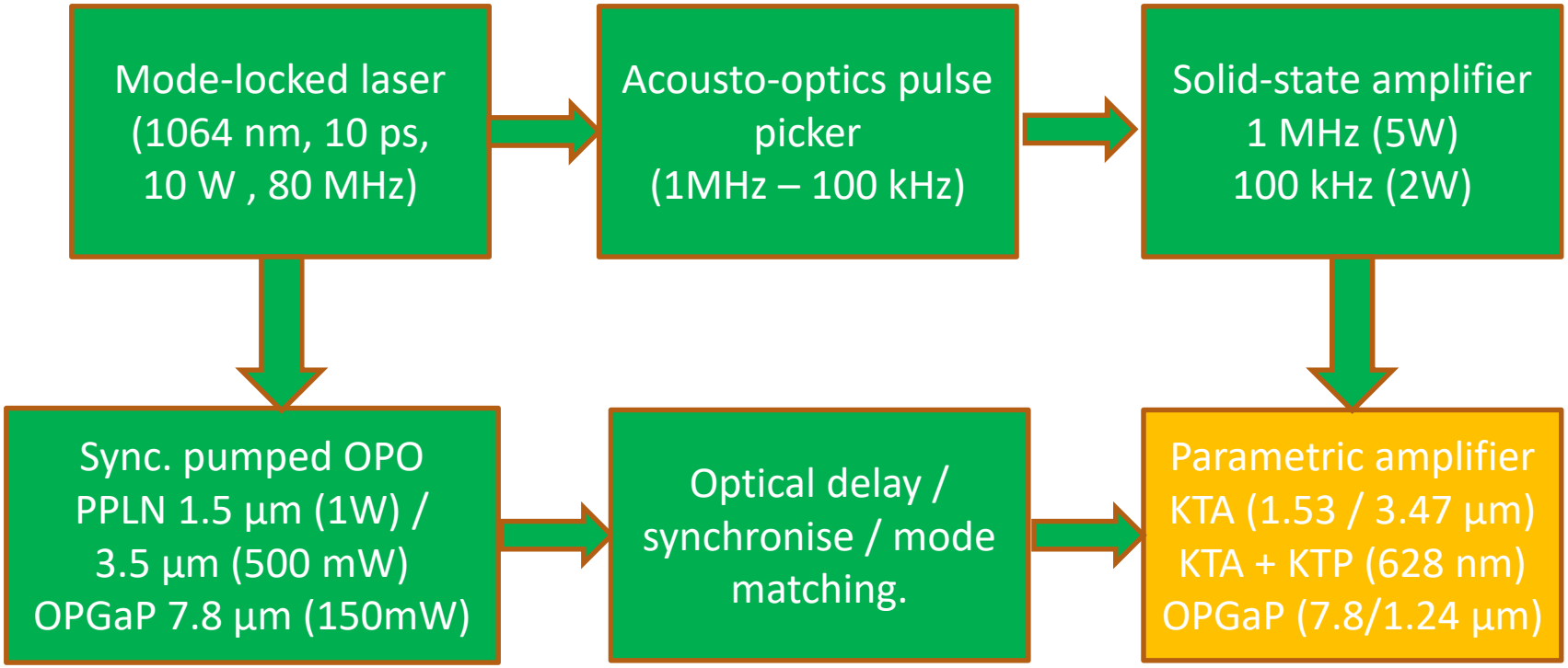


Thermal images courtesy of Leonardo

Future plans

- Push the low-photon counting techniques out to longer wavelengths (mid-infrared and long-wave infrared).
- Exploit and further develop the image processing techniques and concepts developed through UDRC
- Schedule trials activities (November / March) to coincide with foggy weather (back-up foliage)
- Exploit emerging detector developments
  - SPEXS (InAs, SN-SPD), RCE-PD, Up-conversion
- Develop short-pulse infrared laser source and make it available for trials on the range.

Dstl Picosecond laser development



Questions