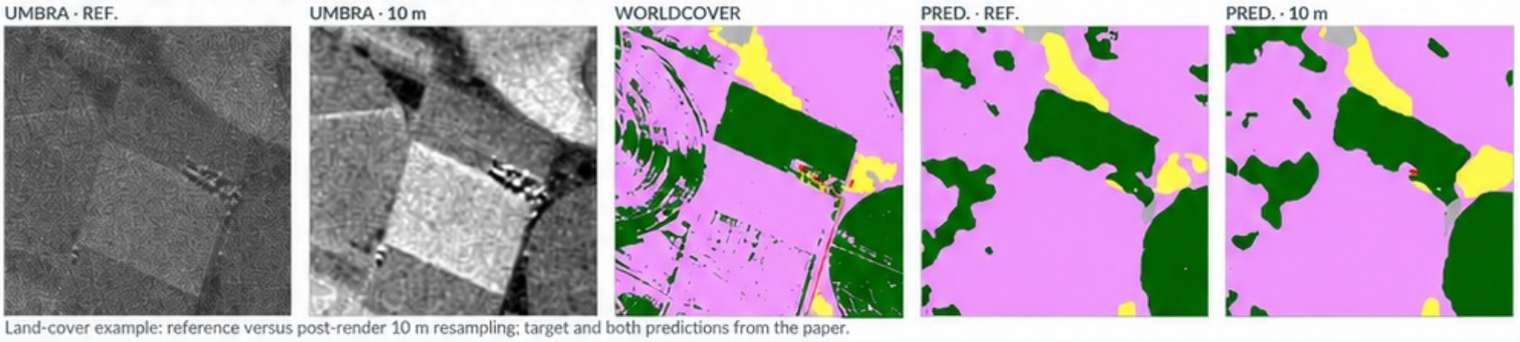
SARLAND

When Spatial Detail Matters in Very-High-Resolution SAR

Malo de Pastor[123] · Kaushik Pillalamarri[14] · Valerio Marsocci[1]
ESA Φ-lab · Télécom SudParis / IP Paris · North Carolina State University

SARLAND: DATASET & LAND COVER

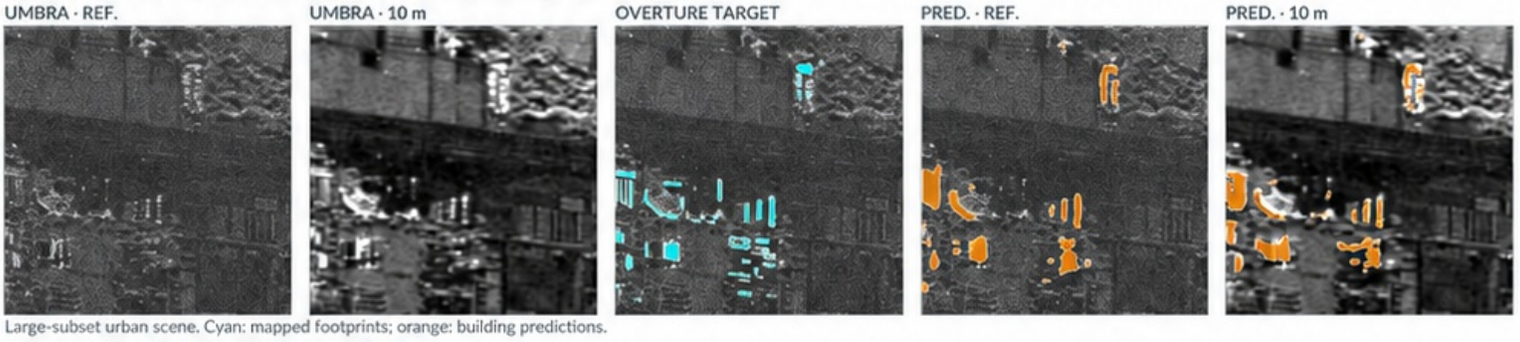
67,083 crops from 1,406 passes · Umbra SLC · Sentinel-1 VV/VH · WorldCover
1024 × 1024 crops; ~0.8 m sampling grid (not a uniform physical resolution).



Land-cover example: reference versus post-render 10 m resampling; target and both predictions from the paper.

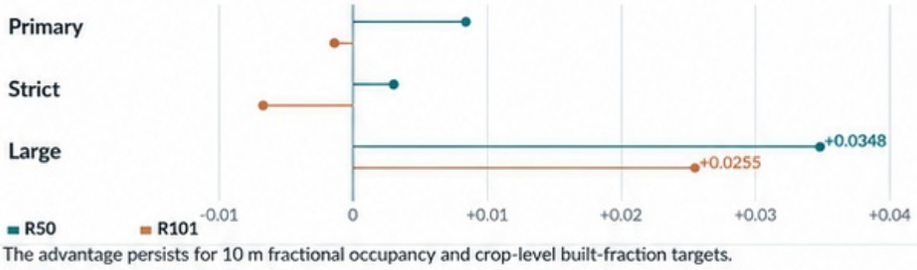
BUILDINGS: LARGER FOOTPRINTS, STRONGER EFFECT

Against our expectation, the strongest reference advantage is in the Large subset.



Large-subset urban scene. Cyan: mapped footprints; orange: building predictions.

BUILDING IoU: REFERENCE MINUS 10 m



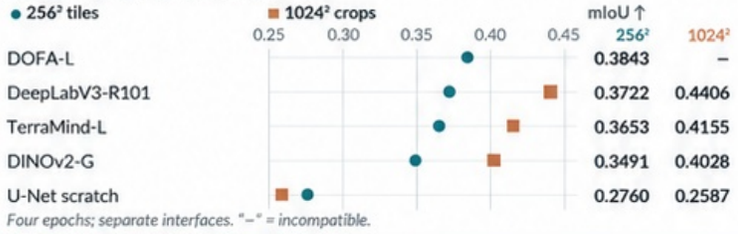
LARGE CONTROL

540 crops · 53 passes
All six seed × backbone comparisons are positive
82.4% of crops favor reference (R50)

The advantage persists for 10 m fractional occupancy and crop-level built-fraction targets.

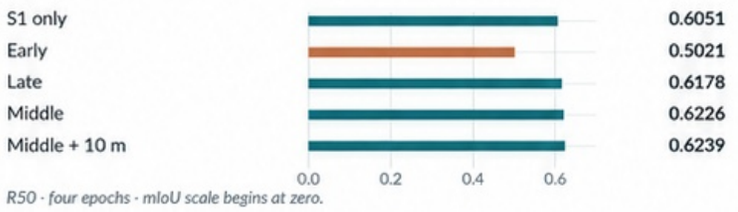
MODELS & BENCHMARK

35 configs on 256² · 20 on 1024²
Selected models · land-cover test mIoU



Four epochs; separate interfaces. "–" = incompatible.

SENTINEL-1 / UMBRA FUSION

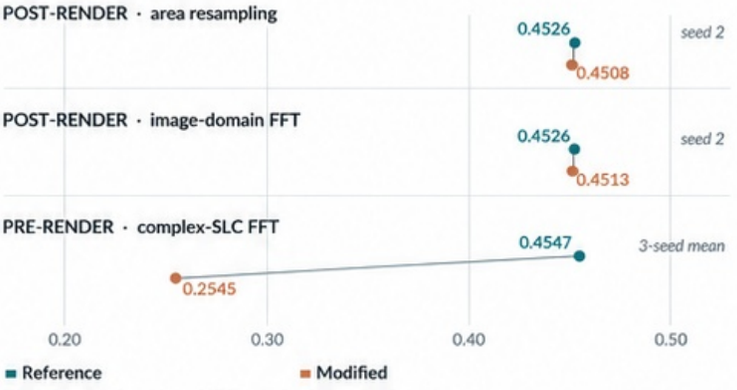


R50 · four epochs · mIoU scale begins at zero.

WHAT DOES "10 m" MEAN?

Processing stage matters: same nominal scale does not imply equivalent operators.

LAND-COVER mIoU



Distinct experiments — NOT matched transfer functions.
The independent-looks explanation is plausible, but was not directly measured.

TAKEAWAY

Nominal SAR spatial scale alone does not specify what information is removed.

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Data: ONERA/S1_GRD_LC · building polygons from Overture (not redistributed).
Limits: pass-disjoint ≠ geography-disjoint; annotation dates differ.

Refs: SARLO-80 (2026); Goodman (1976); Moreira et al. (2013); ESA WorldCover.

DATA REO-2