

6Img-to-3D

**Few-Image Large-Scale Outdoor
Novel View Synthesis**

Théo Gieruc*, Marius Kästingschäfer*,
Sebastian Bernhard, Mathieu Salzmann



6Img-to-3D.github.io/

Collaborators



Théo
Gieruc



Marius
Kästingschäfer



Sebastian
Bernhard



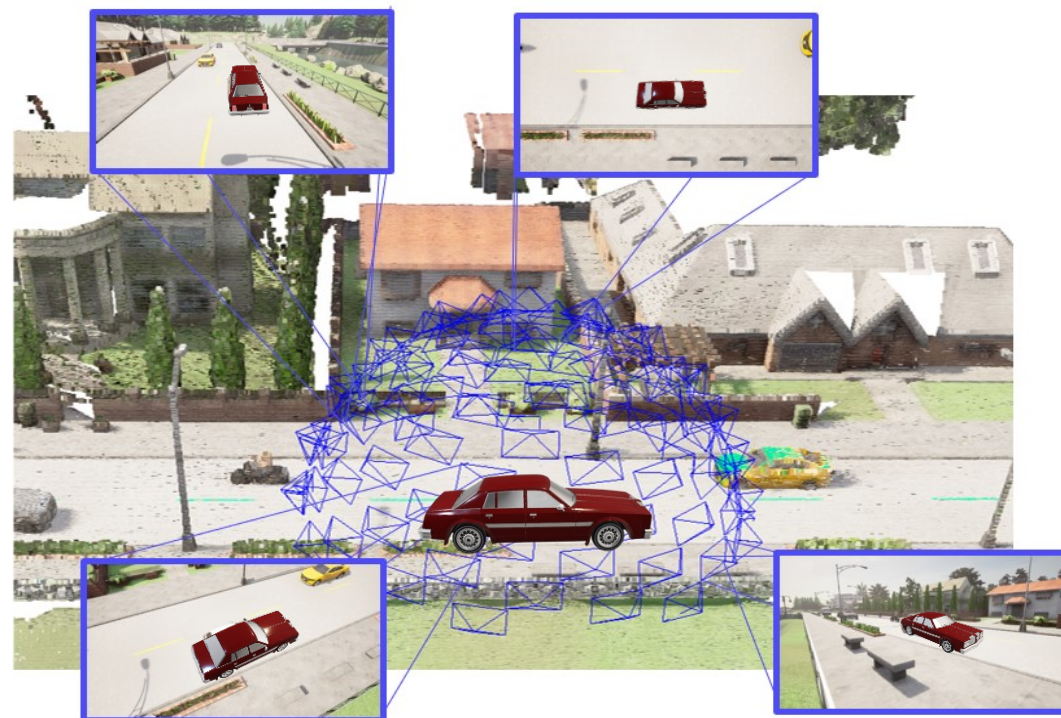
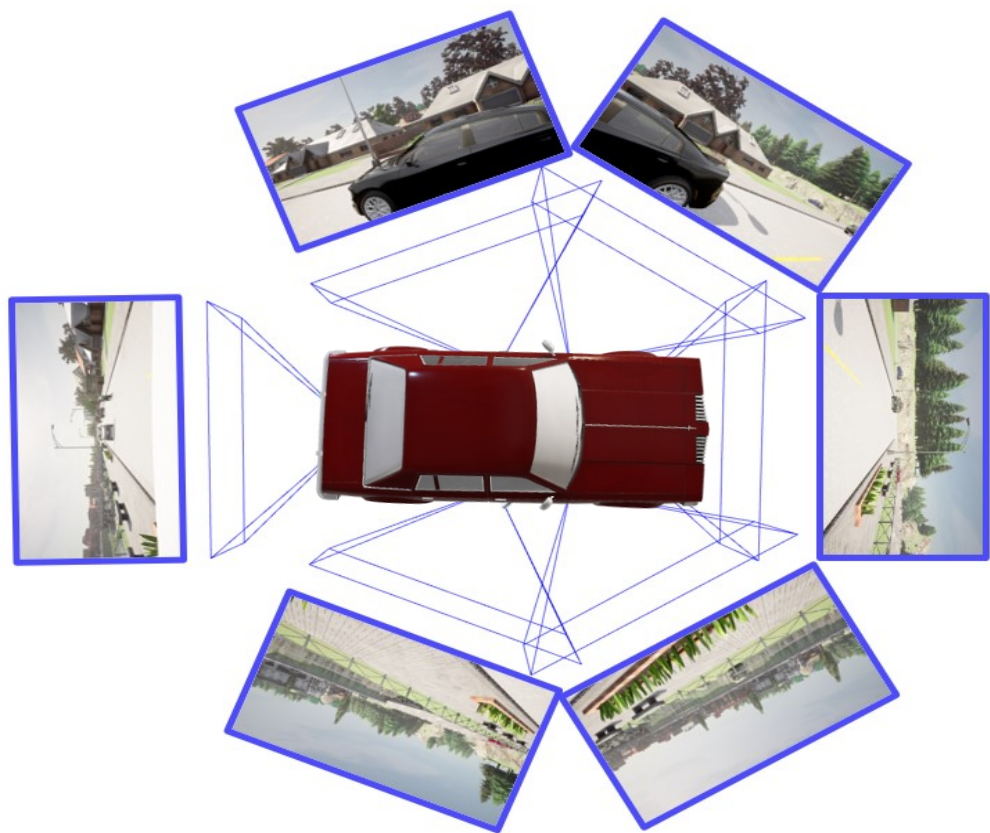
Mathieu
Salzmann



Novel View Synthesis

Moving beyond Birds-Eye View (BEV) only

Goal: Given six input views, we want to perceive a 3D scene and generate novel exocentric views with it.



Task Difficulties

Little Overlap of Views and Feedforward Requirement



Inward-facing



Outward-facing

Novel View Synthesis

Moving beyond Birds-Eye View (BEV) only



Egocentric Views



Exocentric Views

SEED4D Dataset

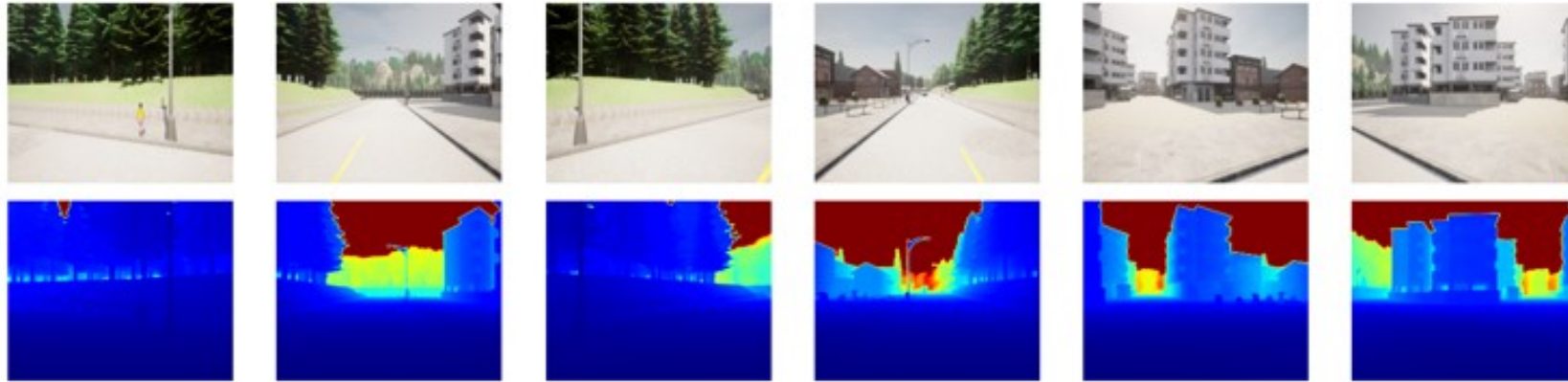
Synchronized Ego—Exo Views

- We use the **SEED4D** (WACV'25) dataset.
- Consisting of < 2000 Scenes (**1900** for training)
- Mixture of synchronized **6 egocentric** and **100 exocentric** images per Scene for supervision in training



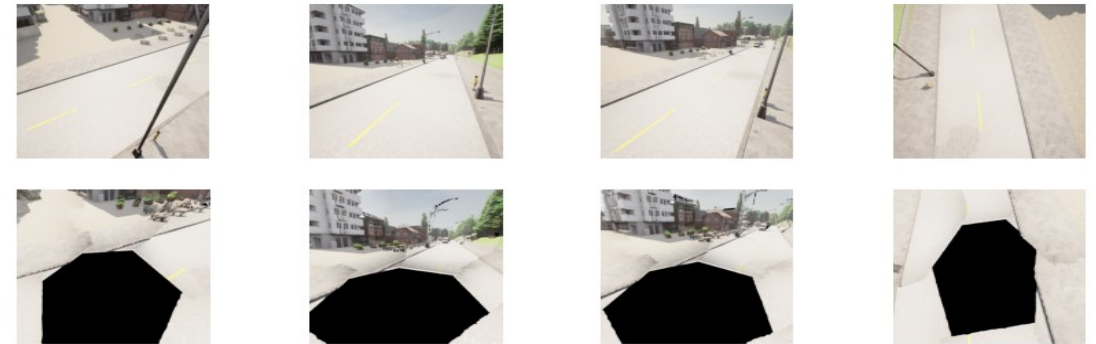
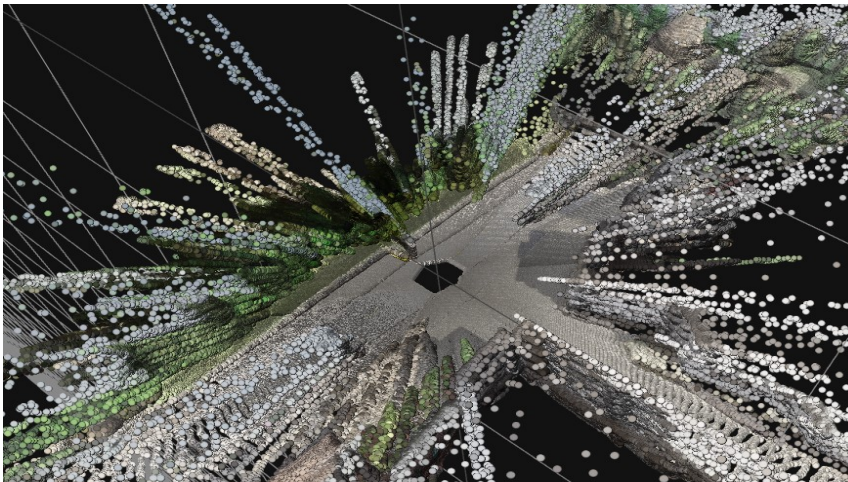
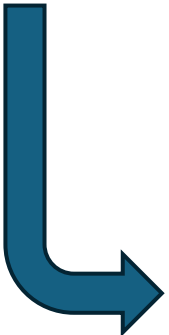
Naïve Baseline from Depth Estimation

Unprojecting Depth Information



Monocular Depth Estimation

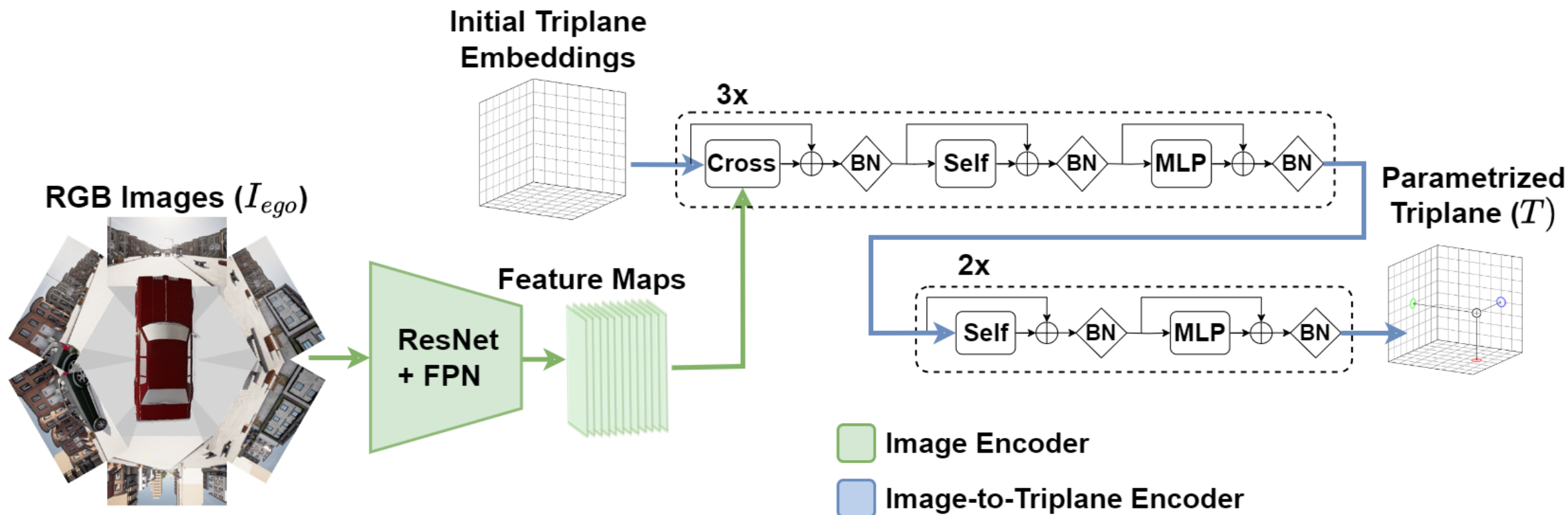
Depth
unprojection



Novel View Rendering

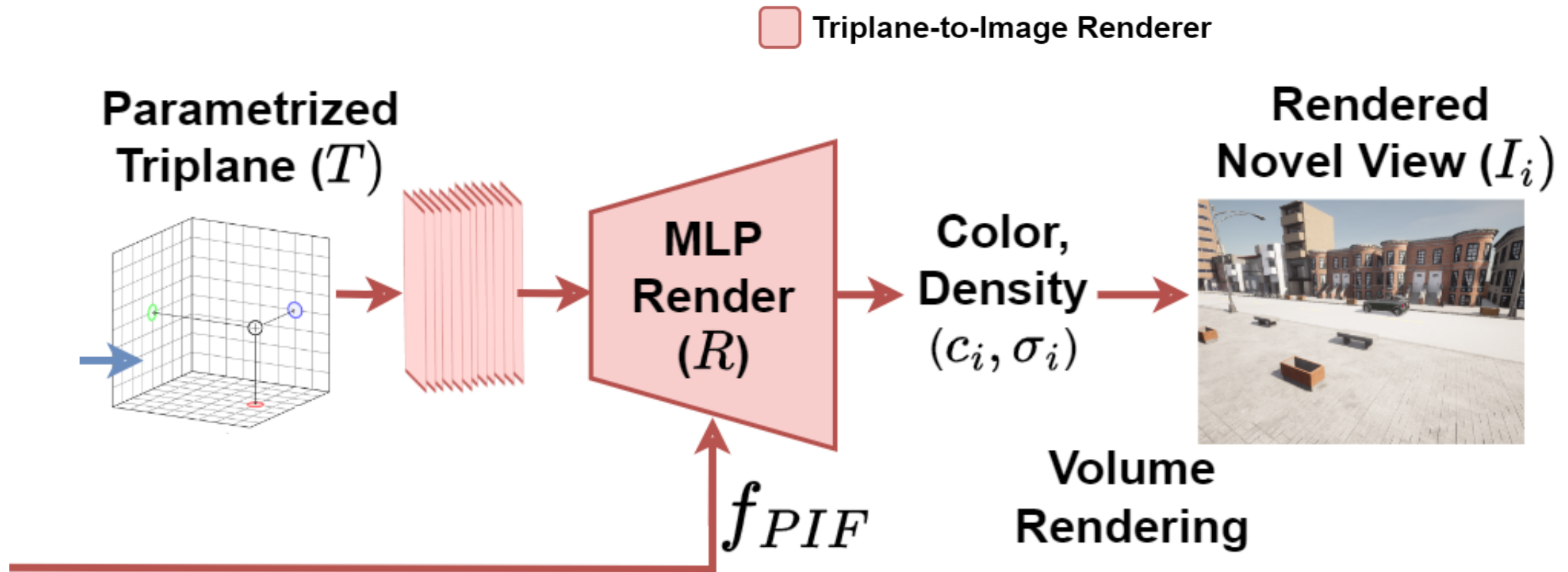
Our approach: 6Img-to-3D

Egocentric Images to TriPlane



Our approach: 6Img-to-3D

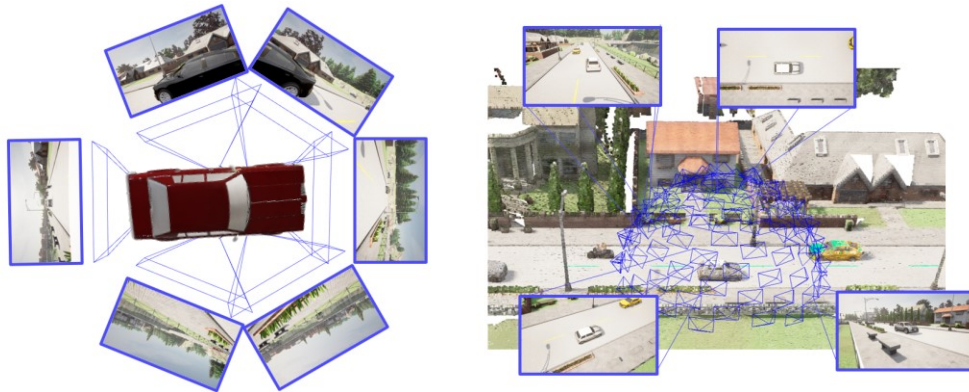
Triplane to Novel Exocentric Views



Quantitative Results

Single-shot Novel View Synthesis

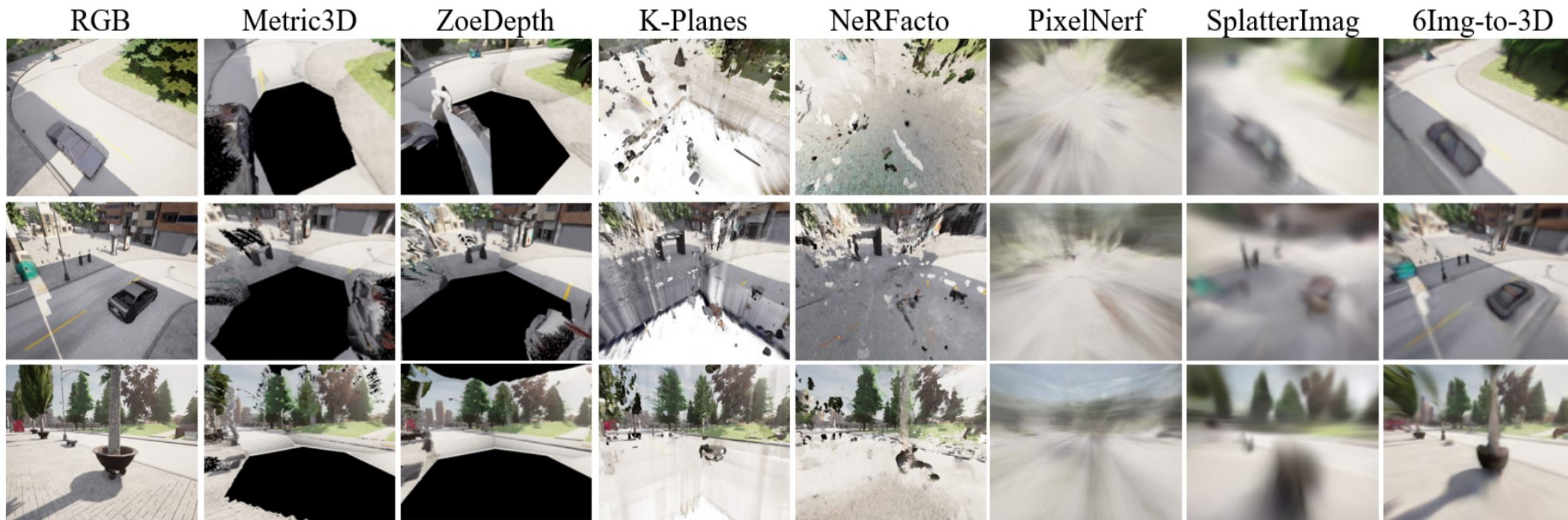
We test monocular depth methods, iterative per-scene optimization methods, and feedforward methods.



Methods	PSNR $\uparrow$	SSIM $\uparrow$	LPIPS $\downarrow$	DRMSE $\downarrow$
ZoeDepth	5.466	0.254	0.563	11.728
ZoeDepth [‡]	14.202	0.661	0.292	9.378
Metric3D	6.314	0.296	0.554	10.049
Metric3D [‡]	13.699	0.600	0.336	8.655
NeRFacto	10.943	0.298	0.791	—
K-Planes	11.356	0.463	0.633	—
SplatFacto	11.607	0.486	0.658	—
PixelNeRF	14.500	0.550	0.652	19.235
SplatterImage	17.791	0.580	0.568	11.049
6Img-to-3D	18.682	0.726	0.451	6.232

Qualitative Results

Single-Shot Novel View Synthesis



Ablation

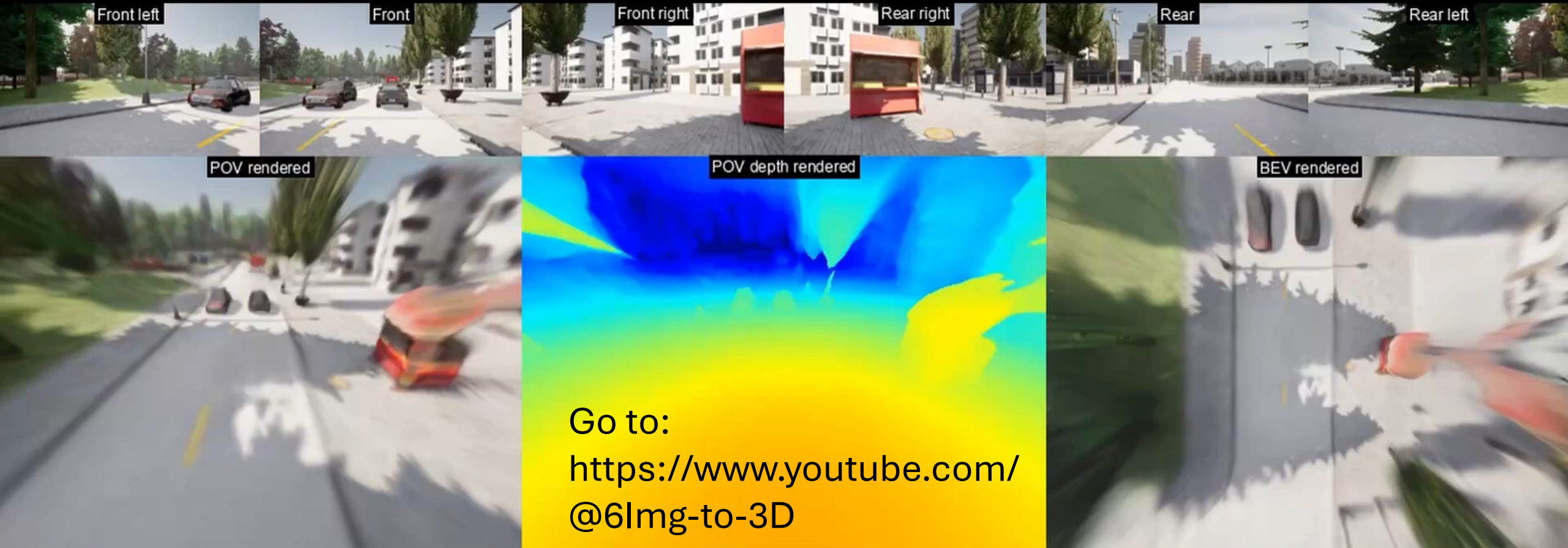
Effectiveness of individual model components

Method Sampling	PSNR $\uparrow$		SSIM $\uparrow$		LPIPS $\downarrow$	
	Single	Double	Single	Double	Single	Double
w/o SC	17.155	17.352	0.699	0.721	0.487	0.474
w/o $\mathcal{L}_{LPIPS}$	18.674	18.812	0.718	0.731	0.551	0.537
w/o f_{PIF}	18.201	18.256	0.714	0.718	0.482	0.487
6Img-to-3D	18.567	18.683	0.712	0.726	0.451	0.451



6Img-to-3D

Few-Image Large-Scale Outdoor Driving Scene Reconstruction



Go to:
<https://www.youtube.com/@6img-to-3D>

<https://6img-to-3d.github.io/6img-to-3D/>

Sim-to-Real

Single-shot Novel View Synthesis

Synthetic (SEED4D)

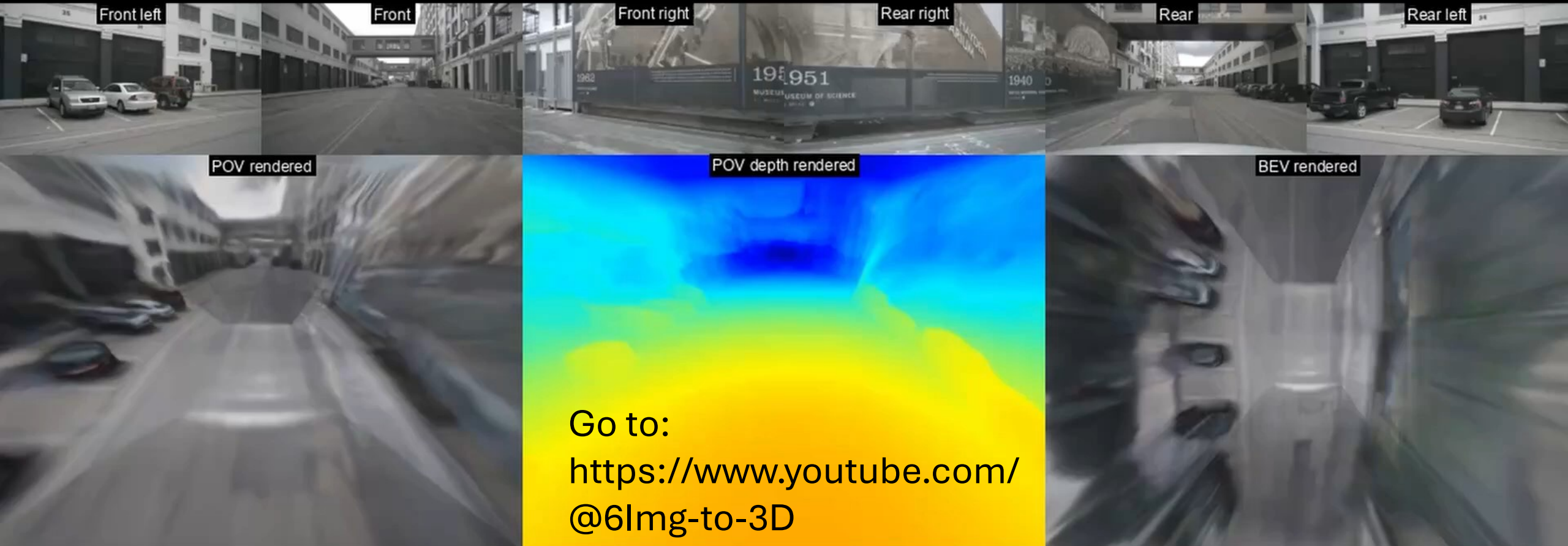


Real (nuScenes)



6Img-to-3D

Few-Image Large-Scale Outdoor Driving Scene Reconstruction





SEED4D

A Synthetic Ego–Exo Dynamic 4D Driving
Dataset, Data Generator and Benchmark

6Img-to-3D

Few-Image Large-Scale Outdoor Novel
View Synthesis

