

AVANTIX

Avancement Simulateur IQ

AVANTIX

pdw2h5

pdw2h5

Problème d'ouverture du fichier tjrs présent
StandBy

AVANTIX

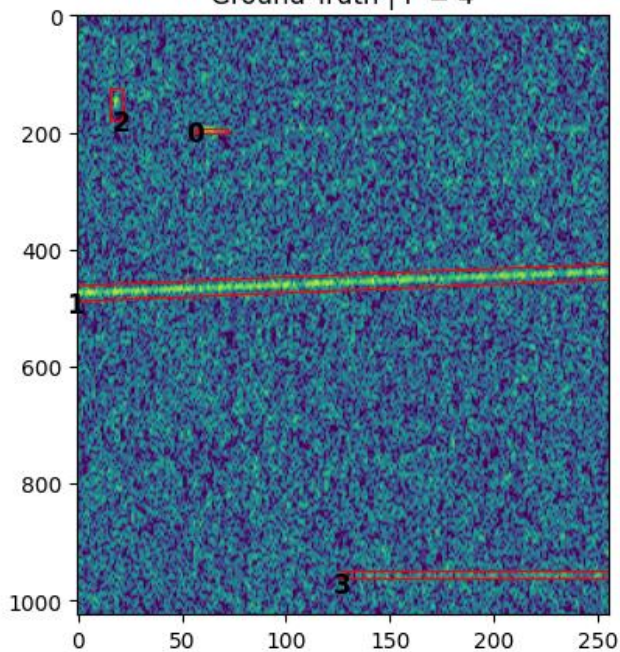
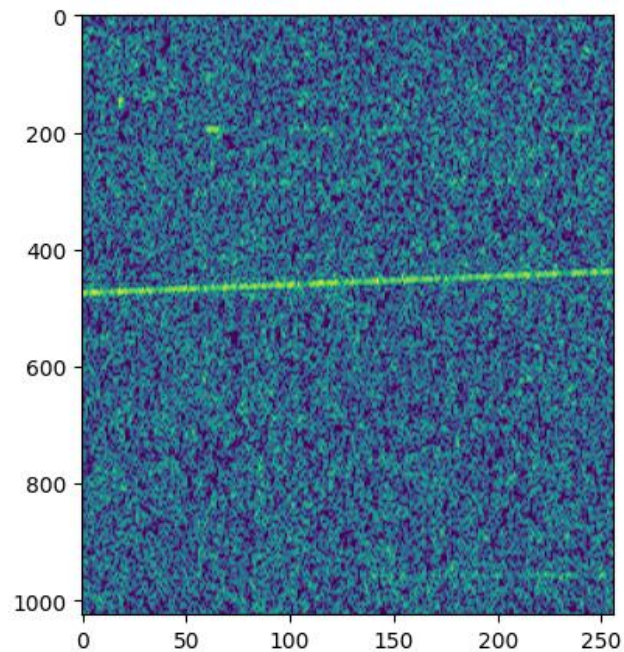
BT-202d

- 40 644 images 80% train, 20% val et 20% test
- $\sigma_{\text{noise}} = 1\text{mV}$, $f_{\text{c_rec}} = 2,5\text{GHz}$, $f_{\text{s}} = 1\text{GSps}$
- RADAR seul
- $n_{\text{perseg}} = [128, 256, 512, 1024]$, $n_{\text{fft}} = 1024$, $n_{\text{overlap}} = n_{\text{perseg}}/2$
- $\text{snr_eff_db_min} = -5\text{dB}$
- Mise à l'échelle : $\text{min} = 1^{\text{er}} \text{ décile}$, $\text{max} = 1000 * 1^{\text{er}} \text{ décile}$
- **Aspect ratio max = 10:1**
- **Min w_h = 5 pix**
- **width x height : 256 x 1024**
- **Meilleur modèle :**
`tuning_nano_Adam_fraction_1_reg_max_16_single_cls_with_dfl/
train11/weights/best.pt`

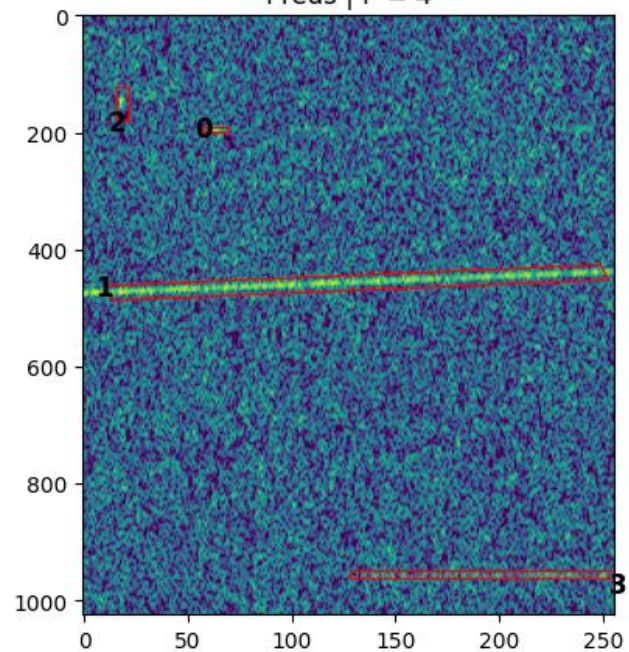
Inférence sur test

seed:0, rec_33736_fs_1000.0MSps_nperseg_128.txt

Ground Truth | $P = 4$



Preds | $P = 4$

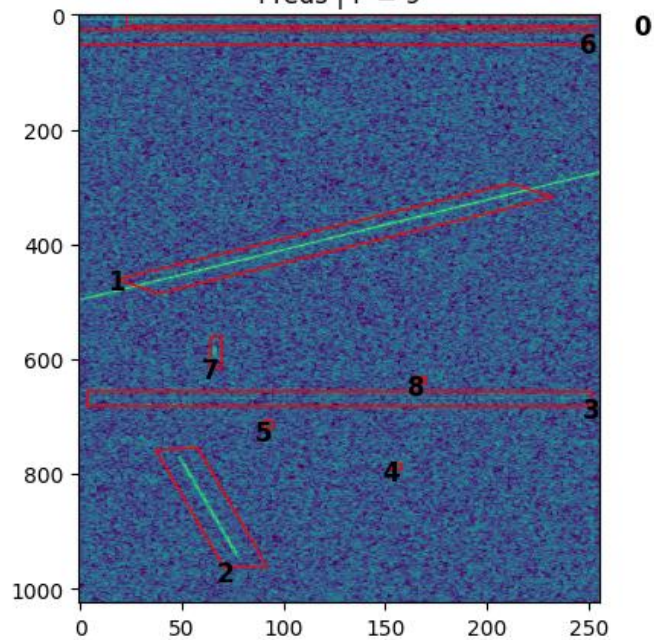
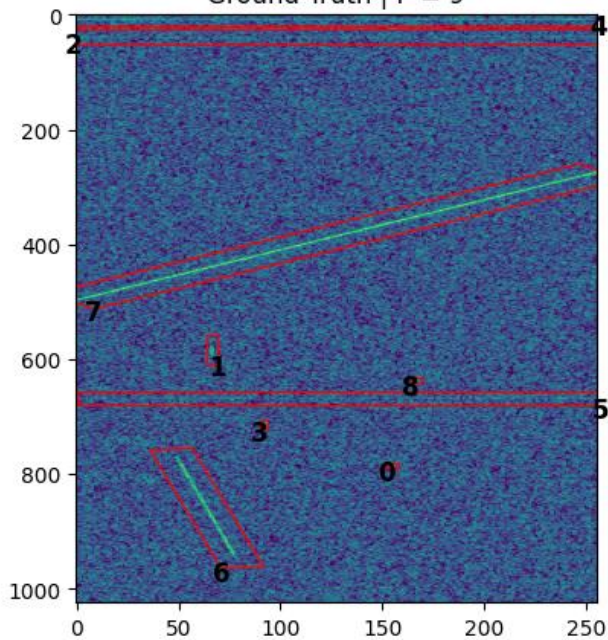
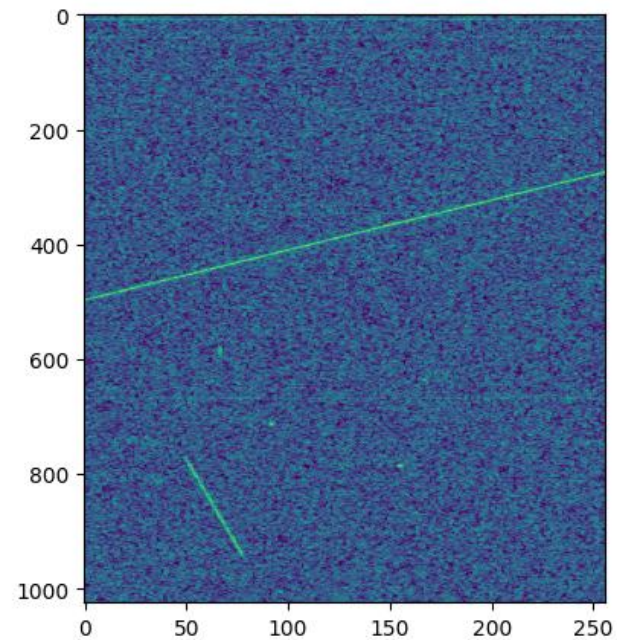


Inférence sur test

seed:1, rec_27392_fs_1000.0MSps_nperseg_512.txt

Ground Truth | $P = 9$

Preds | $P = 9$

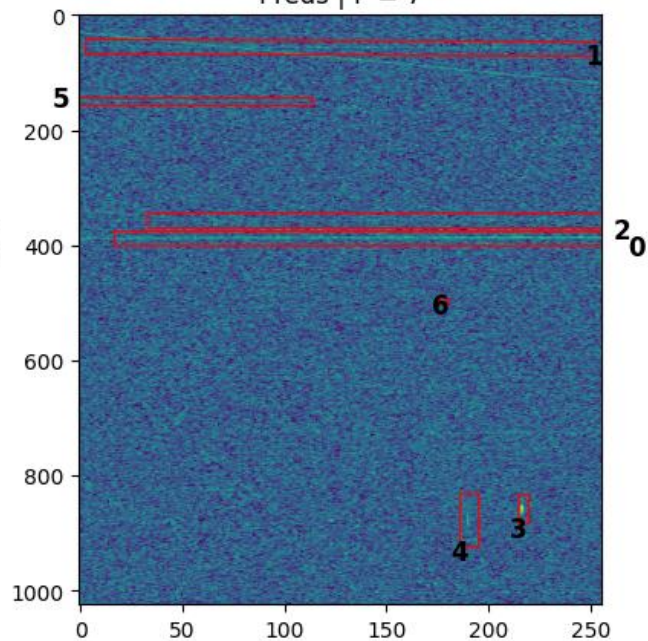
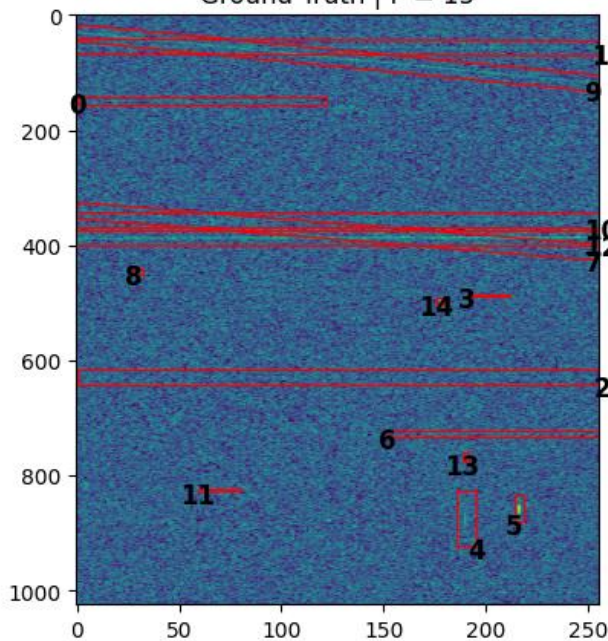
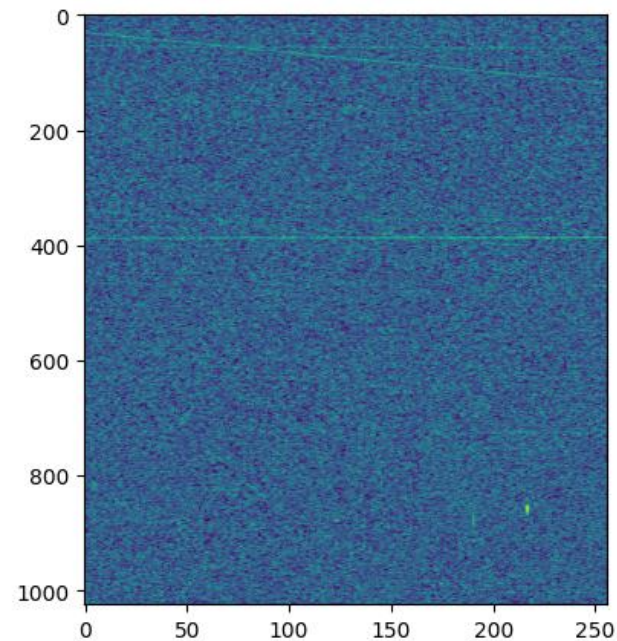


Inférence sur test

seed:2, rec_26538_fs_1000.0MSps_nperseg_1024.txt

Ground Truth | P = 15

Preds | P = 7

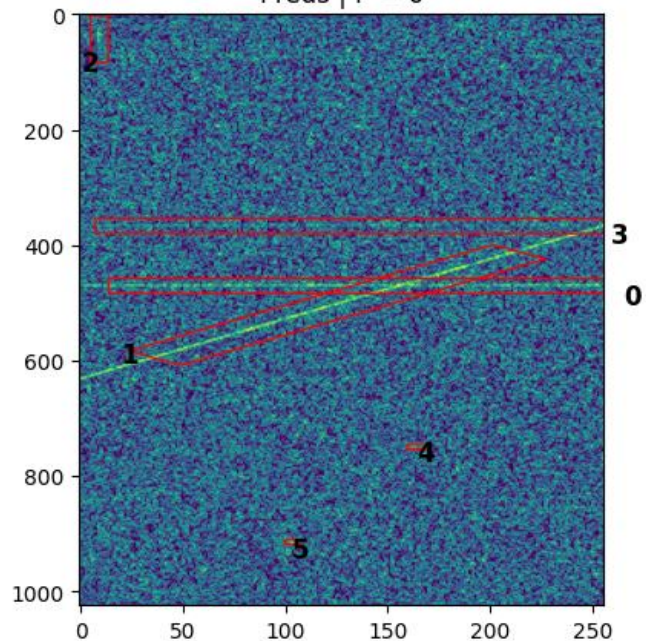
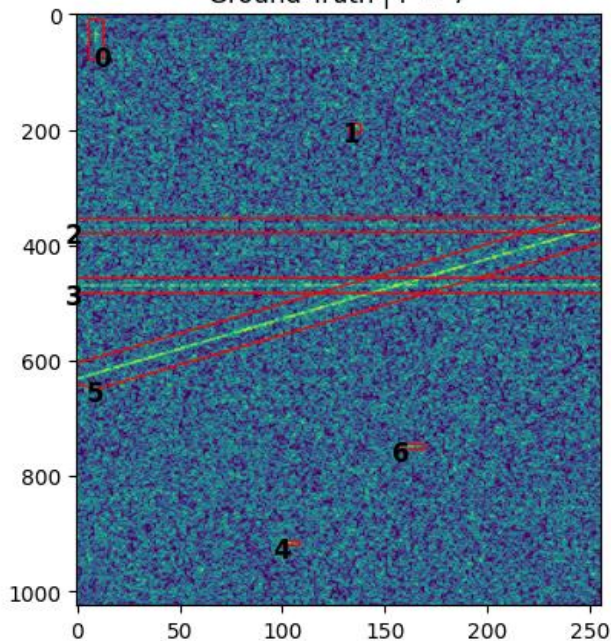
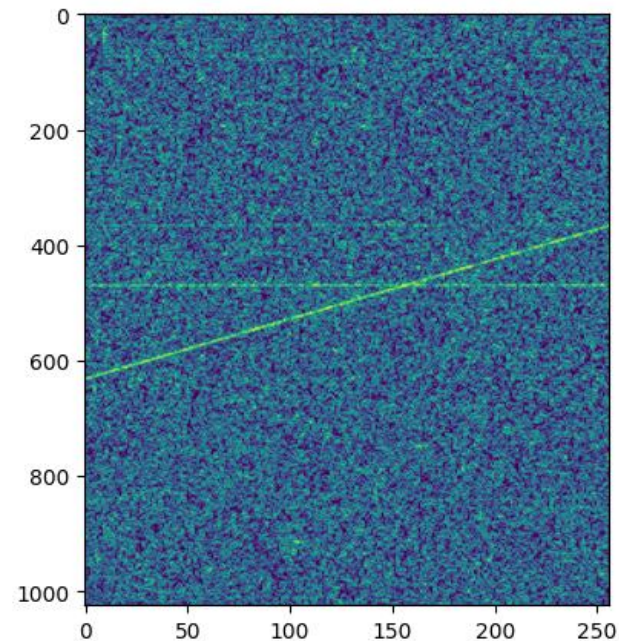


Inférence sur test

seed:3, rec_349_fs_1000.0MSps_nperseg_256.txt

Ground Truth | $P = 7$

Preds | $P = 6$

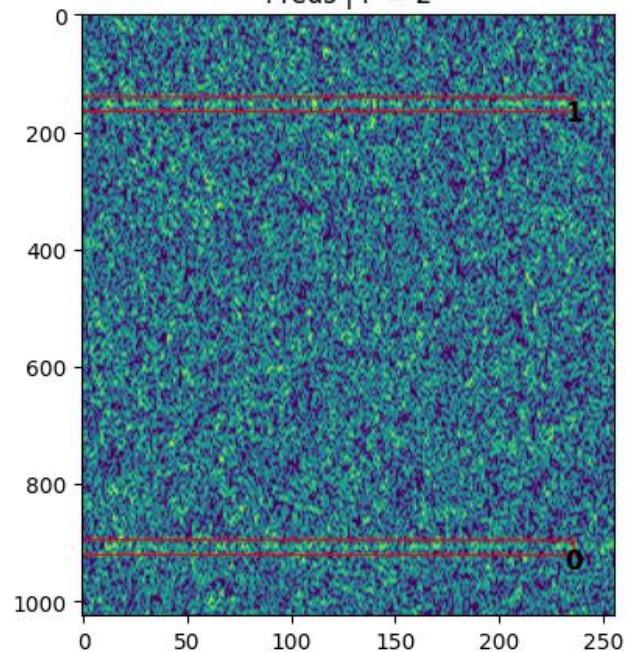
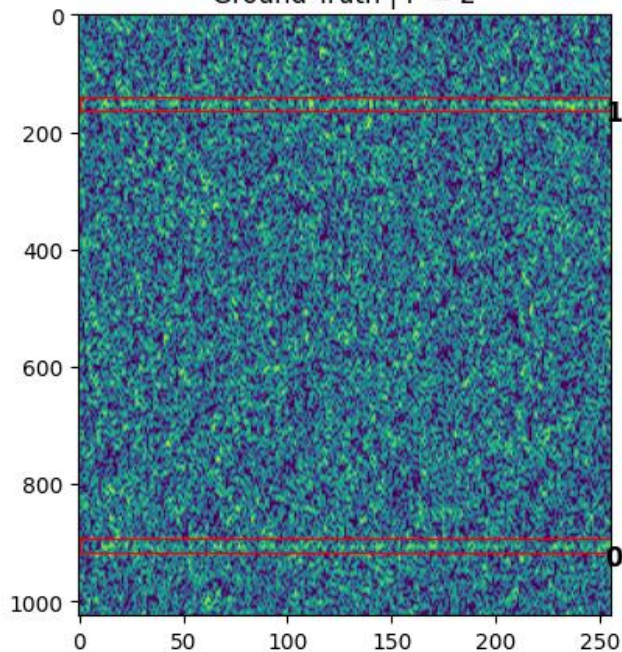
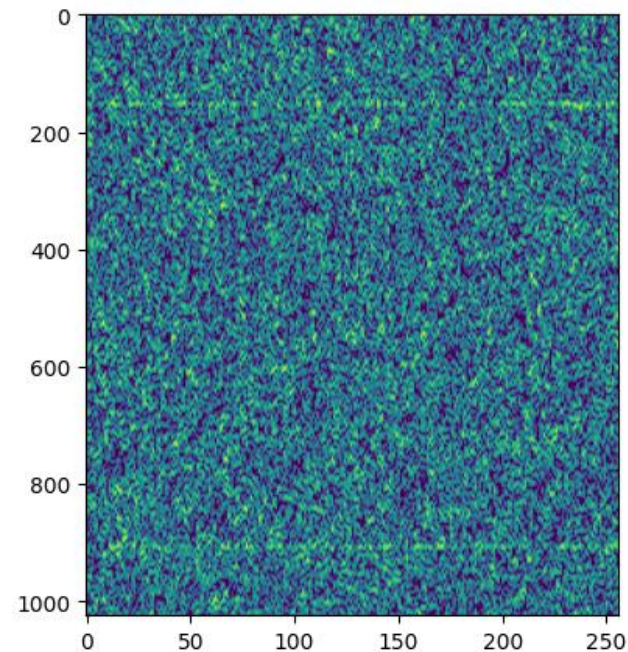


Inférence sur test

seed:4, rec_26369_fs_1000.0MSps_nperseg_128.txt

Ground Truth | $P = 2$

Preds | $P = 2$

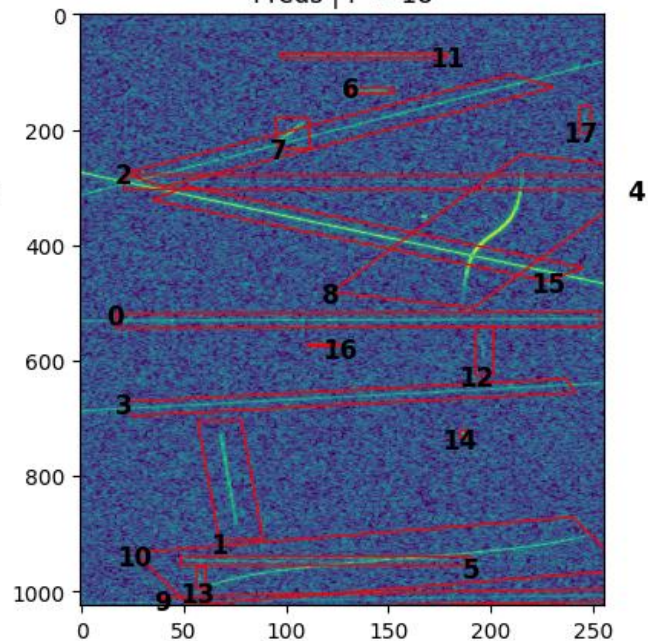
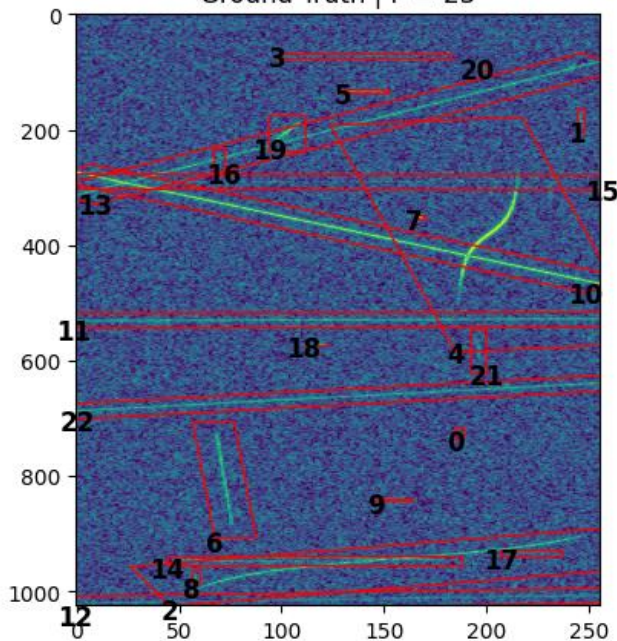
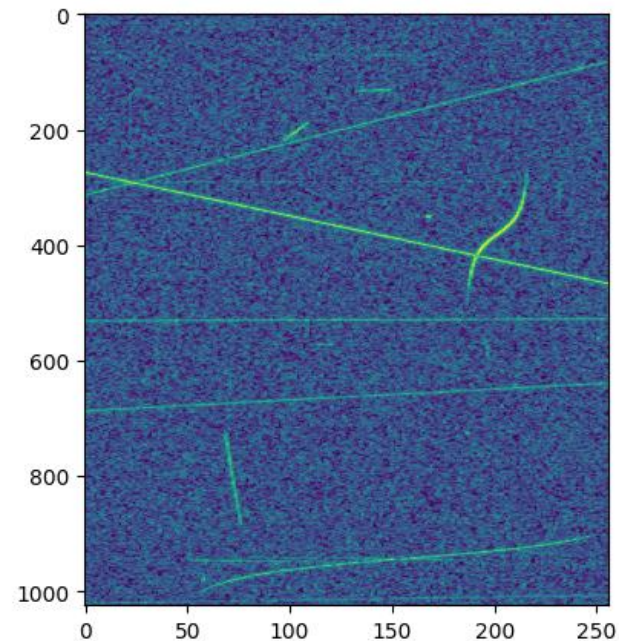


Inférence sur test

seed:5, rec_19691_fs_1000.0MSps_nperseg_512.txt

Ground Truth | P = 23

Preds | P = 18

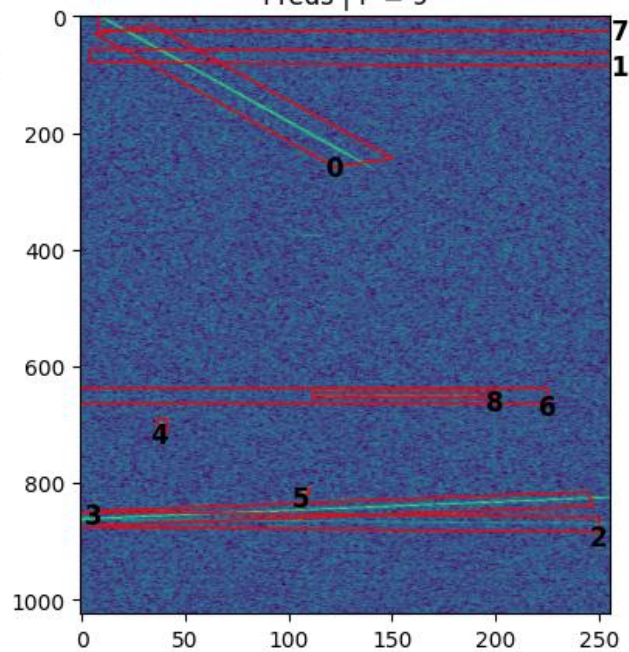
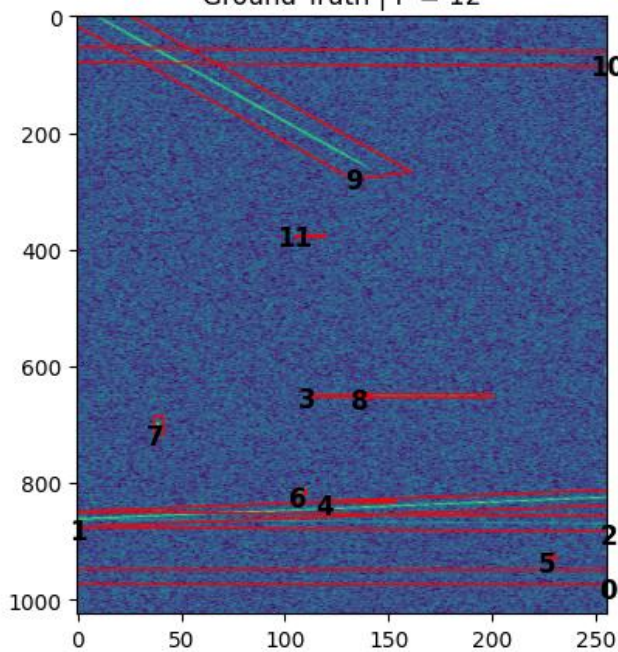
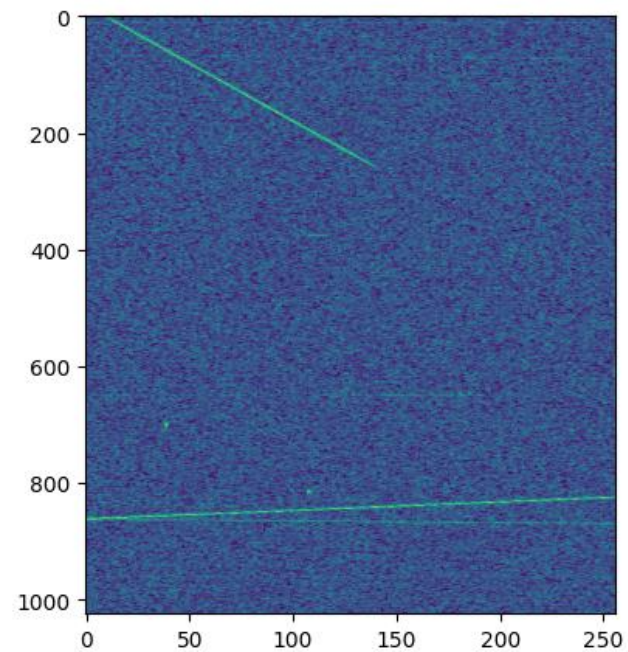


Inférence sur test

seed:6, rec_29350_fs_1000.0MSps_nperseg_1024.txt

Ground Truth | $P = 12$

Preds | $P = 9$

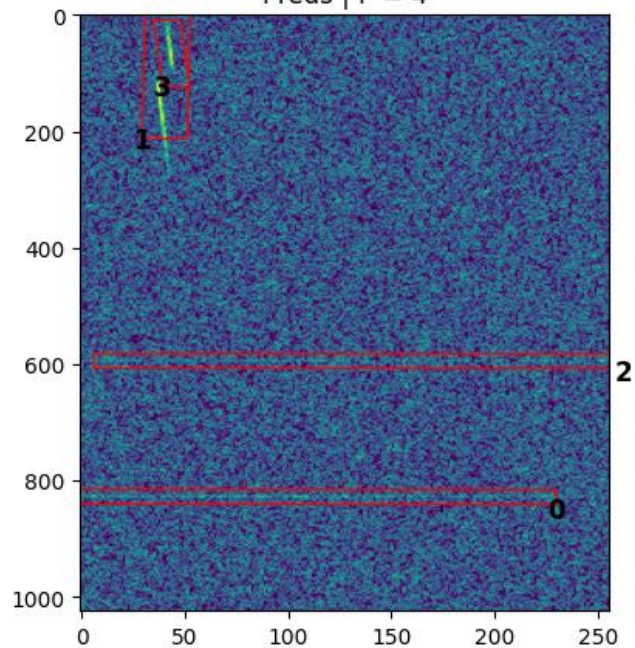
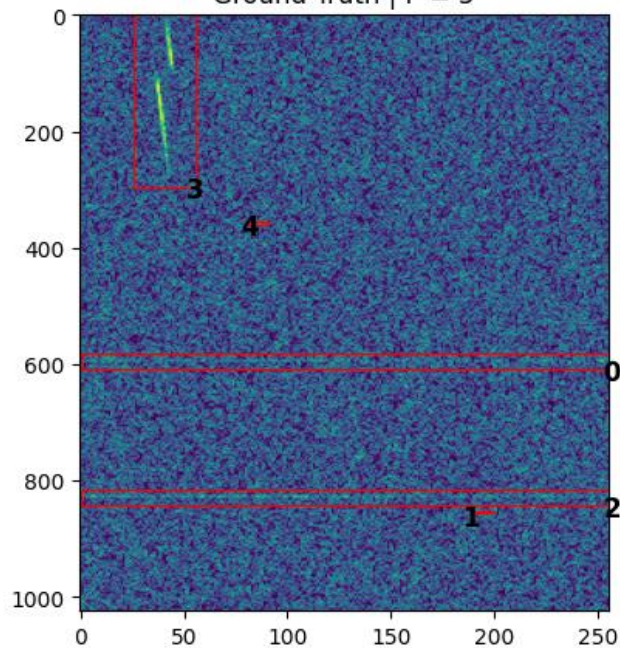
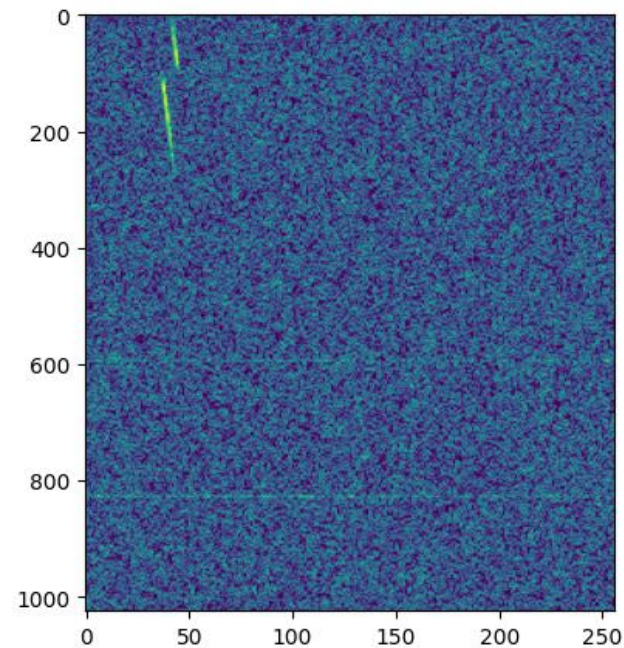


Inférence sur test

seed:7, rec_39852_fs_1000.0MSps_nperseg_256.txt

Ground Truth | P = 5

Preds | P = 4

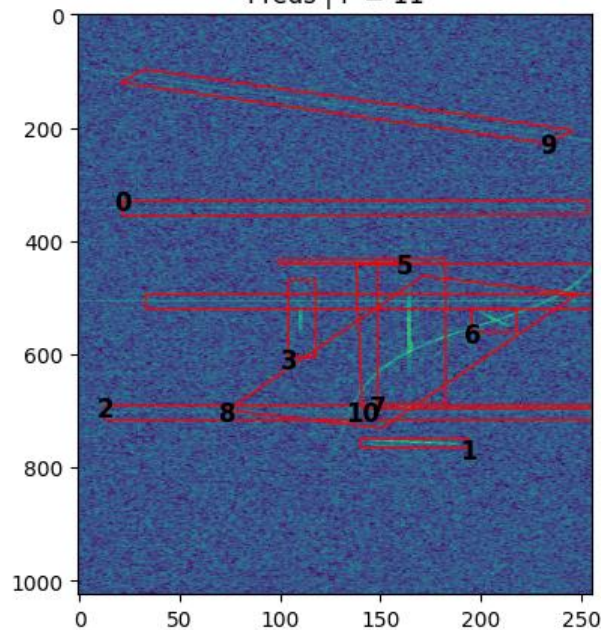
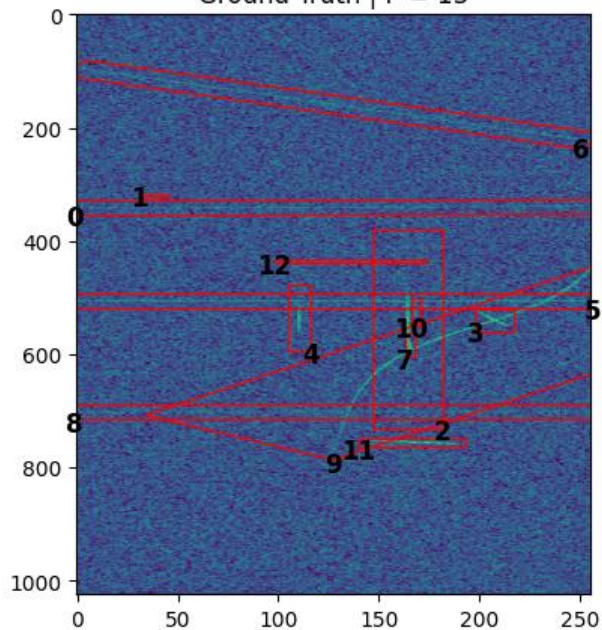
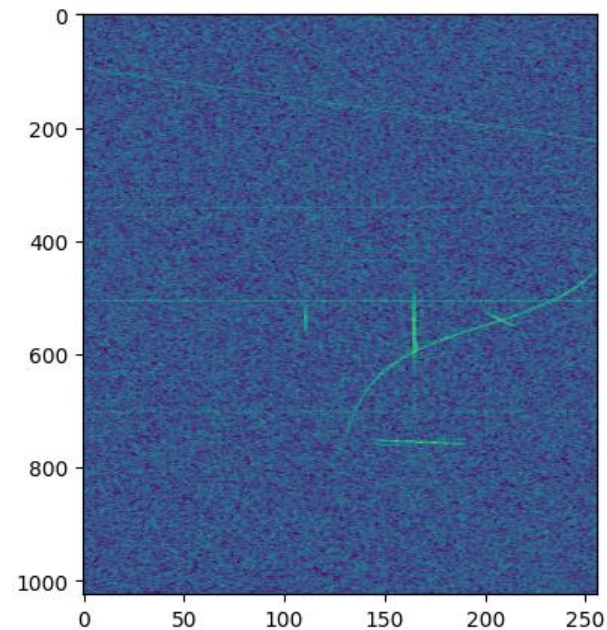


Inférence sur test

seed:8, rec_32402_fs_1000.0MSps_nperseg_1024.txt

Ground Truth | P = 13

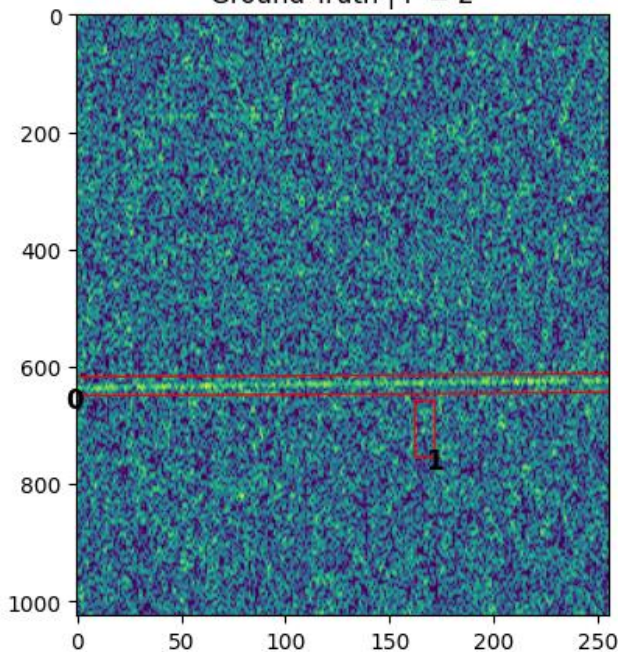
Preds | P = 11



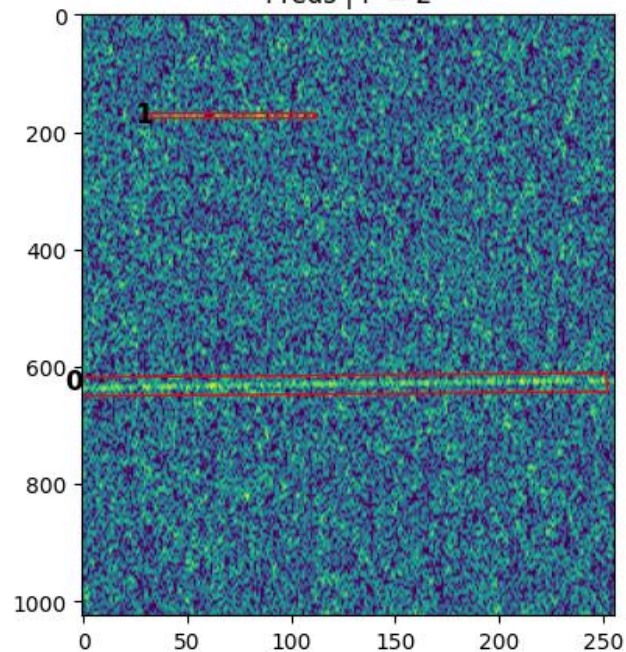
Inférence sur test

seed:9, rec_7326_fs_1000.0MSps_nperseg_128.txt

Ground Truth | $P = 2$



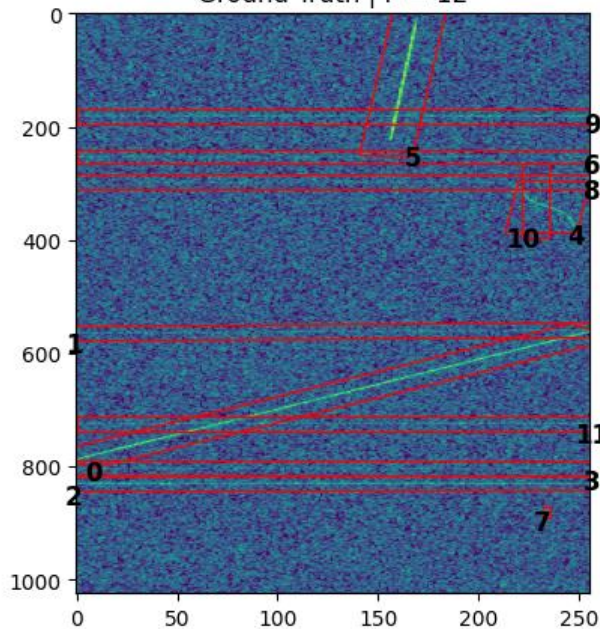
Preds | $P = 2$



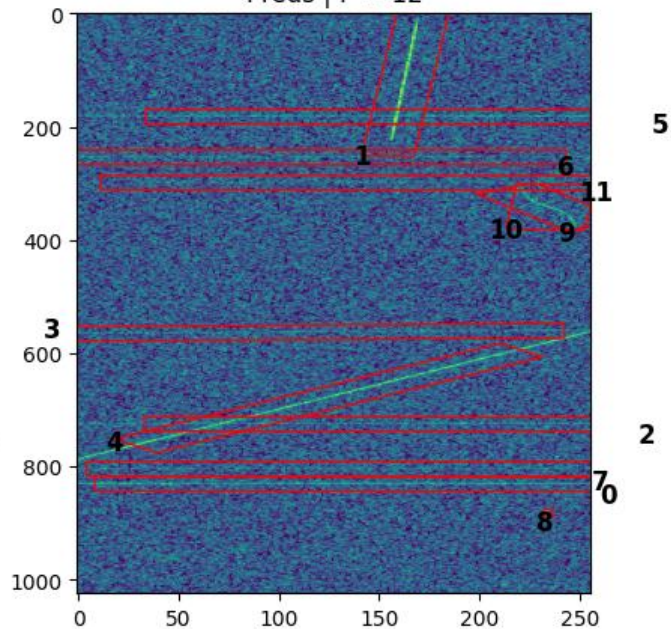
Inférence sur test

seed:10, rec_28332_fs_1000.0MSps_nperseg_512.txt

Ground Truth | P = 12



Preds | P = 12

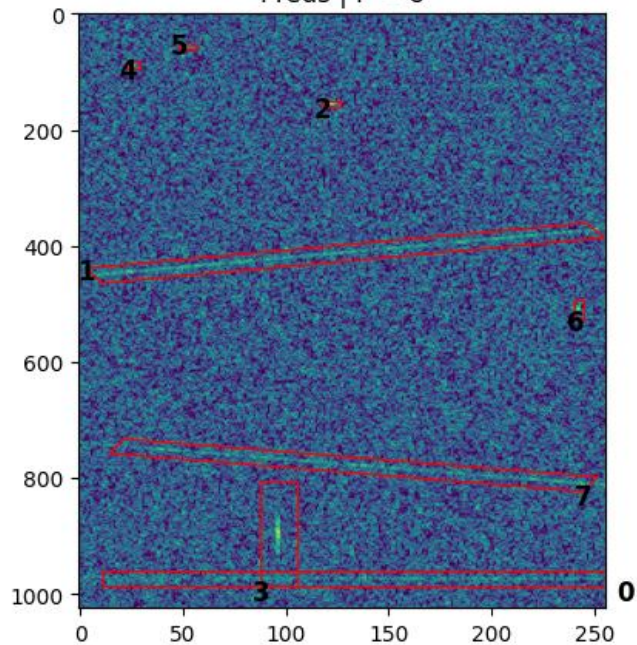
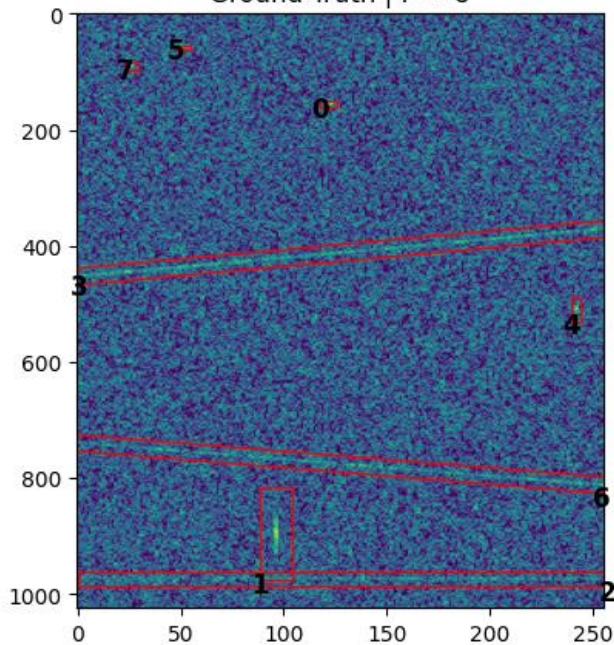
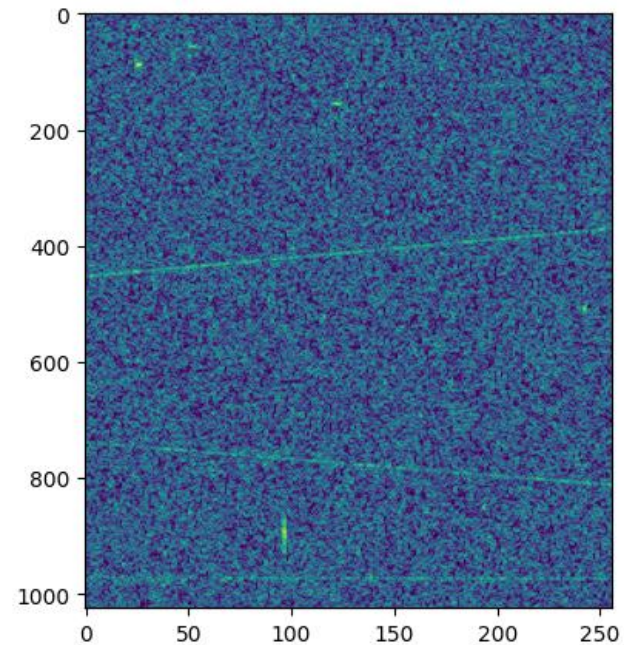


Inférence sur test

seed:11, rec_6486_fs_1000.0MSps_nperseg_256.txt

Ground Truth | P = 8

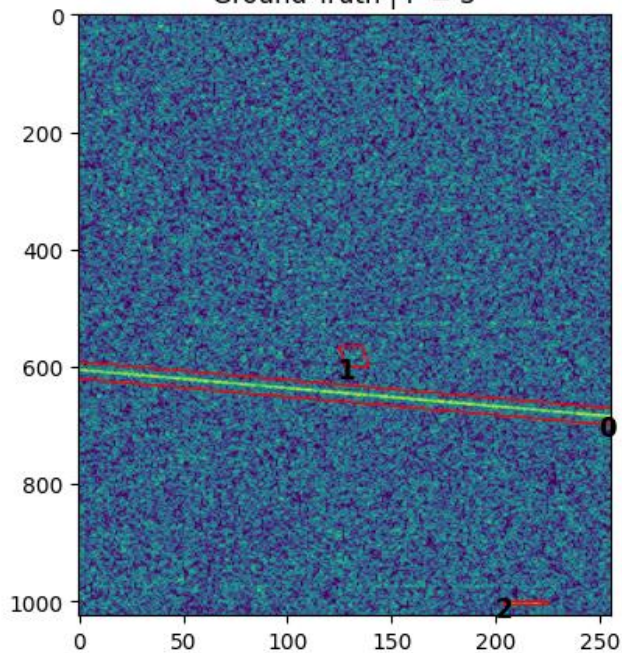
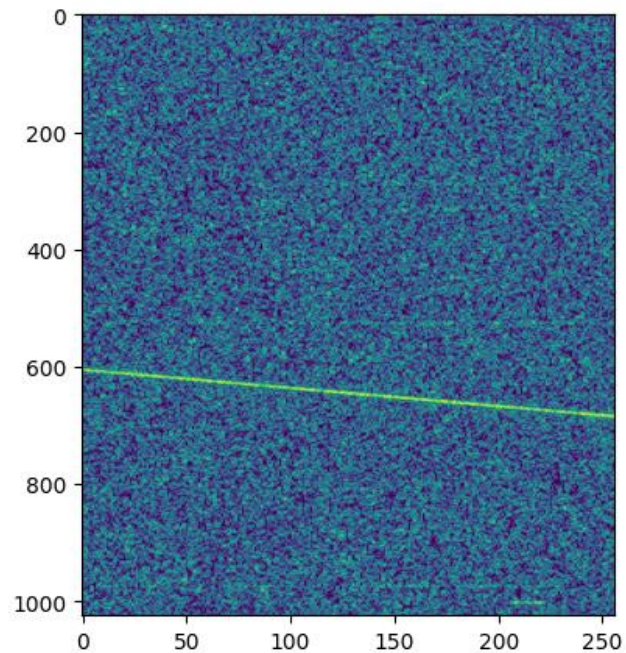
Preds | P = 8



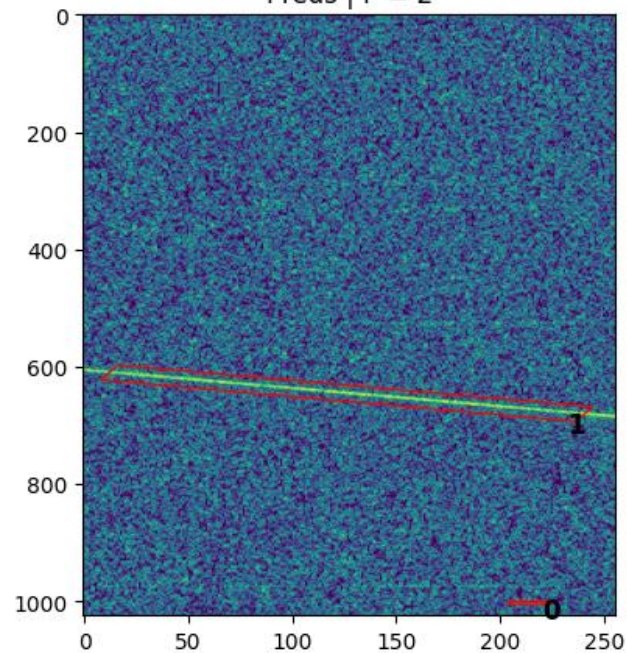
Inférence sur test

seed:12, rec_8345_fs_1000.0MSps_nperseg_256.txt

Ground Truth | $P = 3$



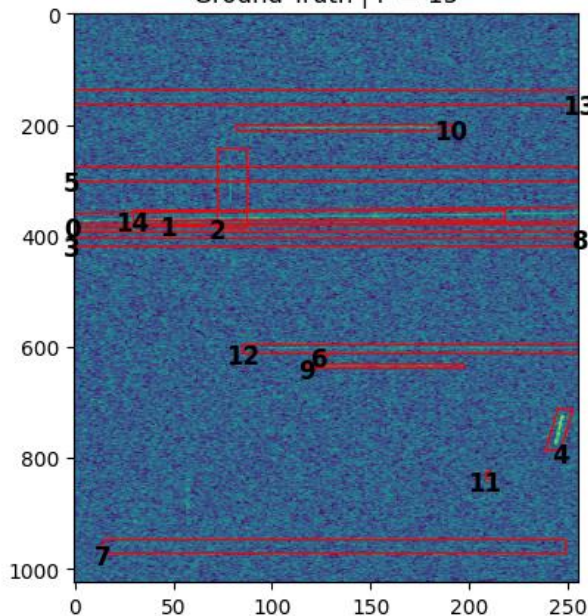
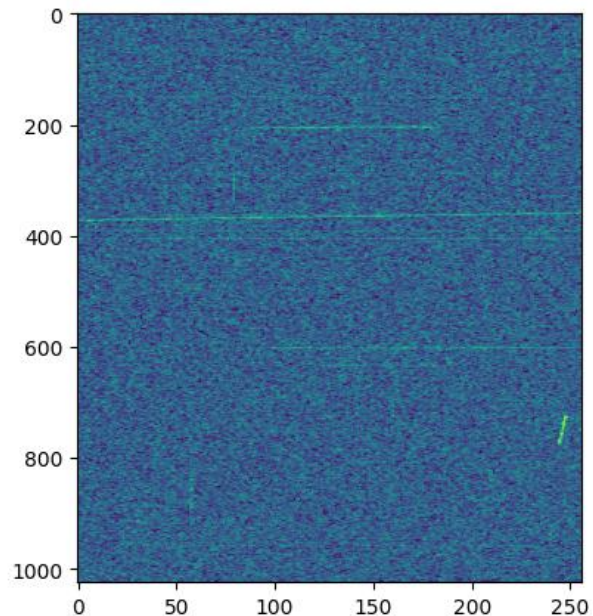
Preds | $P = 2$



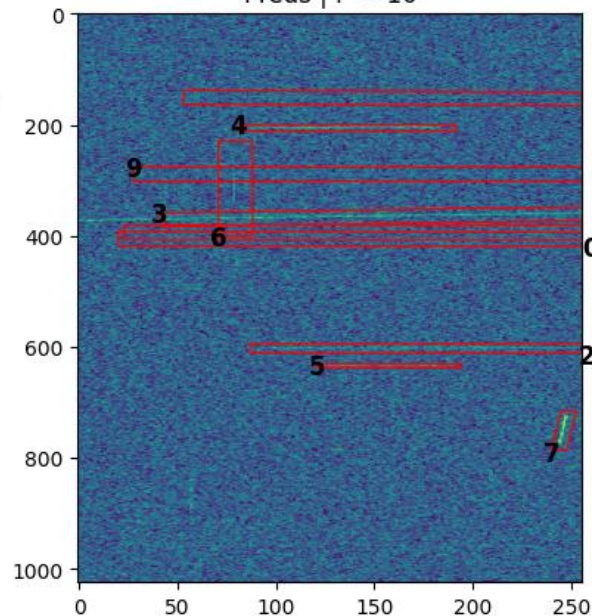
Inférence sur test

seed:13, rec_19587_fs_1000.0MSps_nperseg_1024.txt

Ground Truth | P = 15



Preds | P = 10

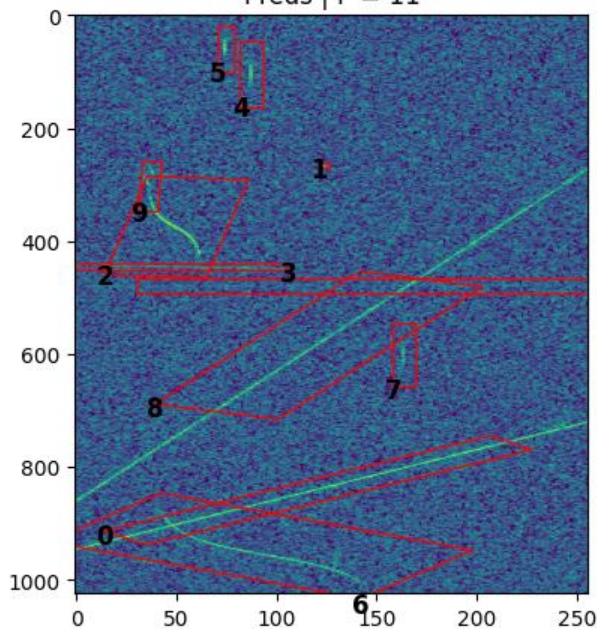
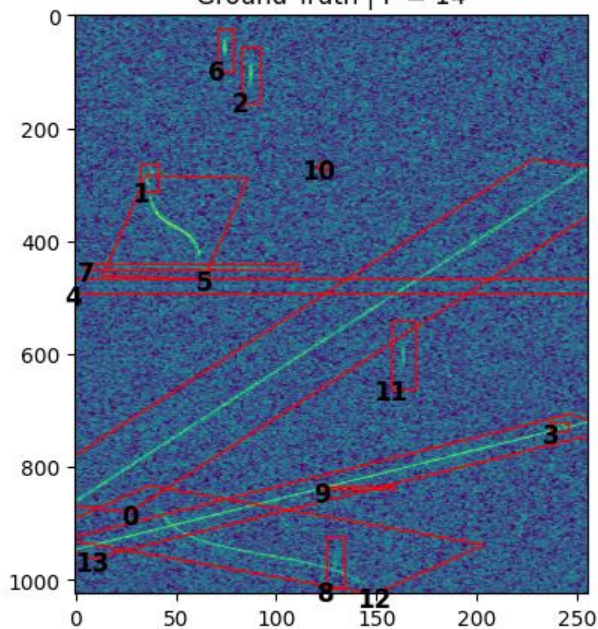
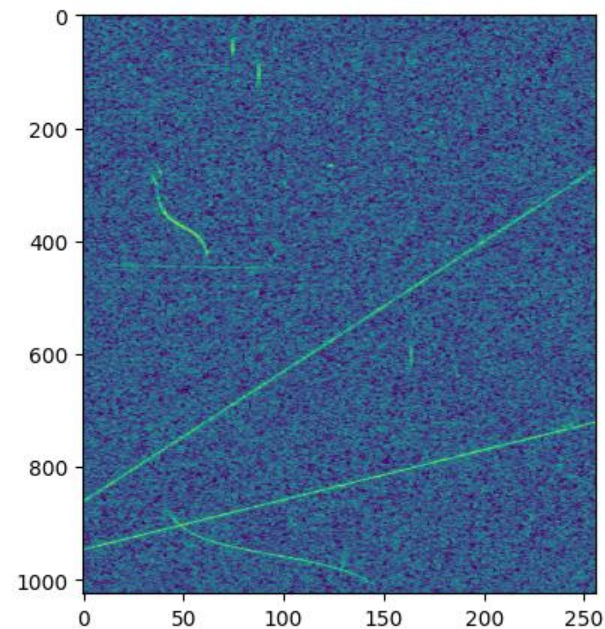


Inférence sur test

seed:14, rec_9321_fs_1000.0MSps_nperseg_512.txt

Ground Truth | P = 14

Preds | P = 11



AVANTIX

BT-202e

BT-202e

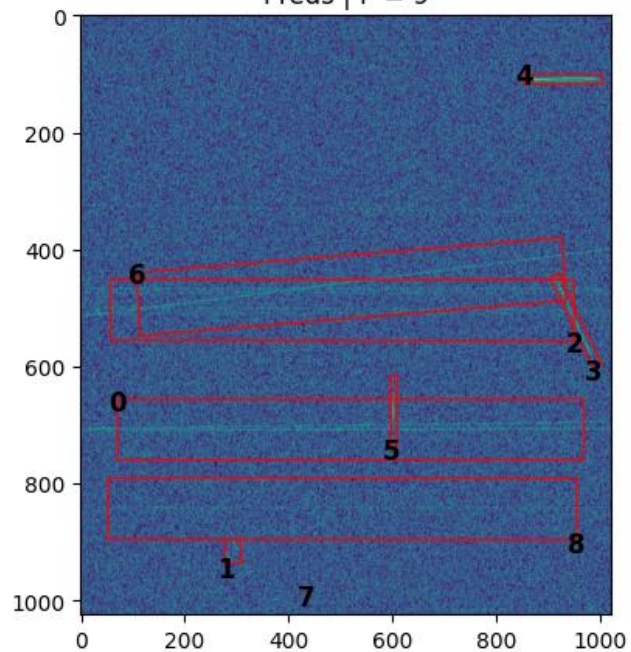
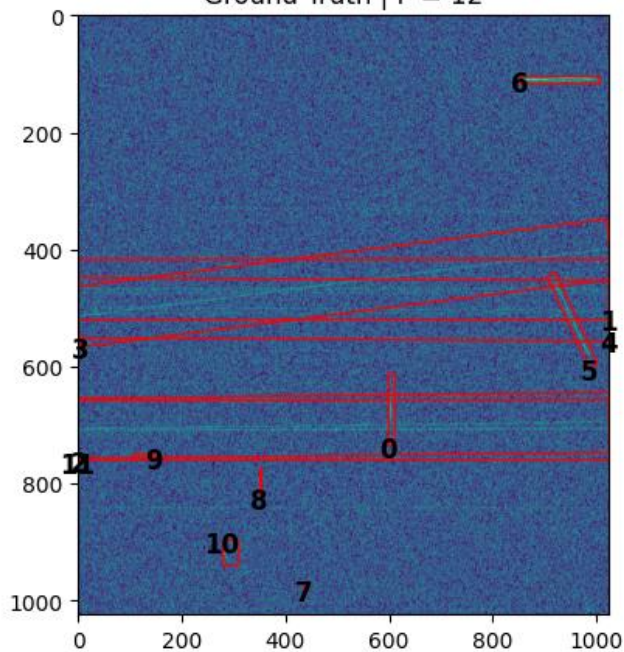
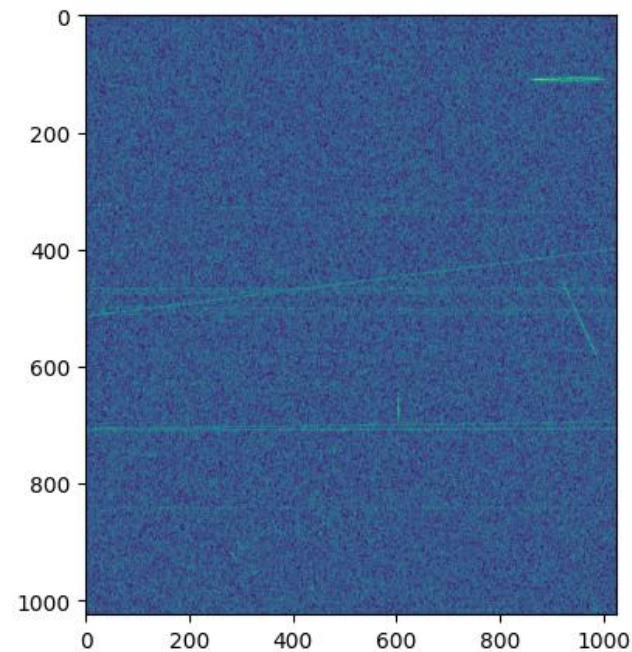
- 41 927 images 80% train, 20% val et 20% test
- $\sigma_{\text{noise}} = 1\text{mV}$, $f_{\text{c_rec}} = 2,5\text{GHz}$, $f_{\text{s}} = 1\text{GSps}$
- RADAR seul
- $n_{\text{perseg}} = [128, 256, 512, 1024]$, $n_{\text{fft}} = 1024$, $n_{\text{overlap}} = n_{\text{perseg}}/2$
- $\text{snr_eff_db_min} = -5\text{dB}$
- Mise à l'échelle : $\text{min} = 1^{\text{er}} \text{ décile}$, $\text{max} = 1000 * 1^{\text{er}} \text{ décile}$
- **Aspect ratio max = 10:1**
- **Min w_h = 5 pix**
- **width x height : 1024 x 1024**
- **Meilleur modèle : En cours**

Inférence sur test

seed:0, rec_39128_fs_1000.0MSps_nperseg_512.txt

Ground Truth | $P = 12$

Preds | $P = 9$

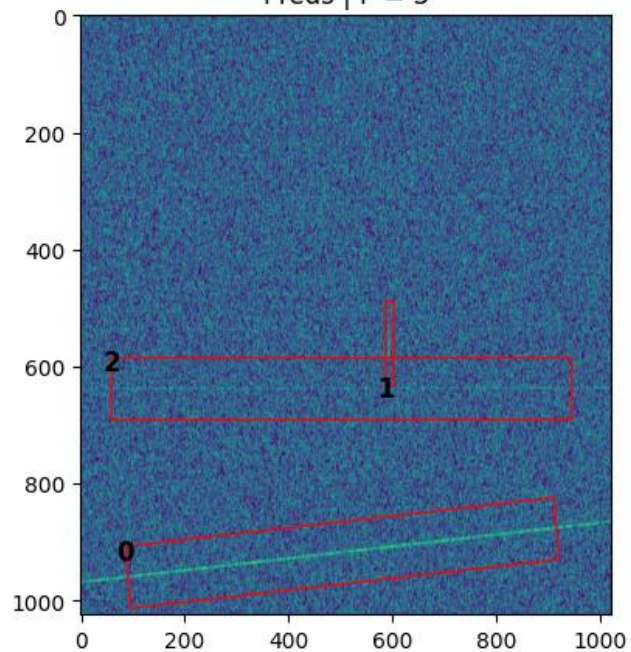
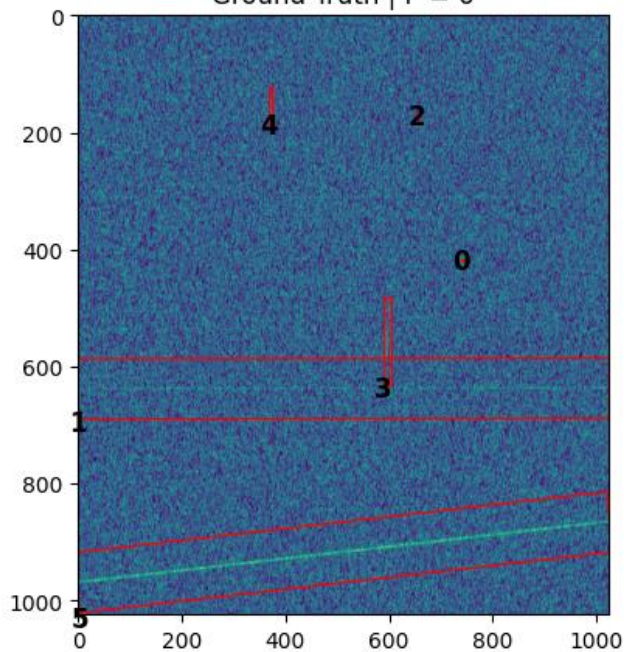
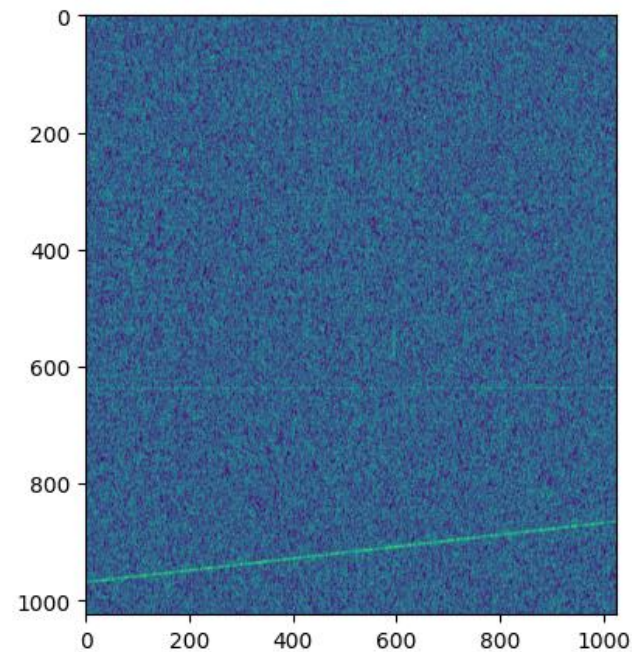


Inférence sur test

seed:1, rec_36424_fs_1000.0MSps_nperseg_256.txt

Ground Truth | P = 6

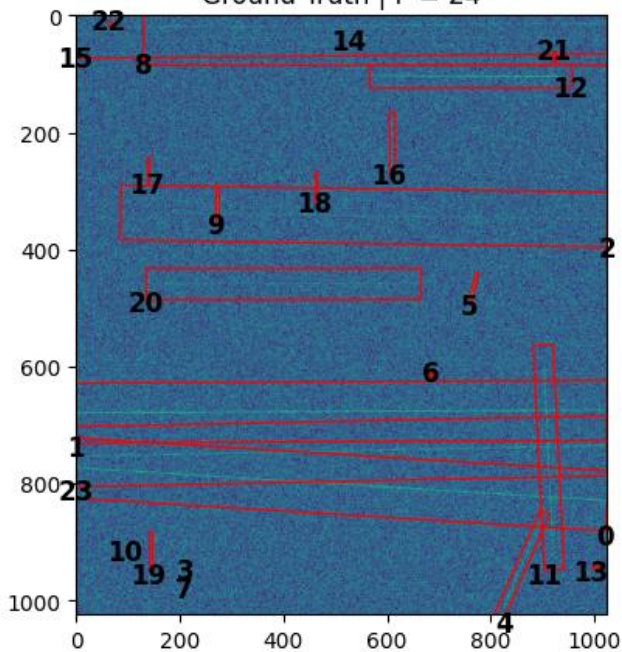
Preds | P = 3



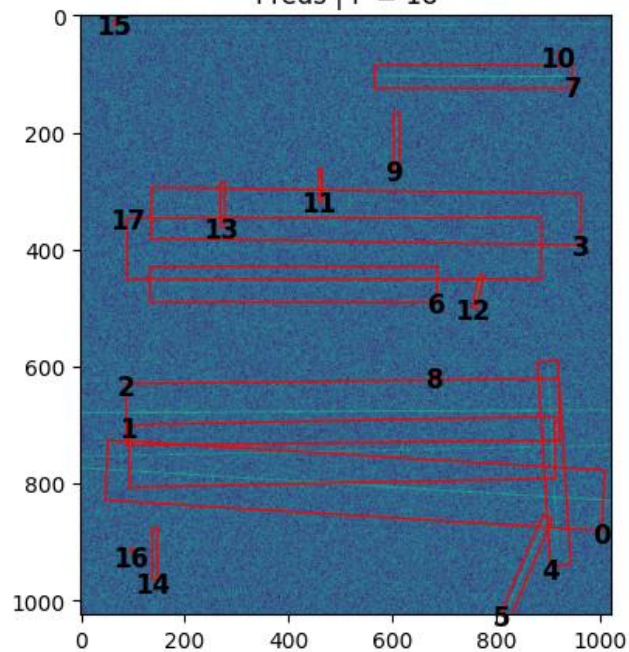
Inférence sur test

seed:2, rec_37601_fs_1000.0MSps_nperseg_1024.txt

Ground Truth | P = 24



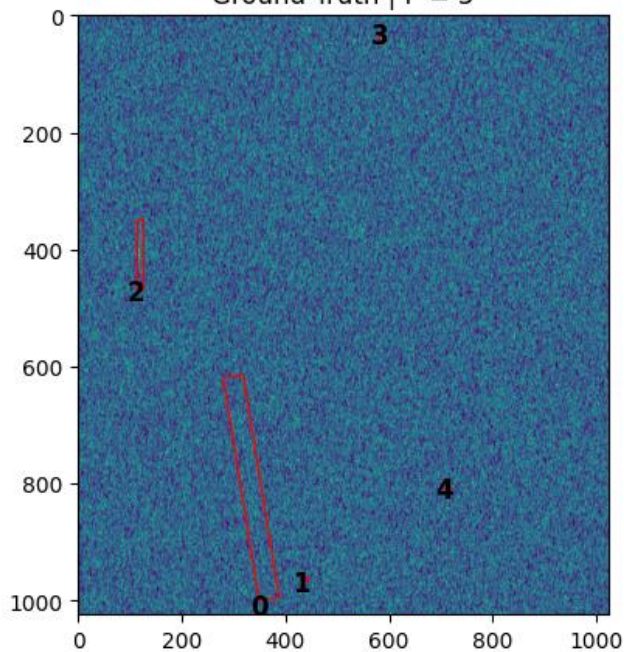
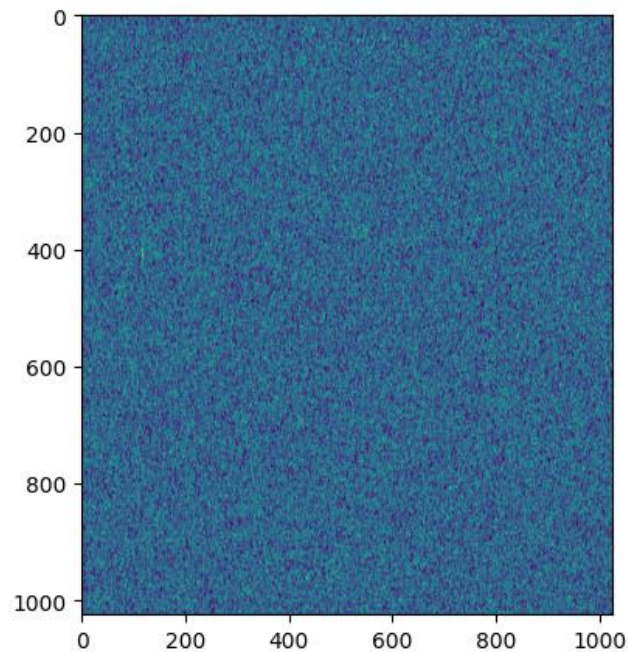
Preds | P = 18



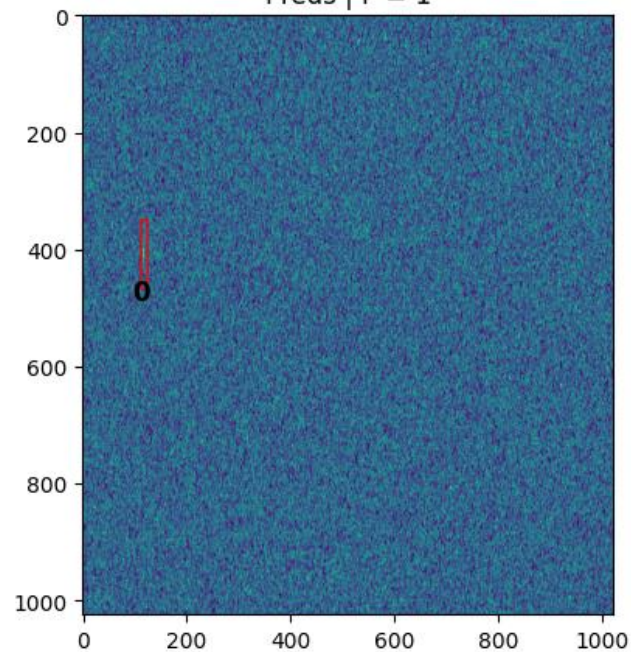
Inférence sur test

seed:3, rec_23423_fs_1000.0MSps_nperseg_256.txt

Ground Truth | $P = 5$



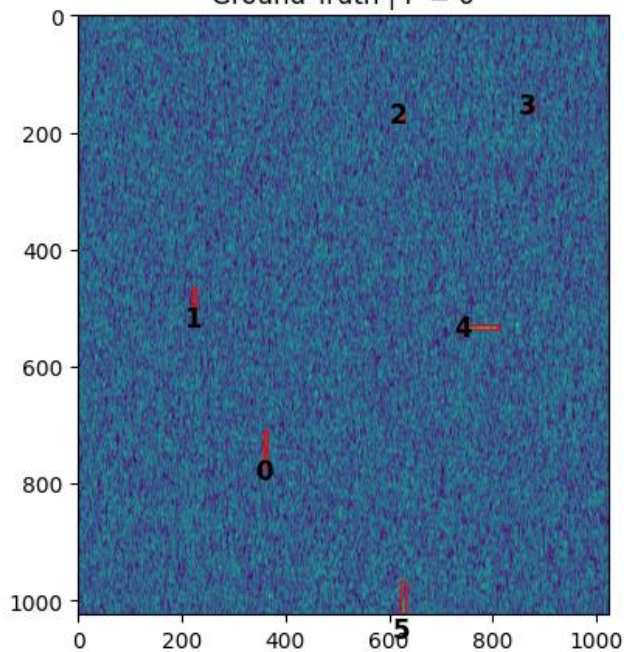
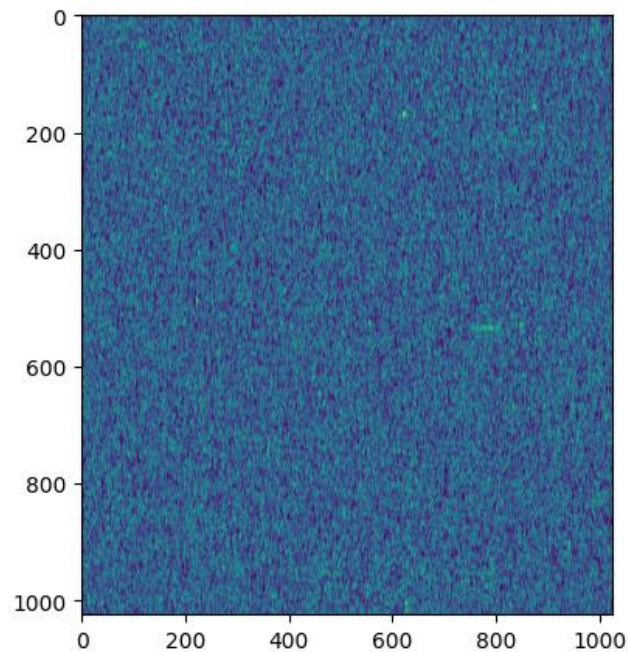
Preds | $P = 1$



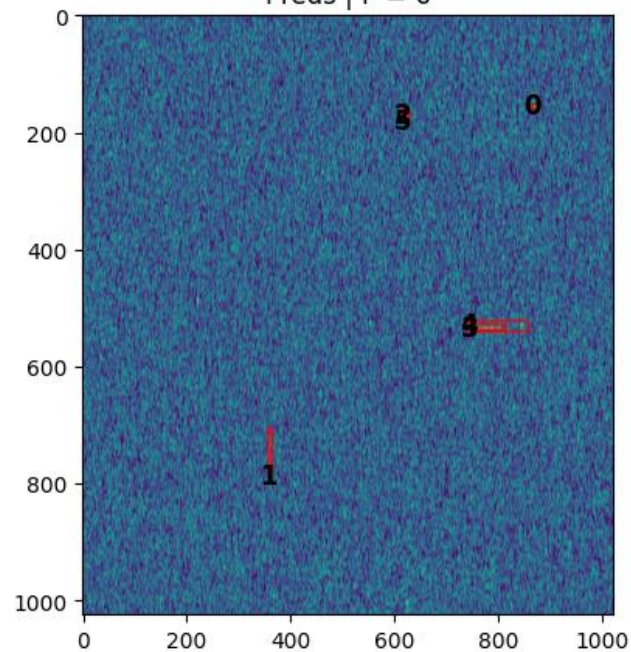
Inférence sur test

seed:4, rec_27729_fs_1000.0MSps_nperseg_128.txt

Ground Truth | P = 6



Preds | P = 6

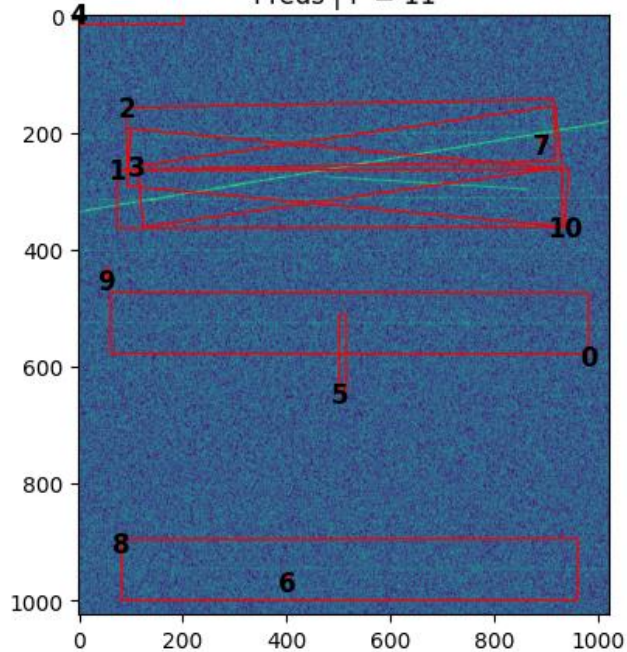
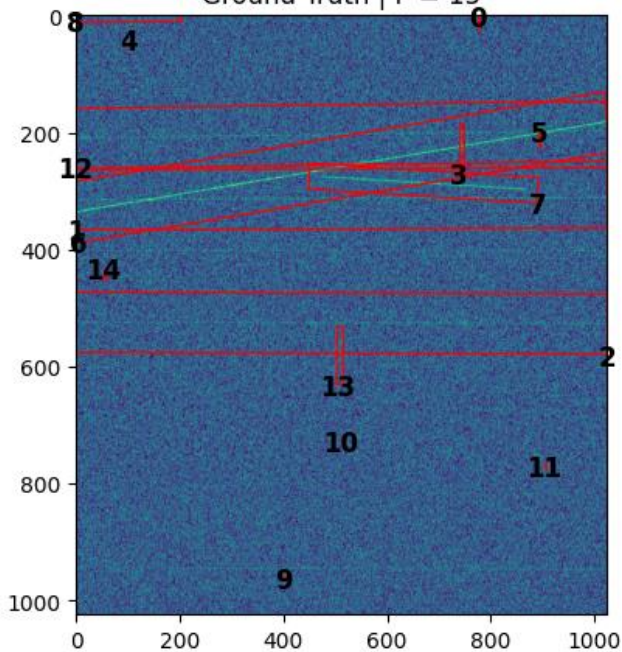
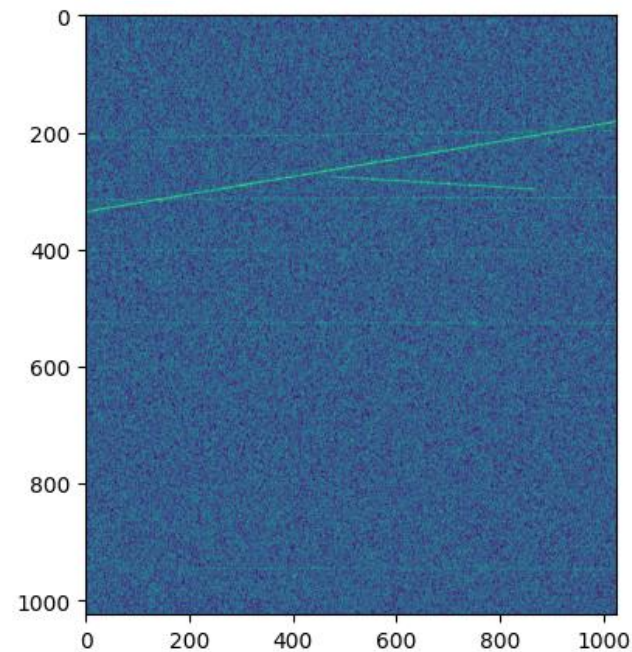


Inférence sur test

seed:5, rec_34033_fs_1000.0MSps_nperseg_512.txt

Ground Truth | P = 15

Preds | P = 11

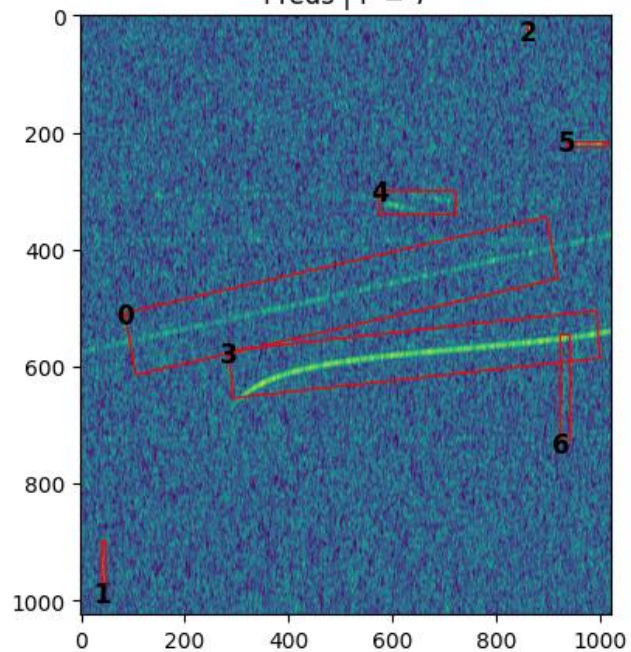
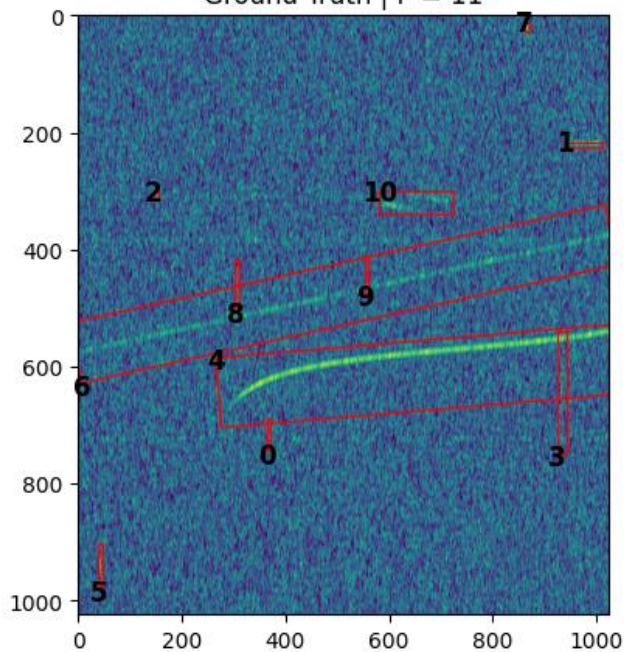
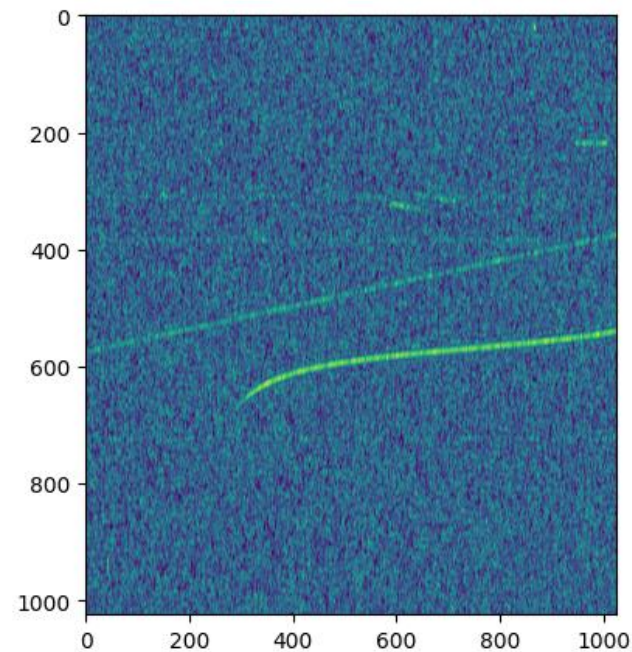


Inférence sur test

seed:6, rec_9058_fs_1000.0MSps_nperseg_128.txt

Ground Truth | P = 11

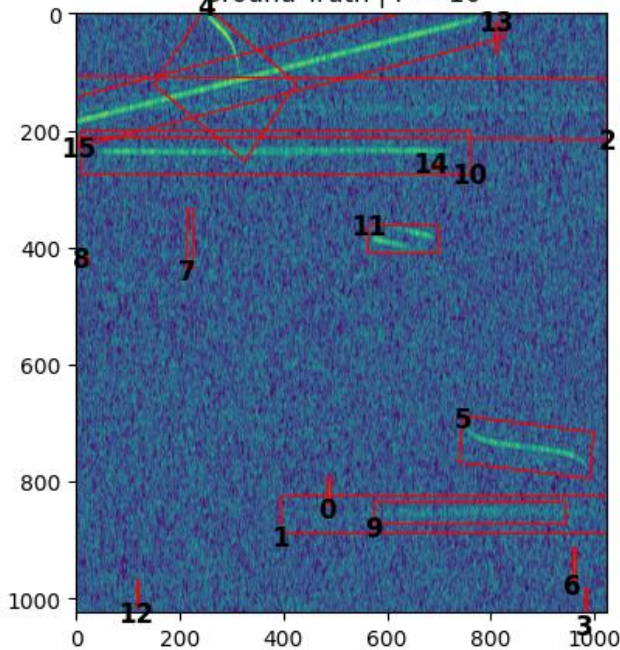
Preds | P = 7



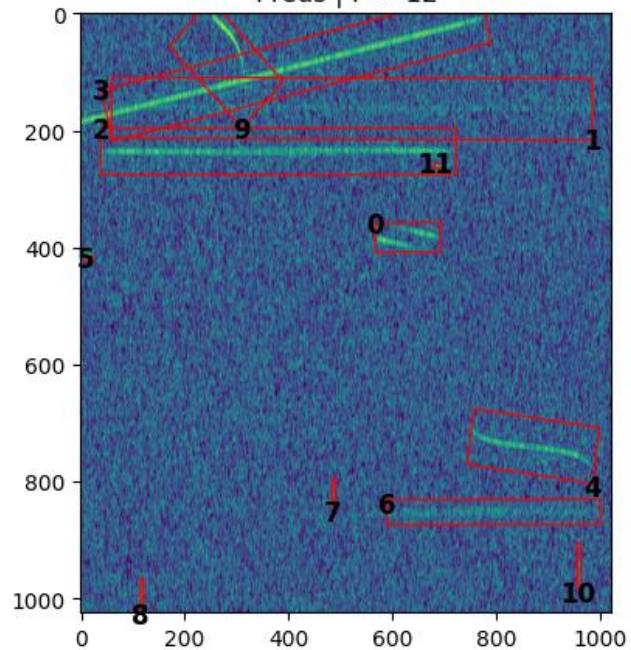
Inférence sur test

seed:7, rec_28700_fs_1000.0MSps_nperseg_128.txt

Ground Truth | P = 16



Preds | P = 12

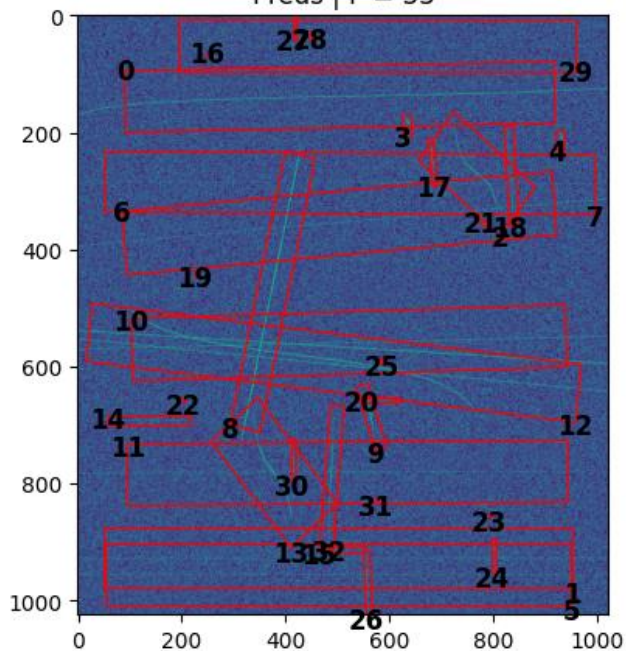
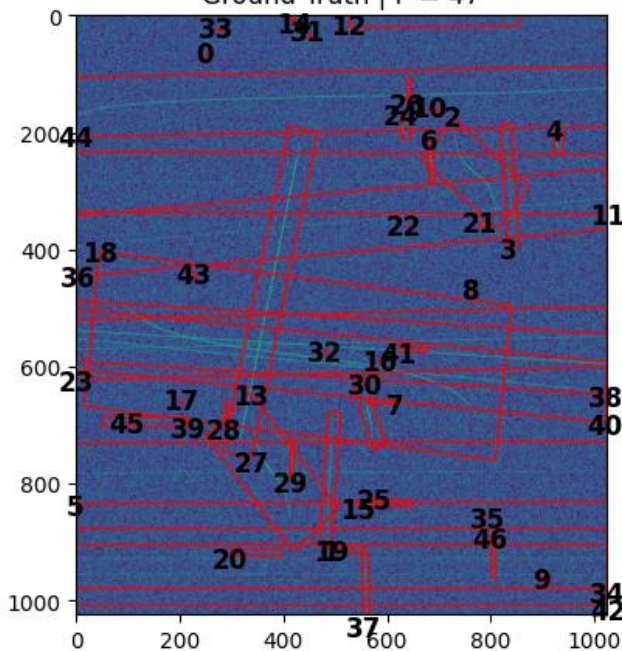
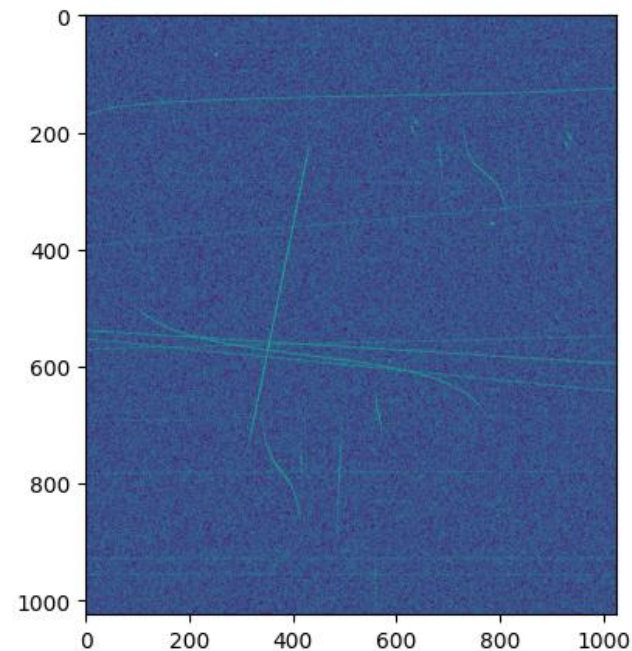


Inférence sur test

seed:8, rec_5475_fs_1000.0MSps_nperseg_1024.txt

Ground Truth | P = 47

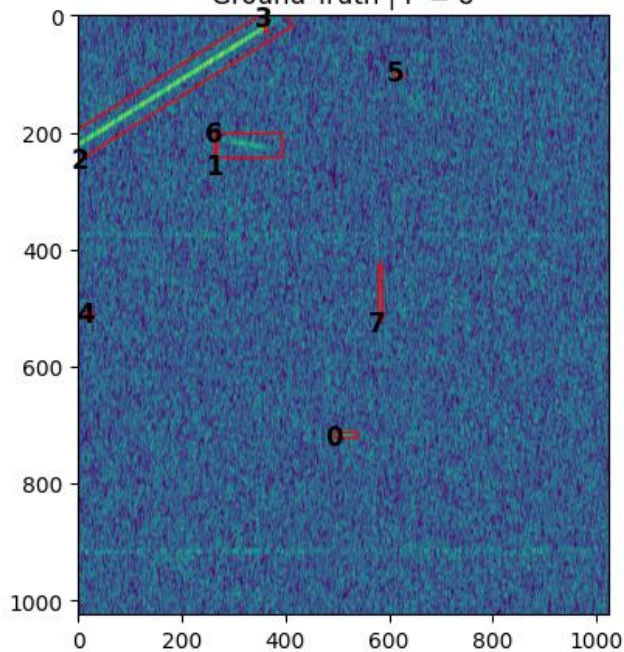
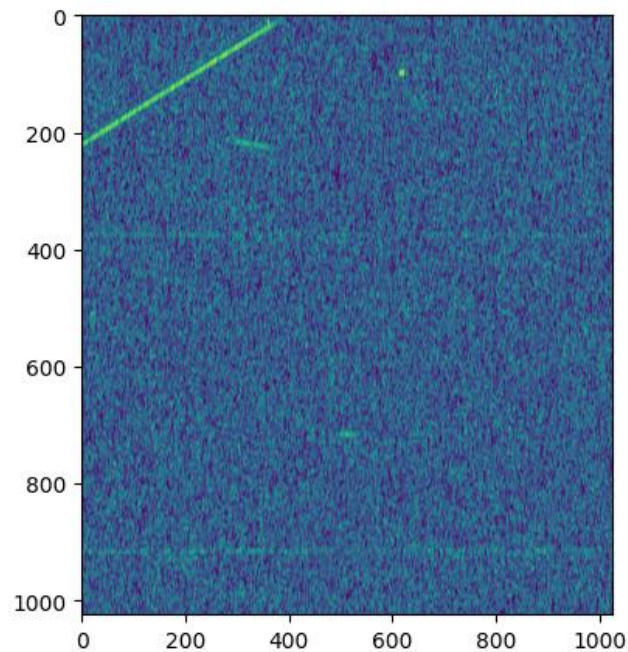
Preds | P = 33



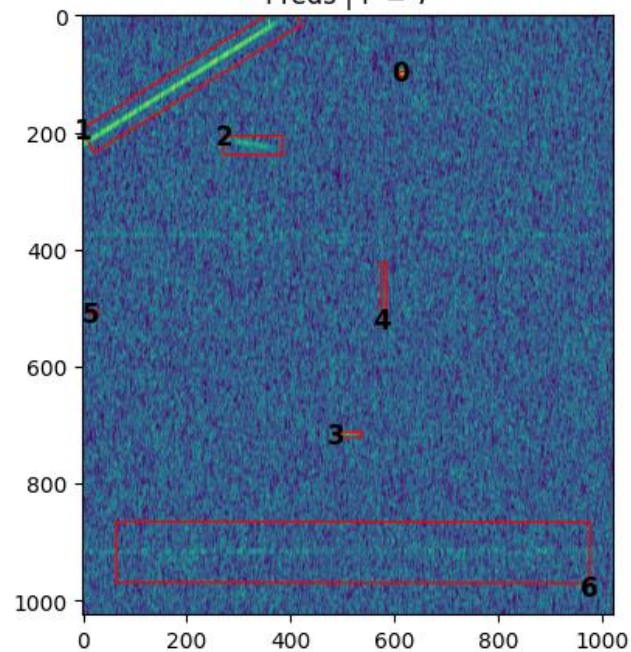
Inférence sur test

seed:9, rec_26473_fs_1000.0MSps_nperseg_128.txt

Ground Truth | P = 8



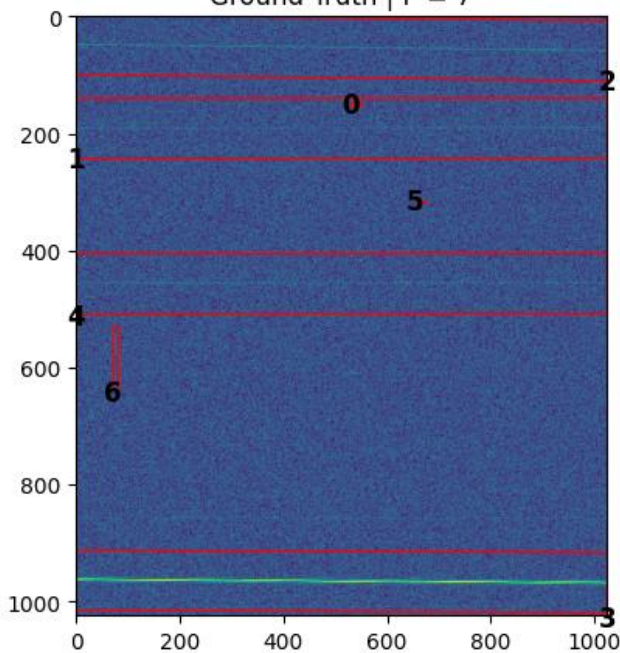
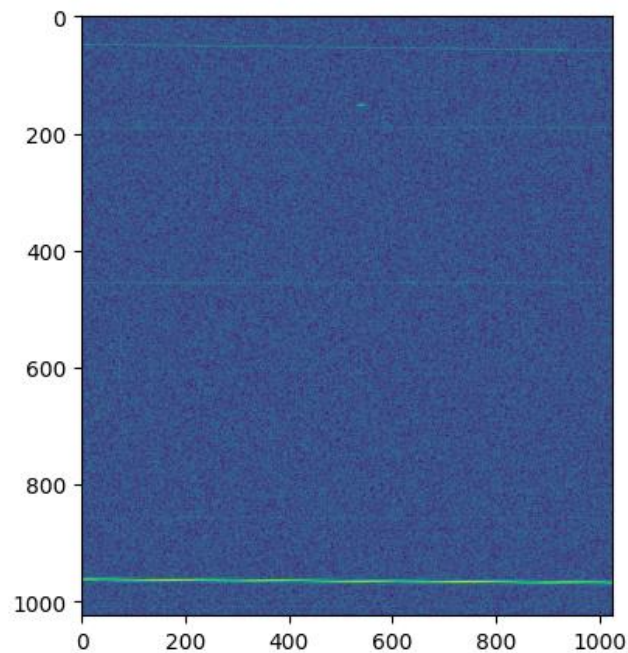
Preds | P = 7



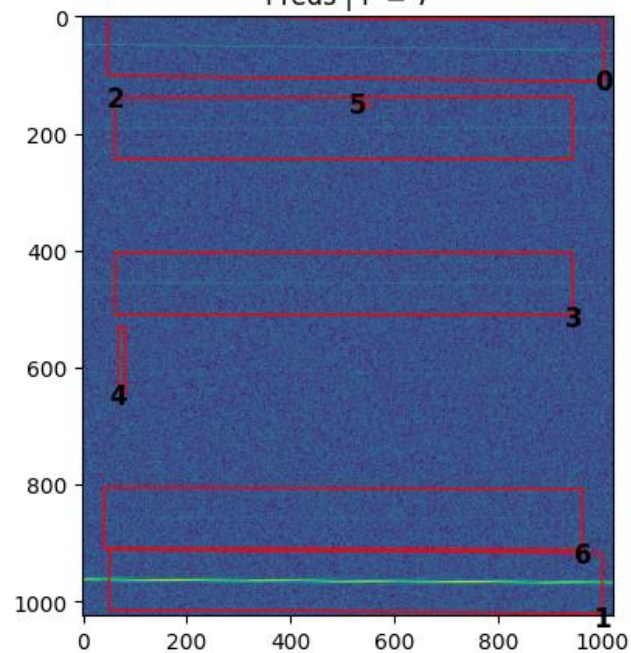
Inférence sur test

seed:10, rec_18889_fs_1000.0MSps_nperseg_1024.txt

Ground Truth | P = 7



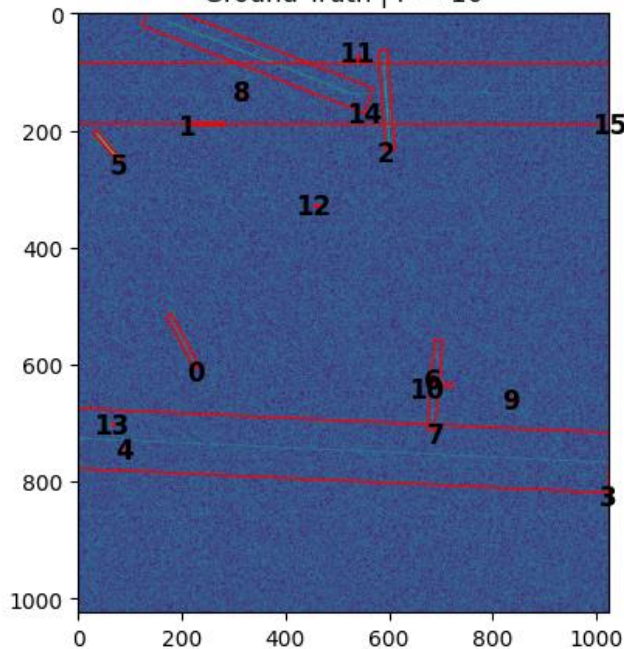
Preds | P = 7



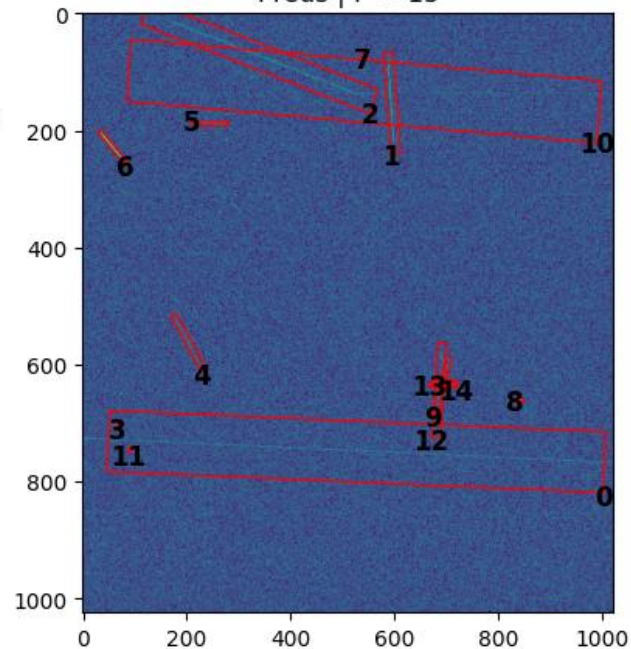
Inférence sur test

seed:11, rec_28135_fs_1000.0MSps_nperseg_1024.txt

Ground Truth | P = 16



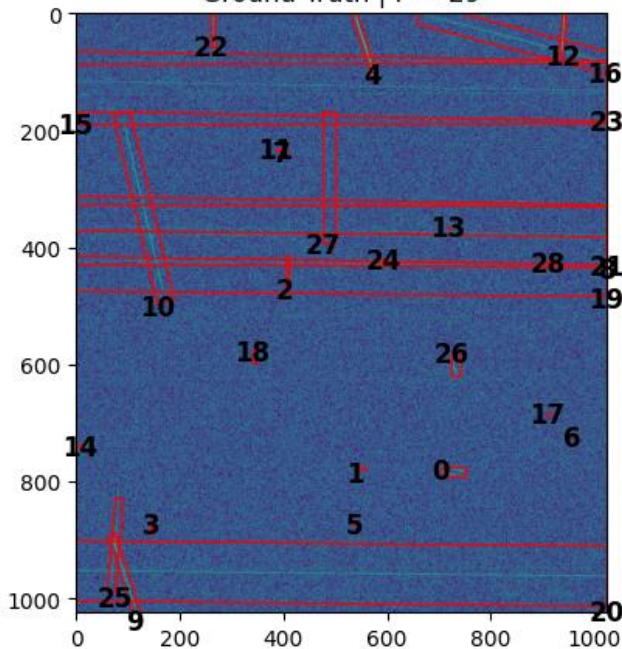
Preds | P = 15



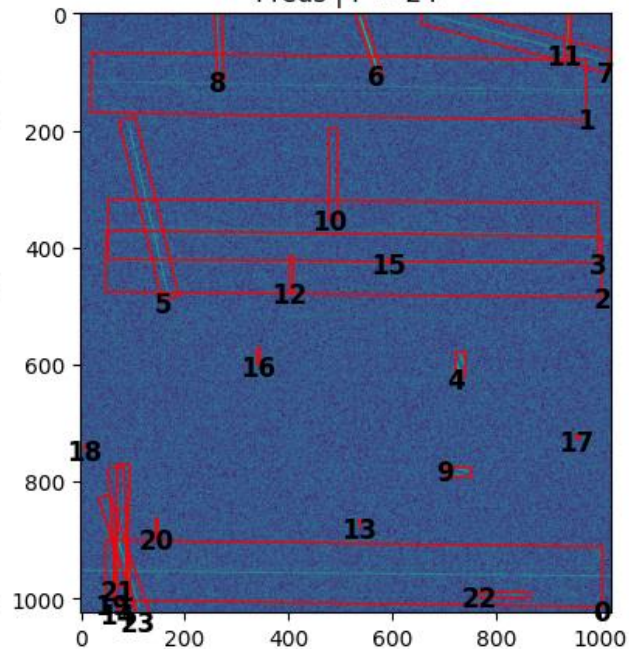
Inférence sur test

seed:12, rec_25226_fs_1000.0MSps_nperseg_1024.txt

Ground Truth | P = 29



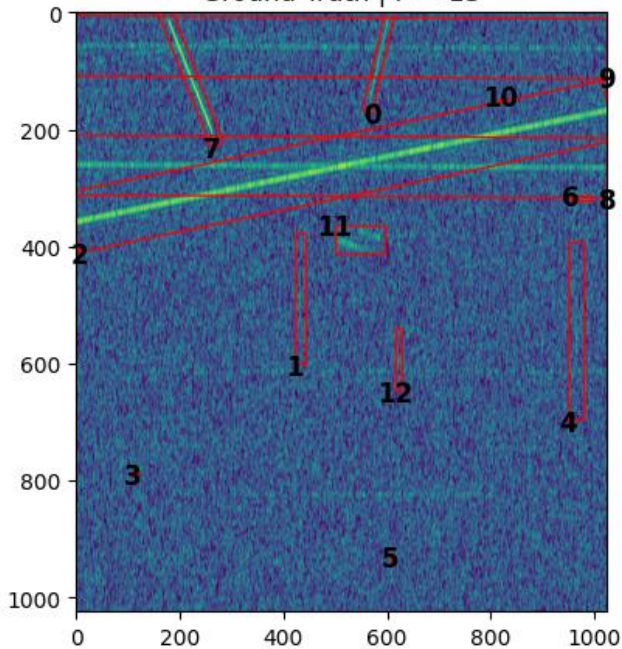
Preds | P = 24



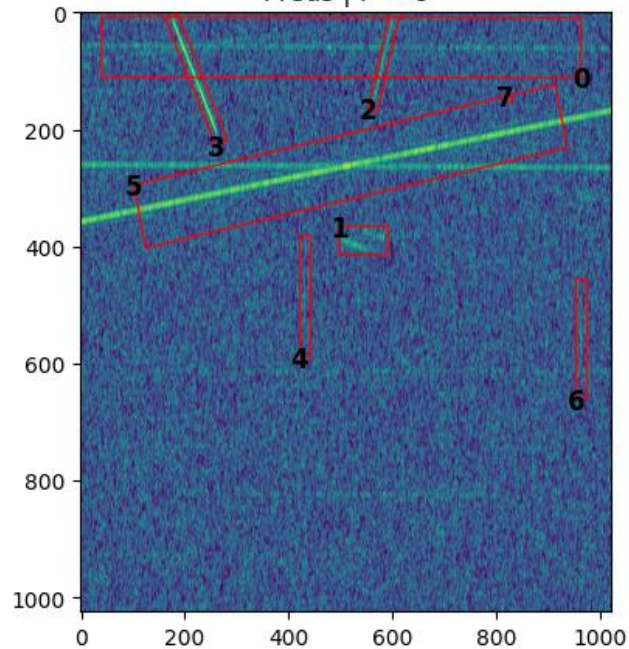
Inférence sur test

seed:13, rec_32634_fs_1000.0MSps_nperseg_128.txt

Ground Truth | $P = 13$



Preds | $P = 8$

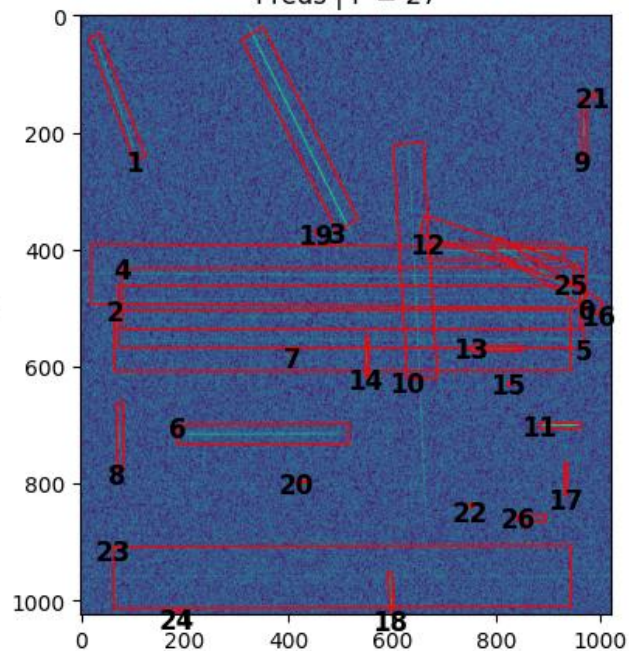
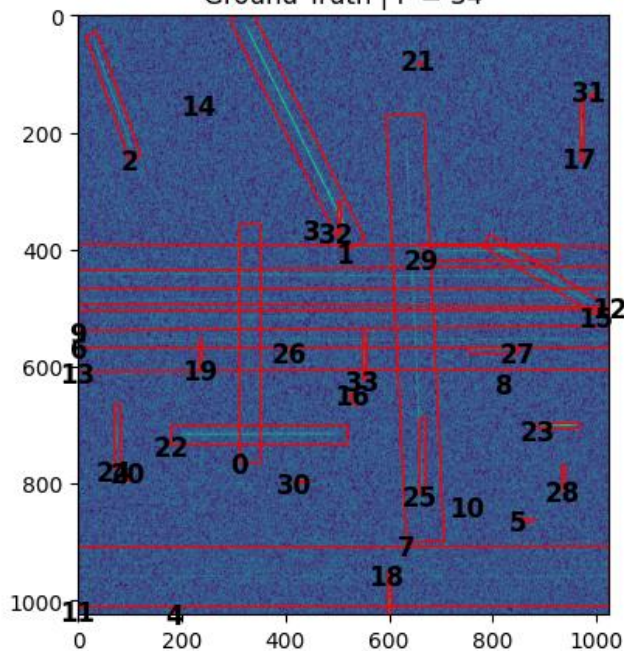
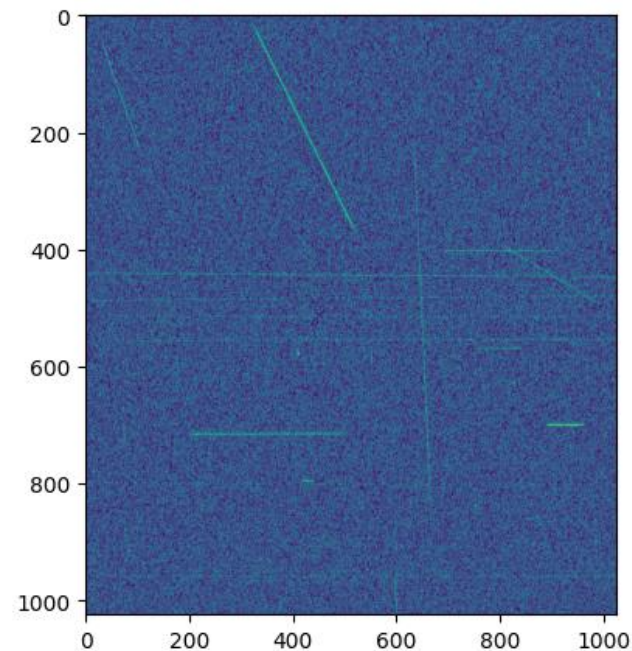


Inférence sur test

seed:14, rec_11577_fs_1000.0MSps_nperseg_512.txt

Ground Truth | P = 34

Preds | P = 27



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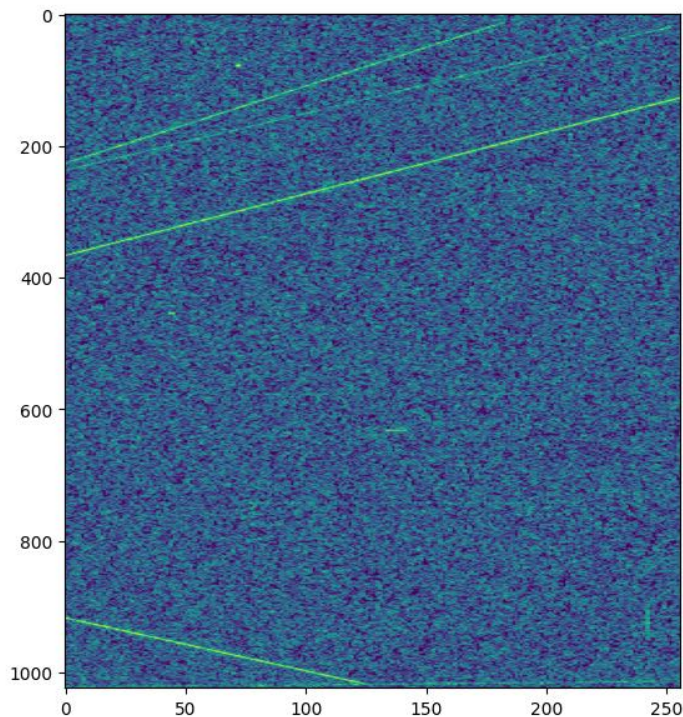
Sxx à haut nperseg
Test sur modèle 1024x256

$N_{\text{perseg}} \in [128, 256, 512, 1024] \mid f_s = 1\text{GSps}$

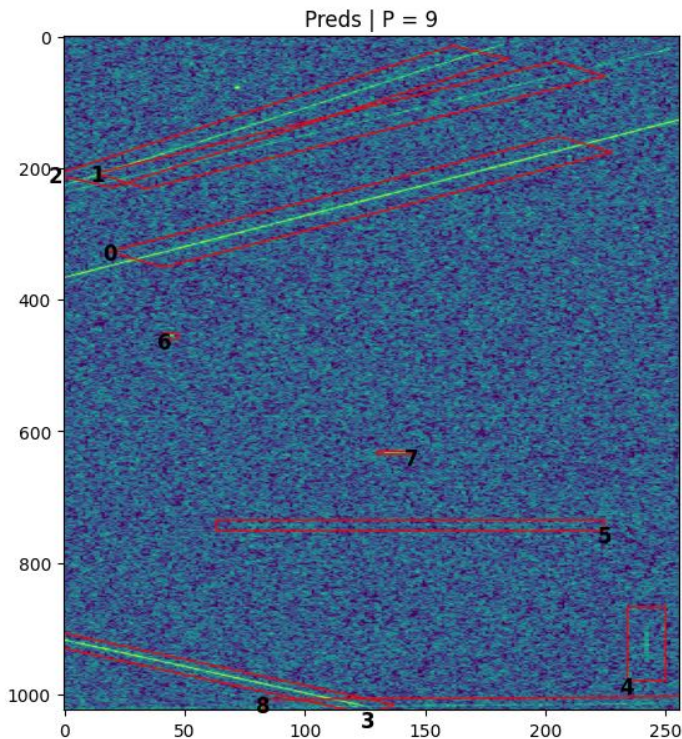
→ Configuration apprentissage

$N_{\text{perseg}} \in [128, 256, 512, 1024] \mid f_s = 1\text{GSps}$

$f_s = 1000.0\text{MSps} \mid \text{tile} = 36 \mid n_{\text{perseg}} \text{ trained on} : \text{True}$

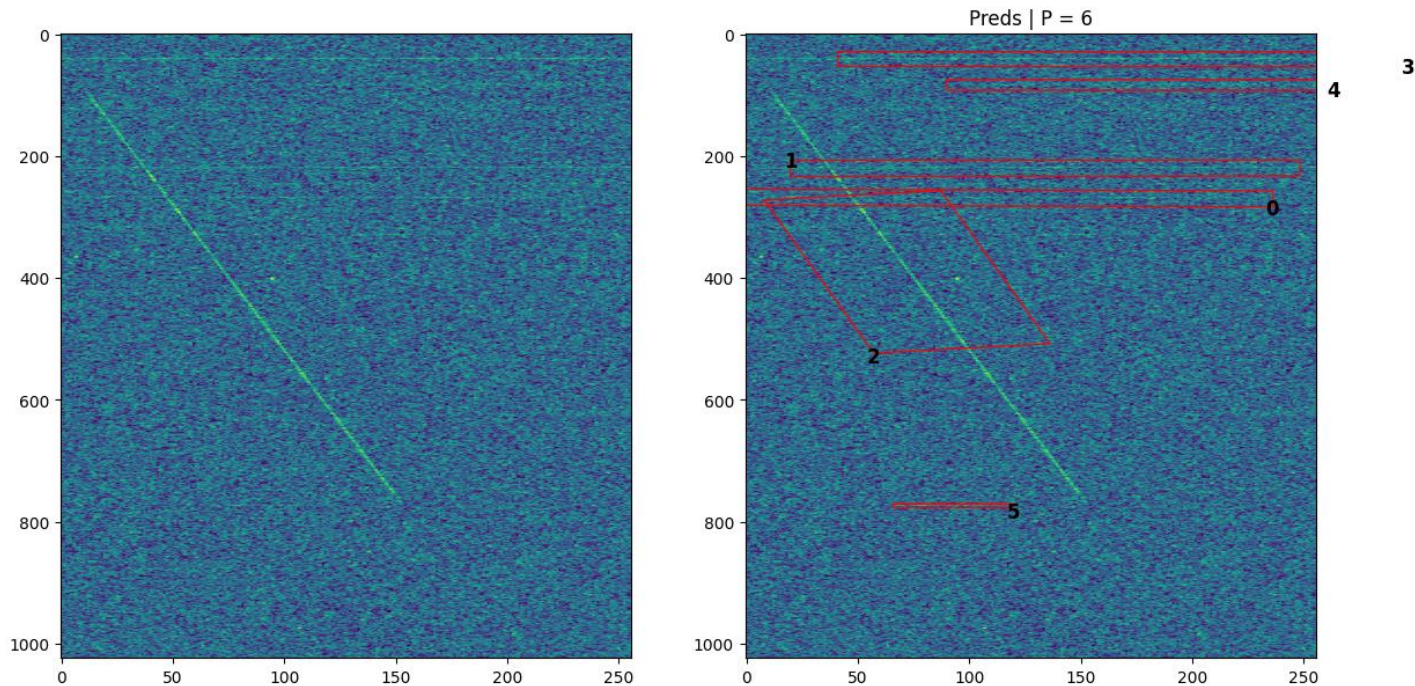


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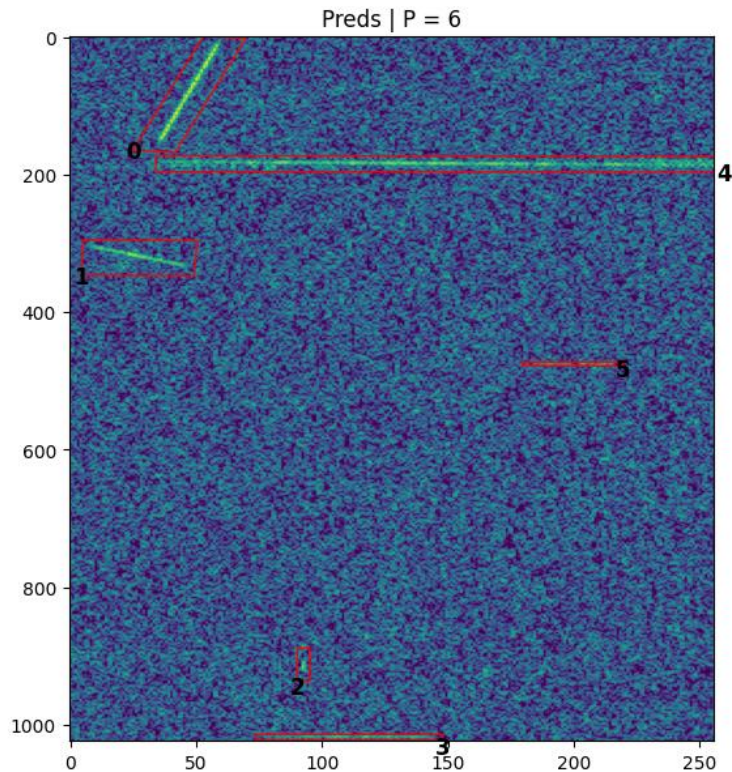
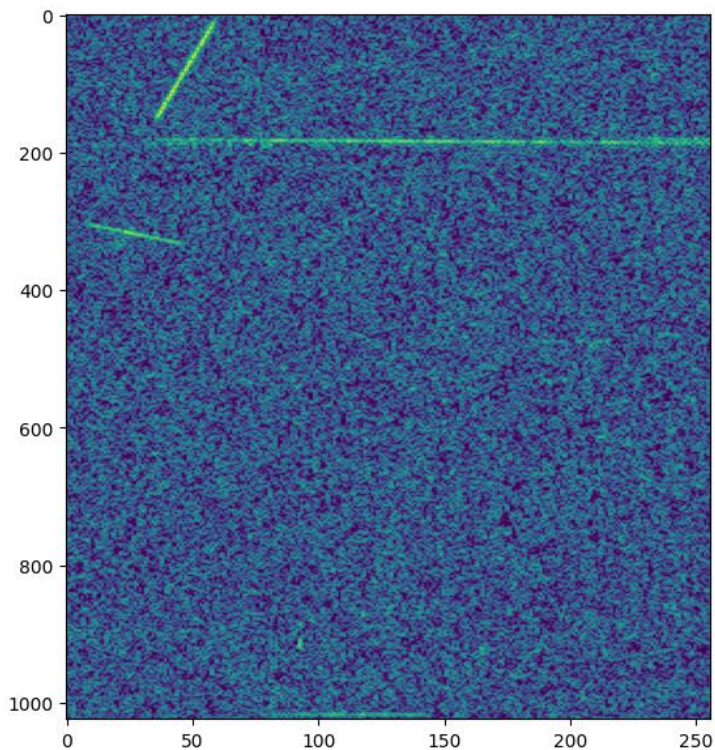
$N_{\text{perseg}} \in [128, 256, 512, 1024] \mid f_s = 1\text{GSps}$

$f_s = 1000.0\text{MSps} \mid \text{tile} = 36 \mid n_{\text{perseg}} \text{ trained on : True}$



$N_{\text{perseg}} \in [128, 256, 512, 1024] \mid f_s = 1\text{GSps}$

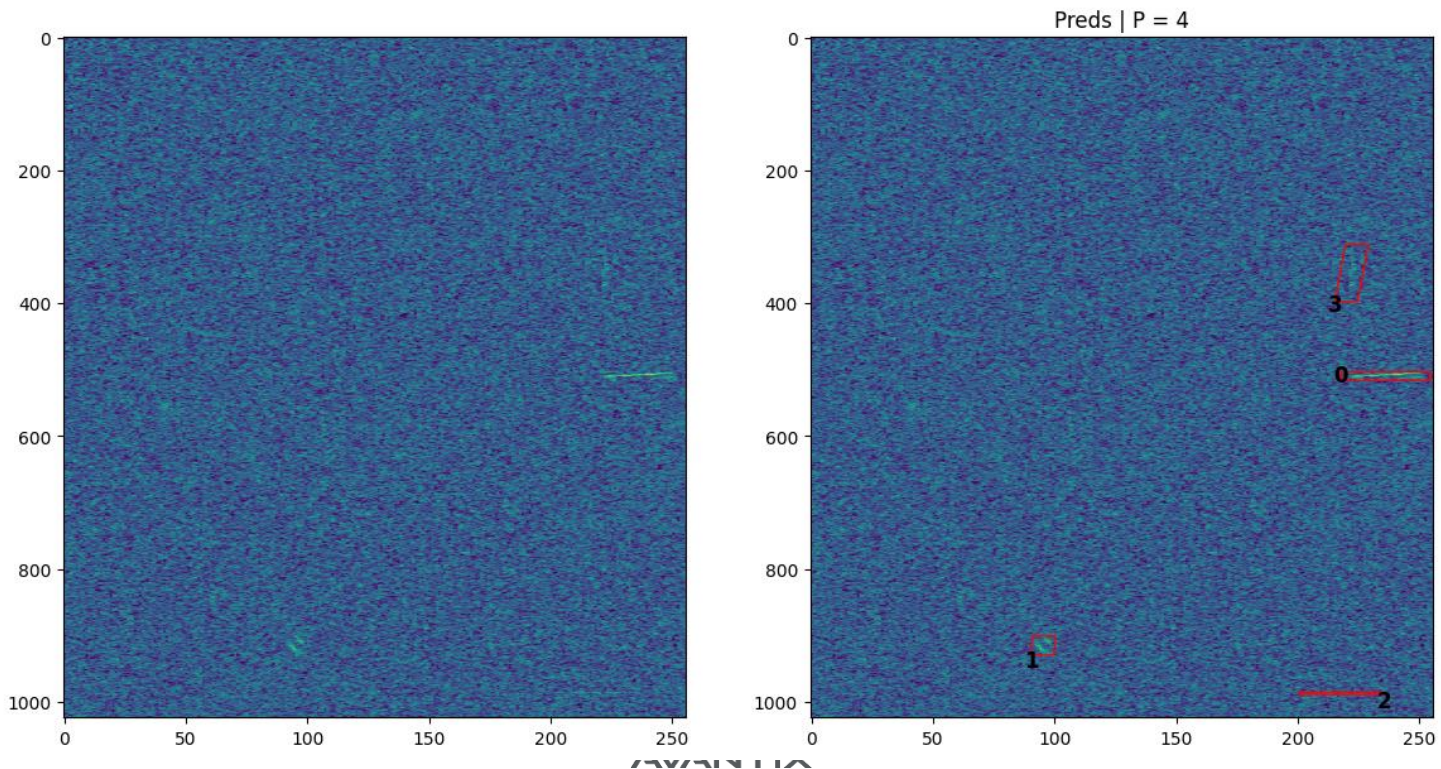
$f_s = 1000.0\text{MSps} \mid \text{tile} = 36 \mid n_{\text{perseg}} \text{ trained on : True}$



Nperseg = 131072 | fs = 4MSps

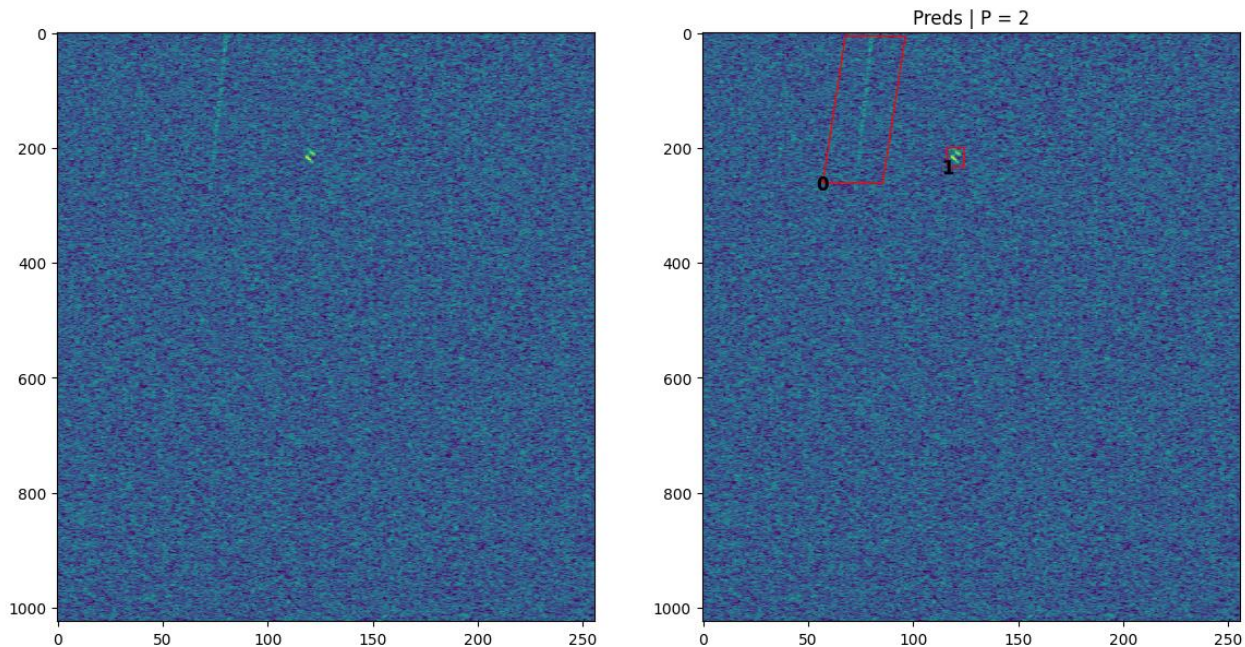
Nperseg = 131072 | fs = 4MSps

fs = 4.0MSps | tile = 120 | nperseg trained on : False



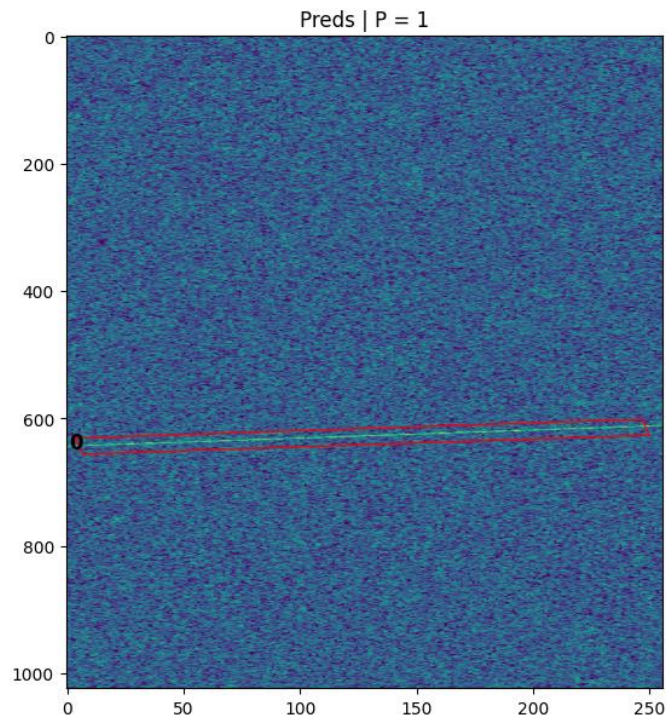
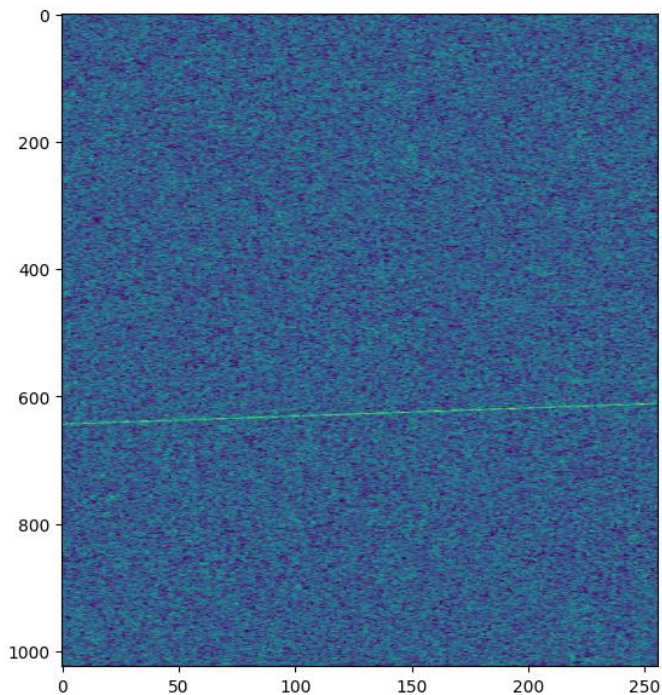
Nperseg = 131072 | fs = 4MSps

fs = 4.0MSps | tile = 97 | nperseg trained on : False



Nperseg = 131072 | fs = 4MSps

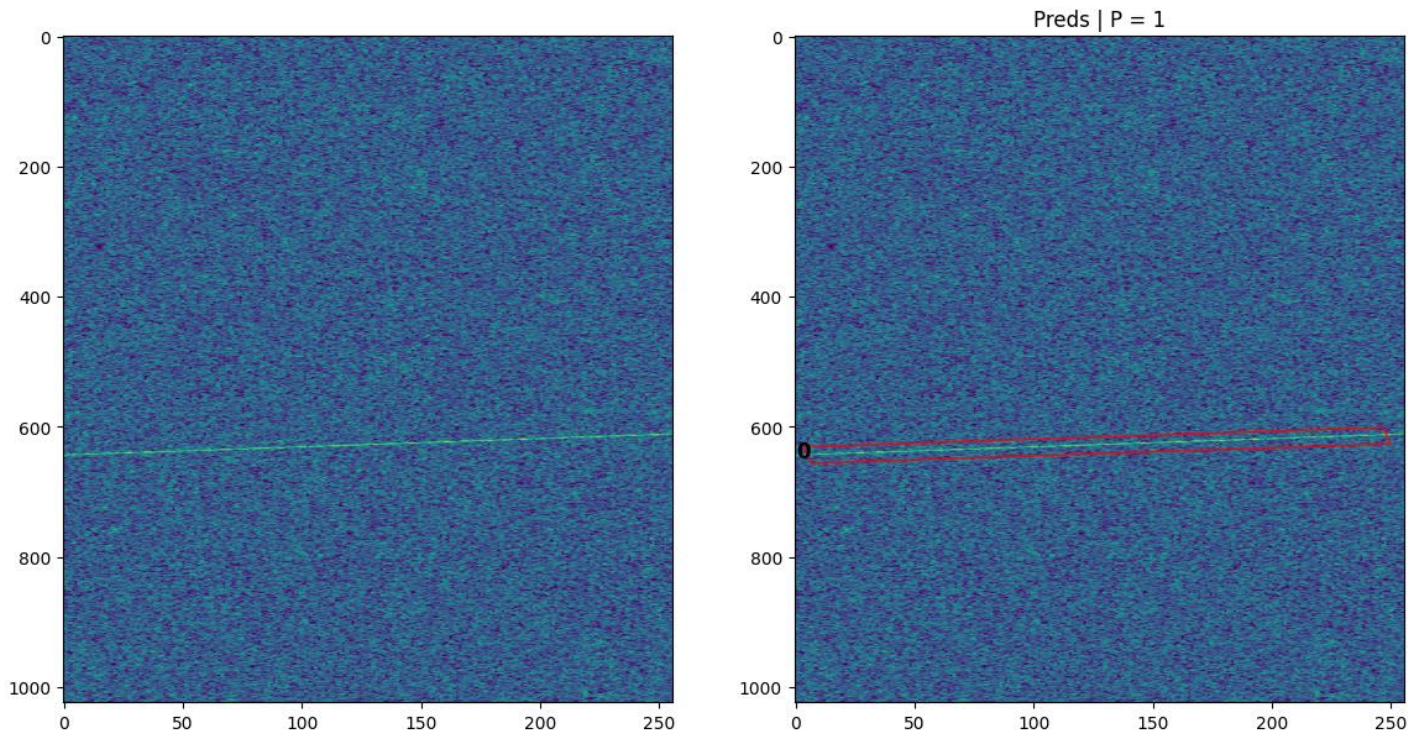
fs = 4.0MSps | tile = 34 | nperseg trained on : False



Nperseg = 131072 | fs = 1GSps

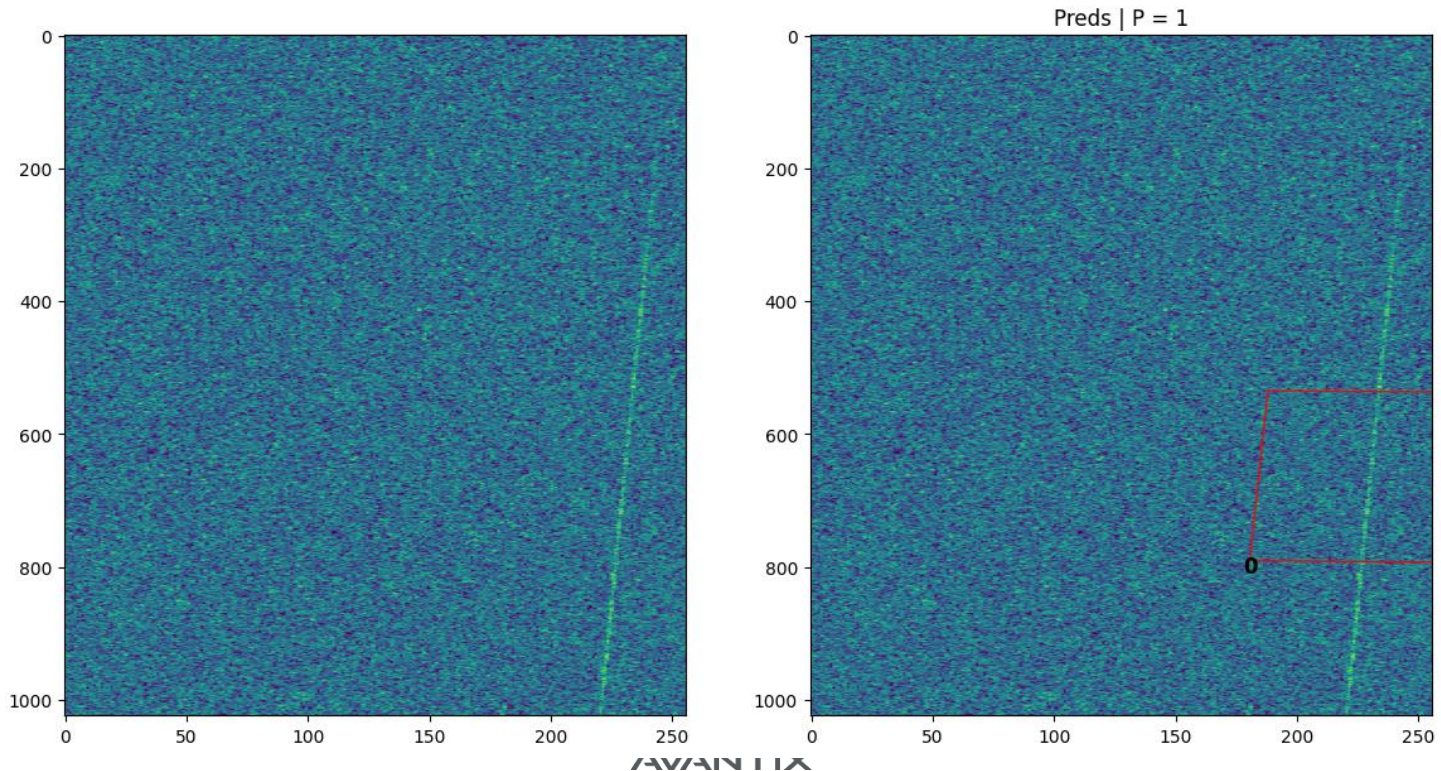
Nperseg = 131072 | fs = 1GSps

fs = 1000.0MSps | tile = 34 | nperseg trained on : False



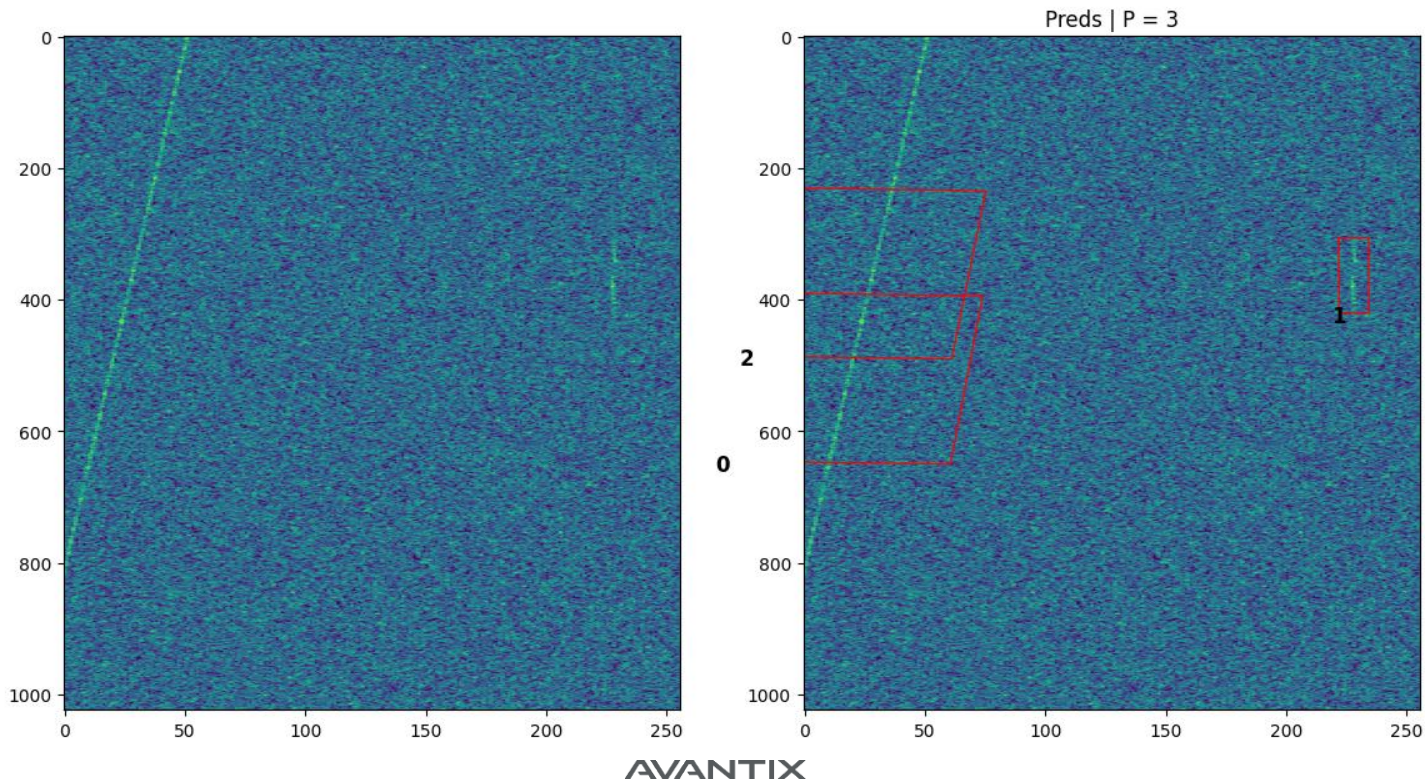
Nperseg = 131072 | fs = 1GSps

fs = 1000.0MSps | tile = 91 | nperseg trained on : False



Nperseg = 131072 | fs = 1GSps

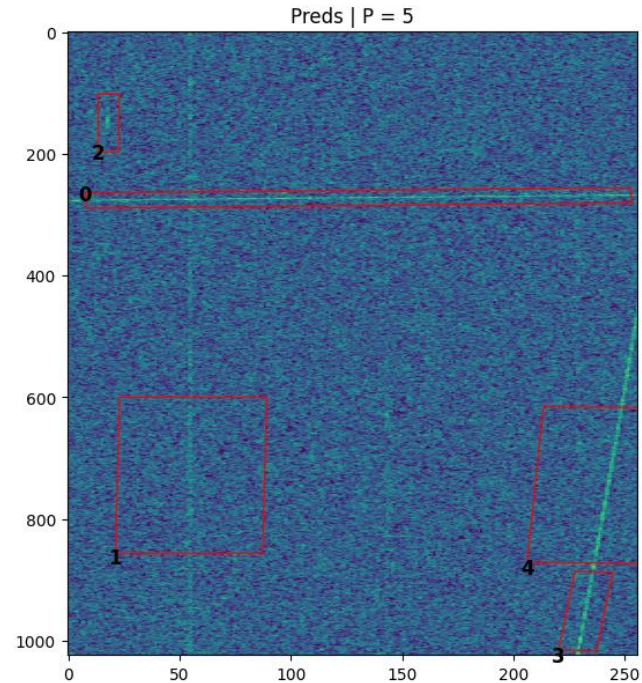
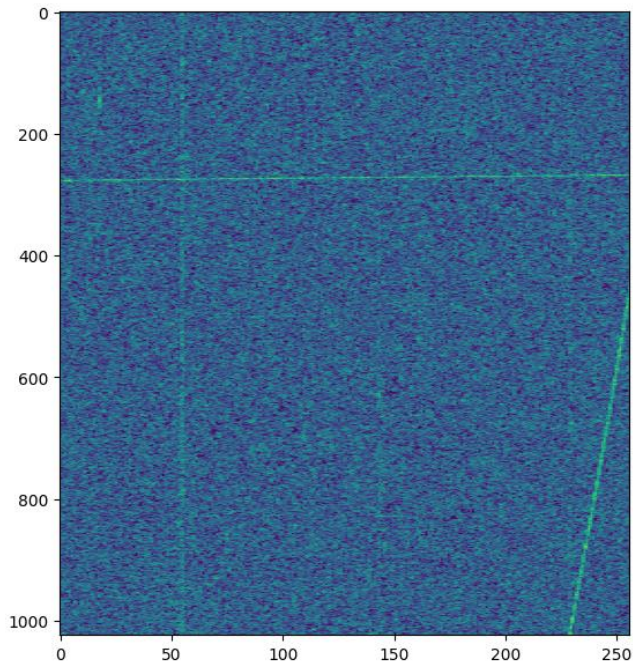
fs = 1000.0MSps | tile = 119 | nperseg trained on : False



$N_{\text{perseg}} = 131072 \mid f_s = 4\text{GSps}$

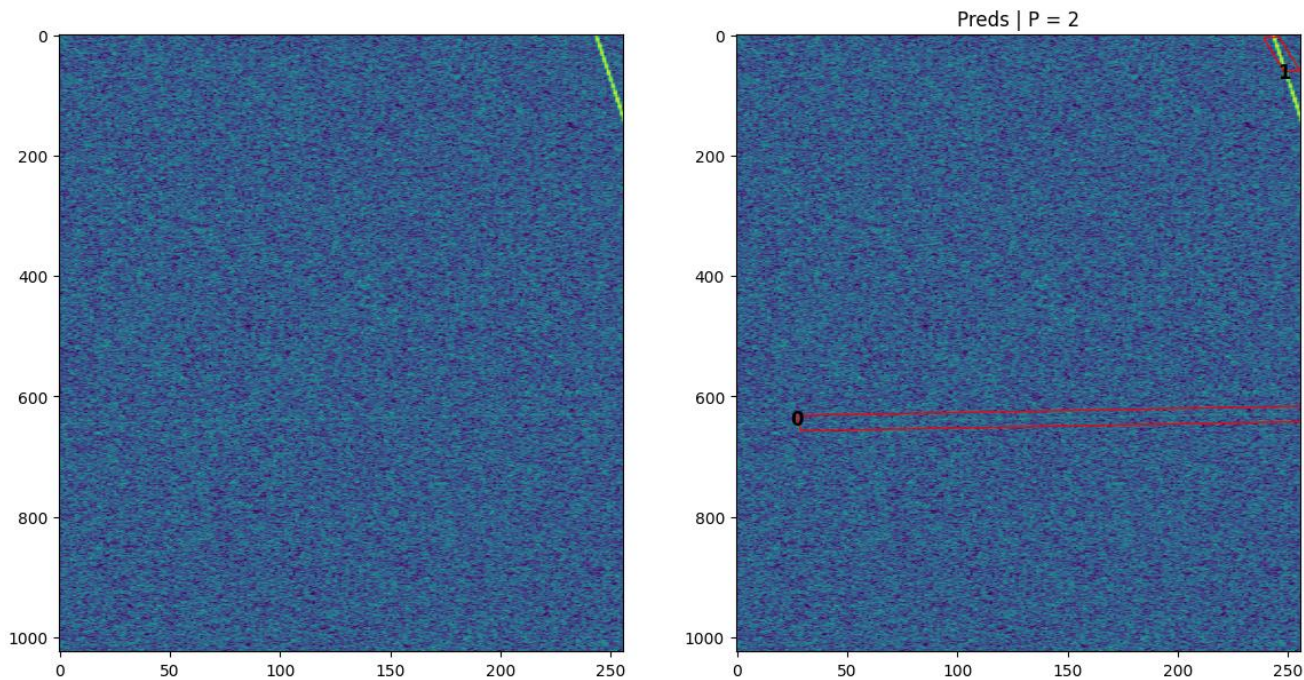
Nperseg = 131072 | fs = 4GSps

fs = 4000.0MSps | tile = 11 | nperseg trained on : False



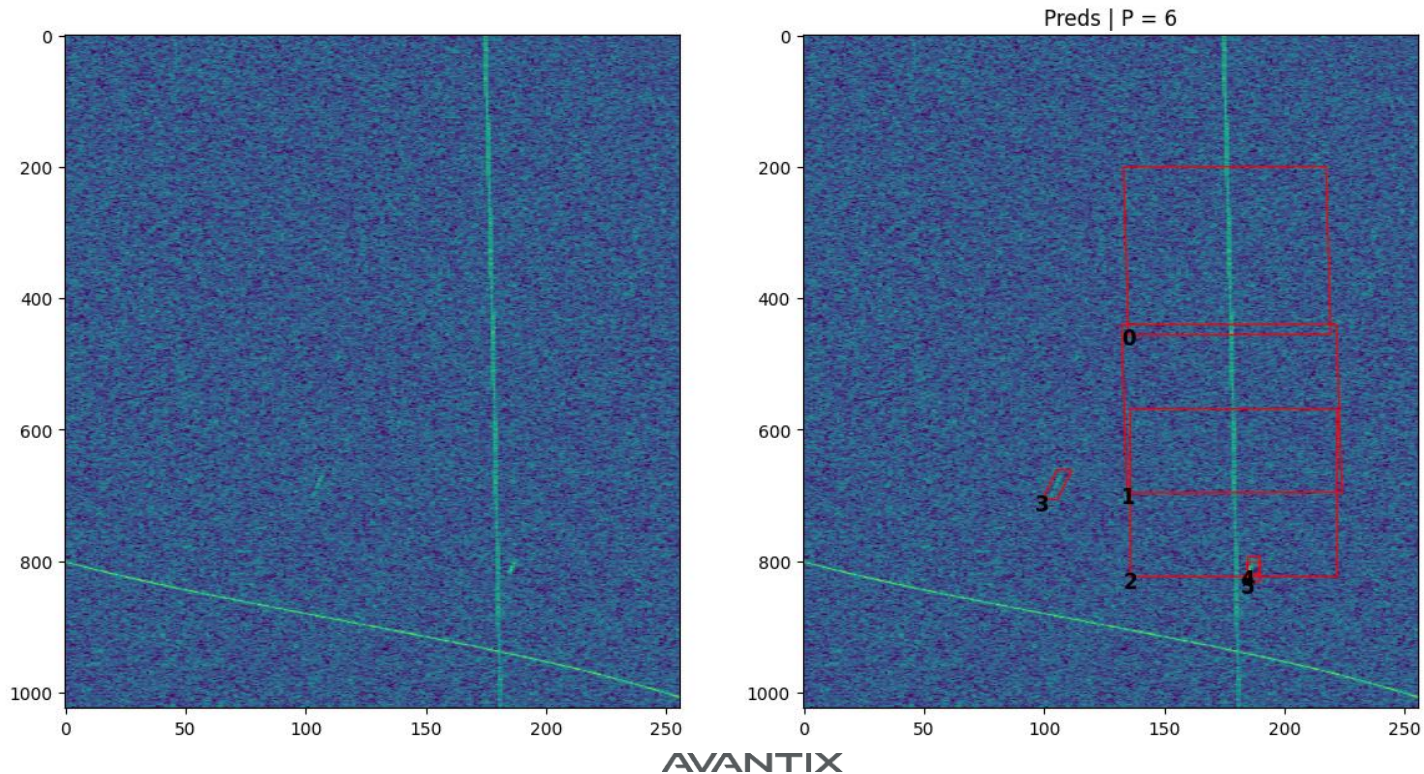
Nperseg = 131072 | fs = 4GSps

fs = 4000.0MSps | tile = 36 | nperseg trained on : False



Nperseg = 131072 | fs = 4GSps

fs = 4000.0MSps | tile = 86 | nperseg trained on : False



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iq2pdw

Batch size

batch_size: 1	Inference per img = 27.42 ms
batch_size: 2	Inference per img = 5.95 ms
batch_size: 4	Inference per img = 2.84 ms
batch_size: 8	Inference per img = 6.14 ms
batch_size: 16	Inference per img = 4.85 ms
batch_size: 32	Inference per img = 3.61 ms
batch_size: 64	Inference per img = 4.52 ms
batch_size: 128	Inference per img = 3.55 ms
batch_size: 256	Inference per img = 3.77 ms
batch_size: 512	Inference per img = 2.56 ms



Refact iq2pdw pour
inférer par batch.
Gain en temps > x4 par
rapport à inférer par 1
seule image

Pour

- 1024x256 (HxW)
- NPERSEGS = [64, 128, 256, 512, 1024, 2048, 8192, 32768, 131072]
- Overlap 50%
- $Fs_{min} = 4MSps$ et $Fs_{max} = 4GSps$

On a :

- $n_{rec} = nperseg_{max} * (W + 1) / 2 = \mathbf{16\ 842\ 752}$
- $N_{imgs} = nperseg_{max} * (1/64 + 1/128 + \dots + 1/1024 + 1/1024 + \dots + 1/1024) = \mathbf{4480\ images}$

Pour le passage en temps contraint ça correspond à :

- $dt_{rec} @ 4MSps = 4,210s \rightarrow FPS@4MSps = 1k$
- $dt_{rec} @ 4GSps = 4,210ms \rightarrow FPS@4GSps = 1\ M$

Taille d'une image : 2 octets x 1024 x 256 = 524 ko

Taille de tous les spectrogrammes = 4480 * 524ko = 2,34 Go → Ça rentre dans la RAM

Refact IQ2PDW :

- Etape 1 : Calculer tous les spectro en linéaire et stocker sur la RAM
- Etape 2 : Inférer sur tous les spectro
- Etape 3 : Fusionner les OBB
- Etape 4 : Extraire les PDW

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TODO

TODO

- Pdw2h5 : Corriger fichier MC
- Iq2pdw : split en 4 étapes
 - Génération des Sxx
 - Inférence des Sxx
 - Merge intra & inter Sxx
 - Extraction PDW

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