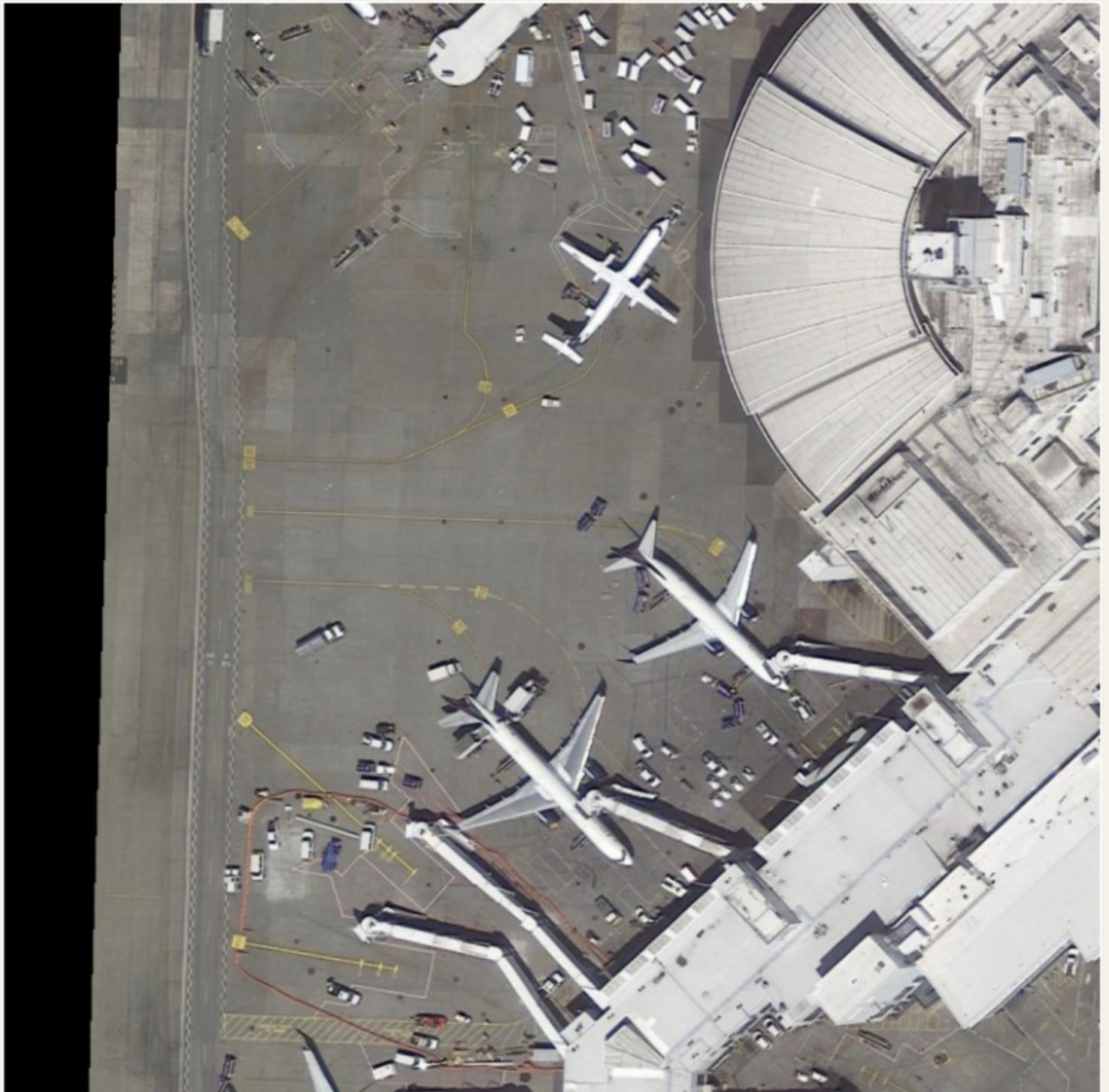
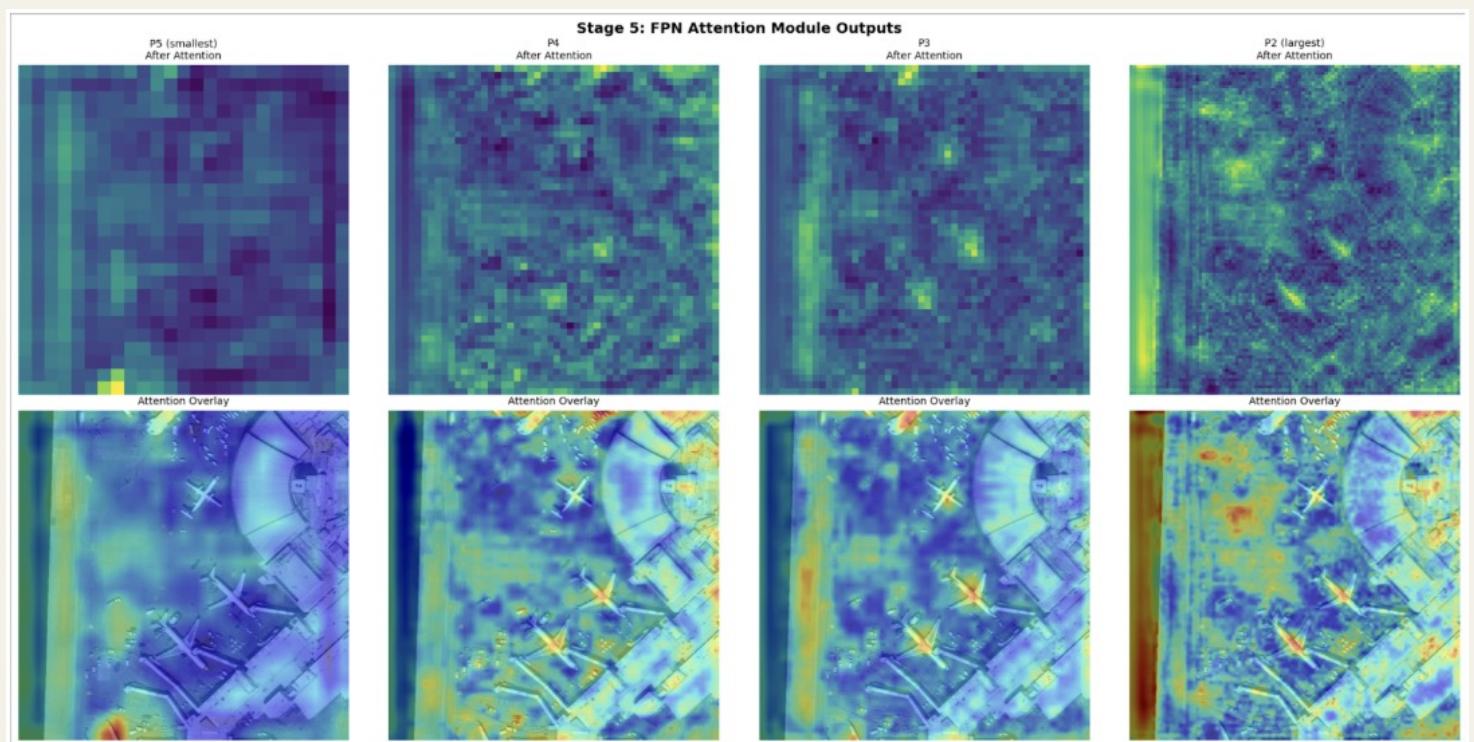
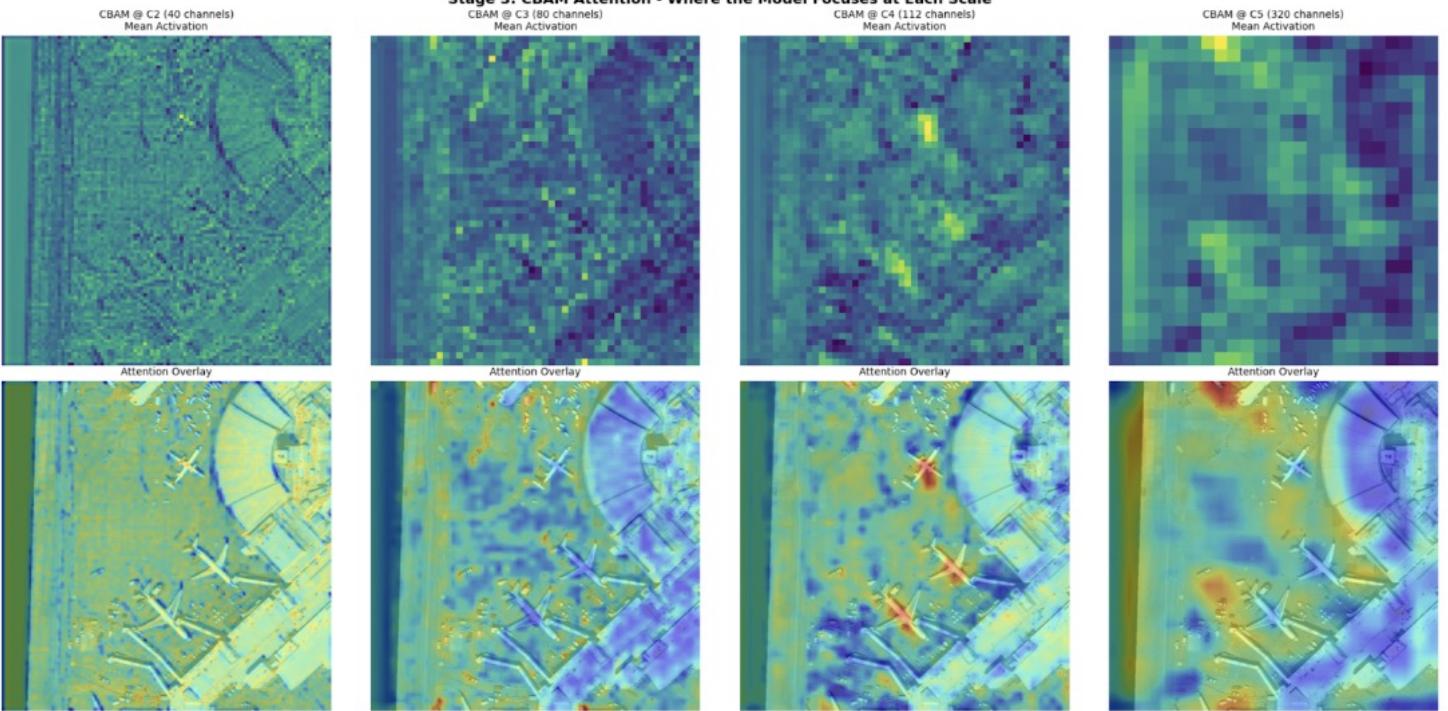


Image 1

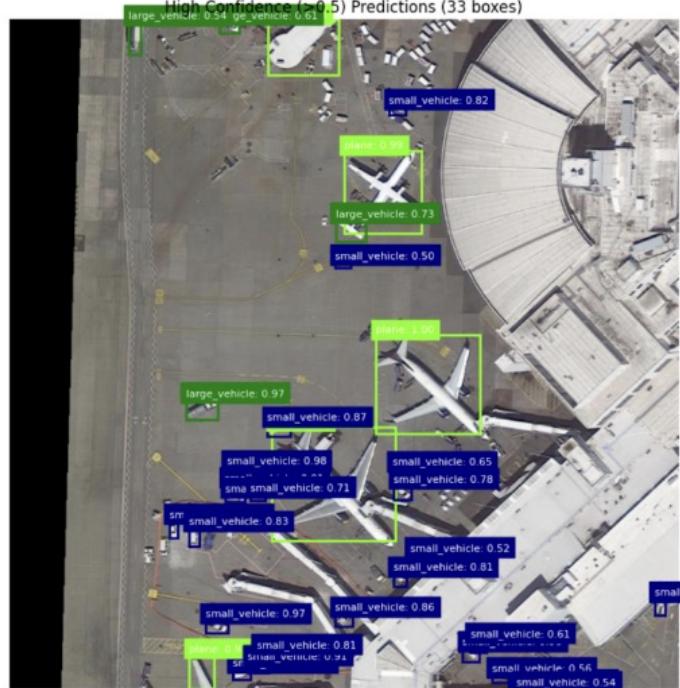
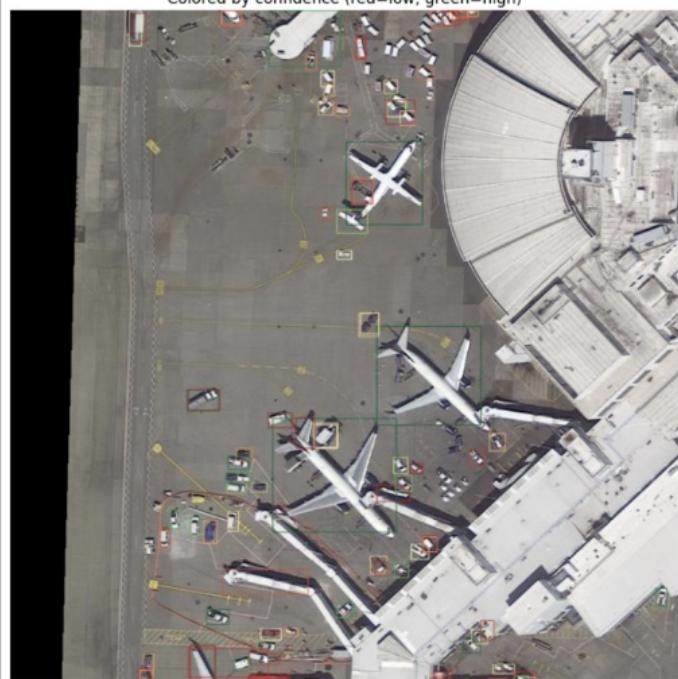


Custom Mask R-CNN with EfficientNet backbone

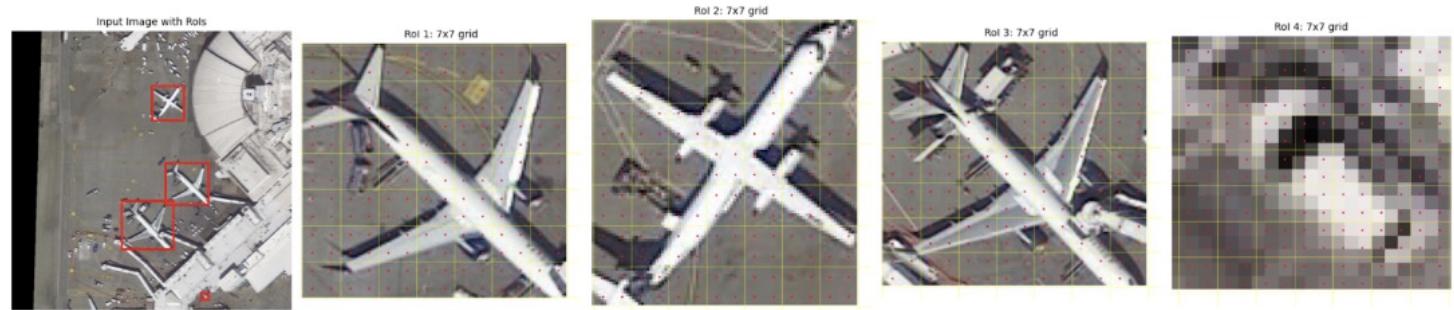


All Predictions (100 boxes)
Colored by confidence (red=low, green=high)

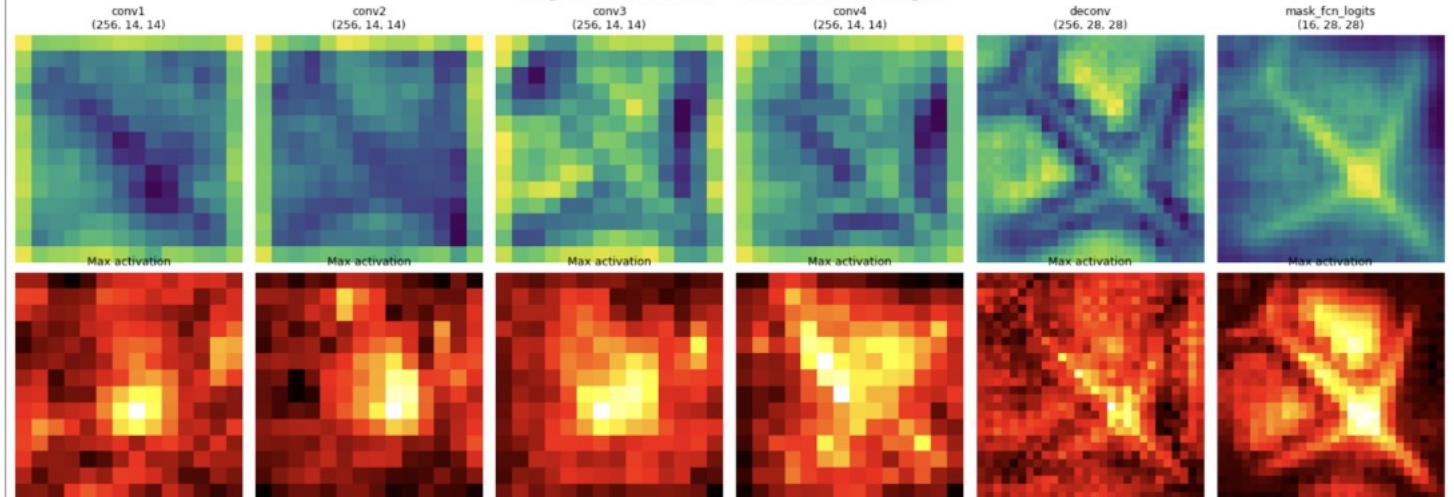
Stage 6: Region Proposals and NMS Results



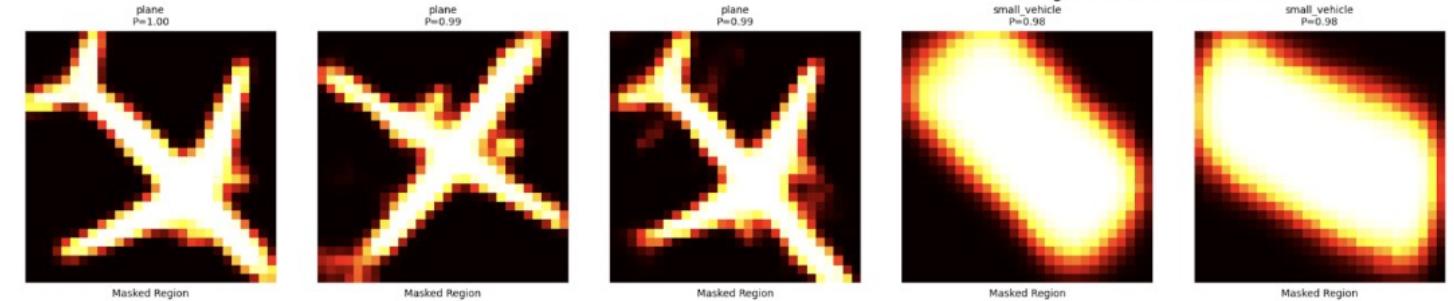
Stage 7: ROI Align - Bilinear Sampling Grid Visualization



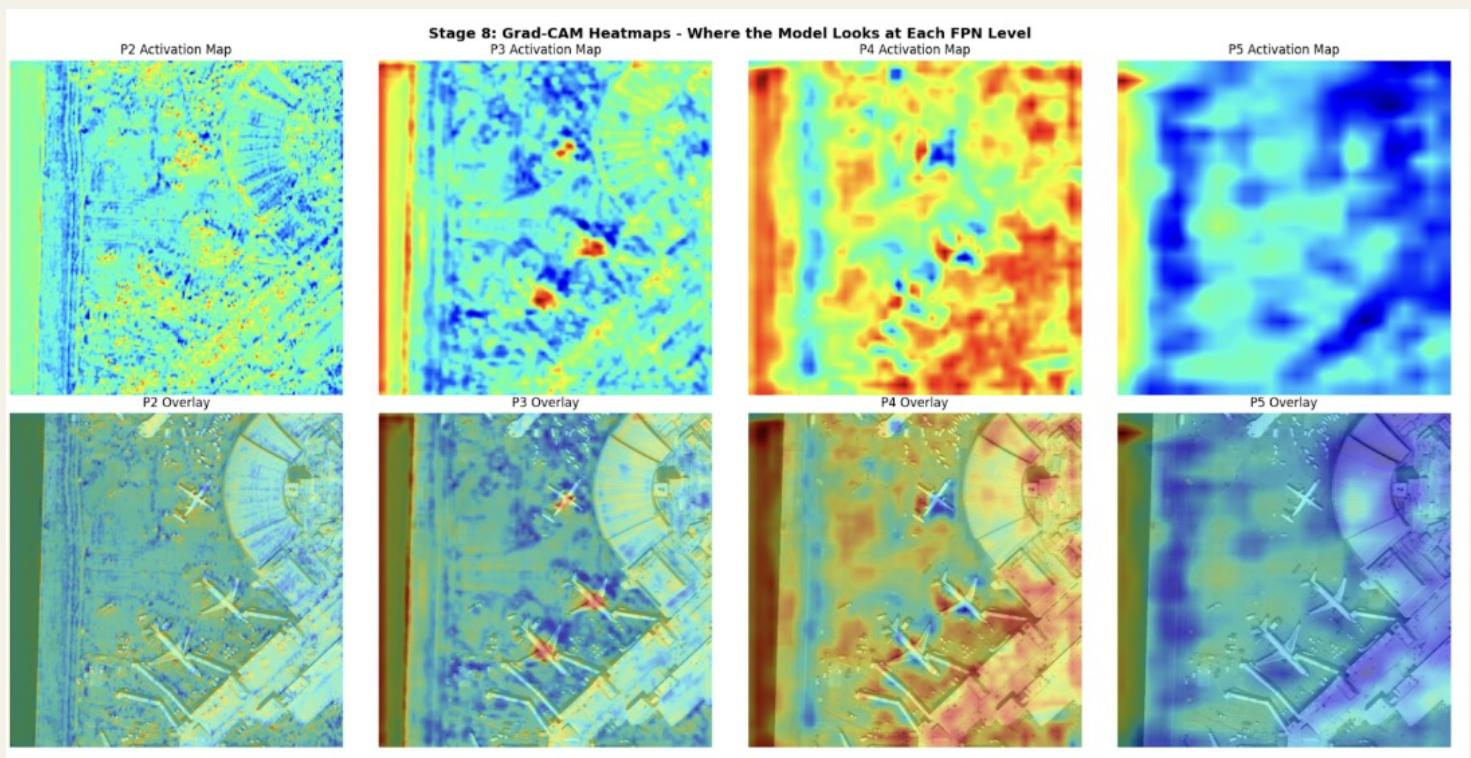
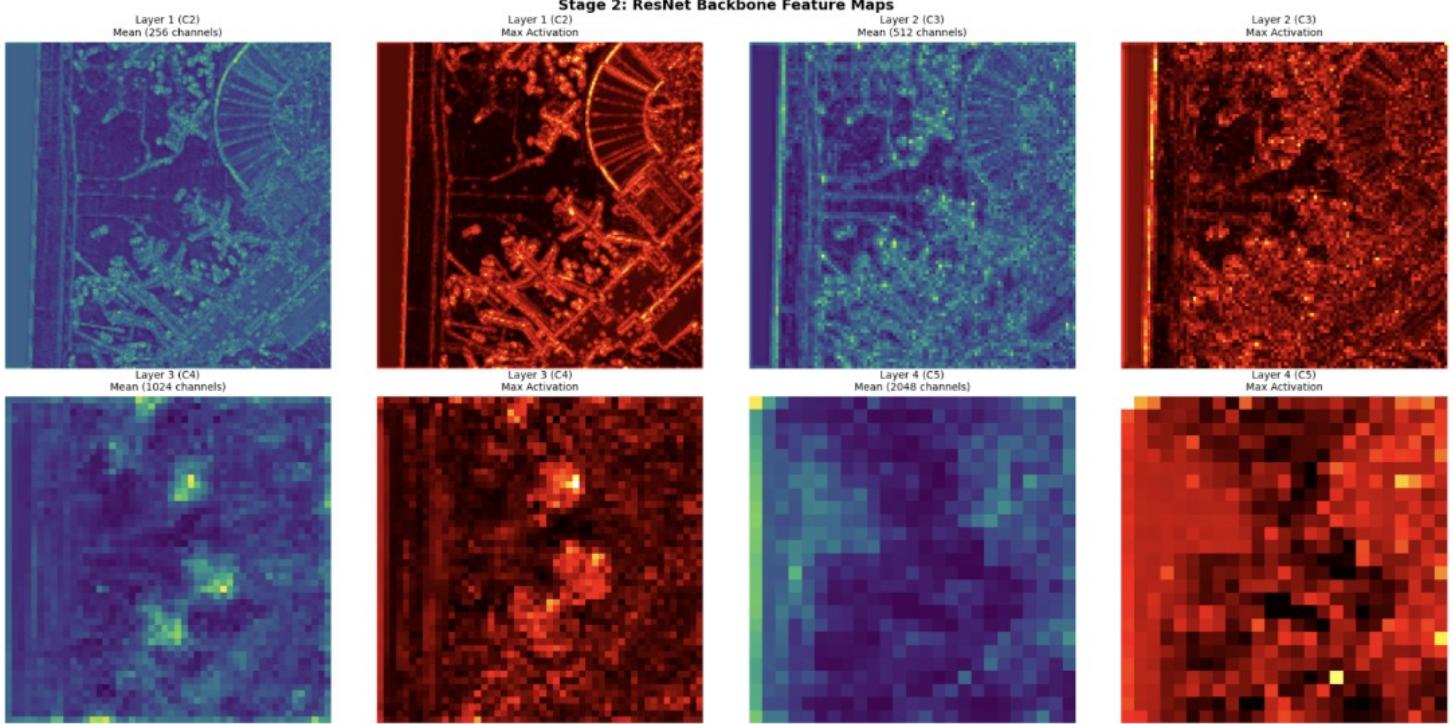
Stage 9: Mask Head - Convolutional Stages



Stage 9: Individual Mask Predictions



Mask R-CNN with ResNet 101 backbone



Stage 4: Region Proposals and NMS Results

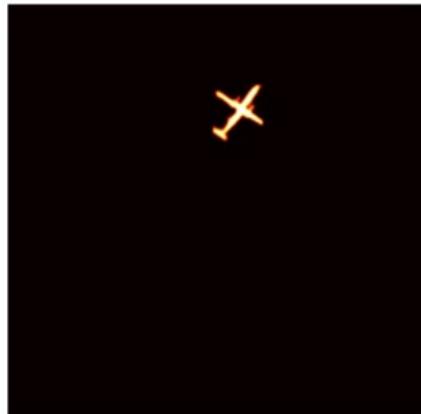
All Predictions (100 boxes)
Colored by confidence (red=low, green=high)



High Confidence (>0.5) Predictions (50 boxes)



plane
 $P=1.00$



plane
 $P=1.00$



plane
P=1.00



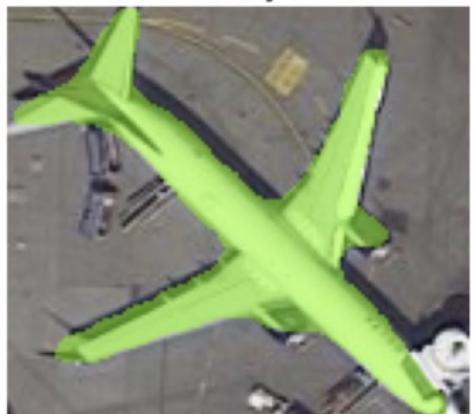
Masked Region

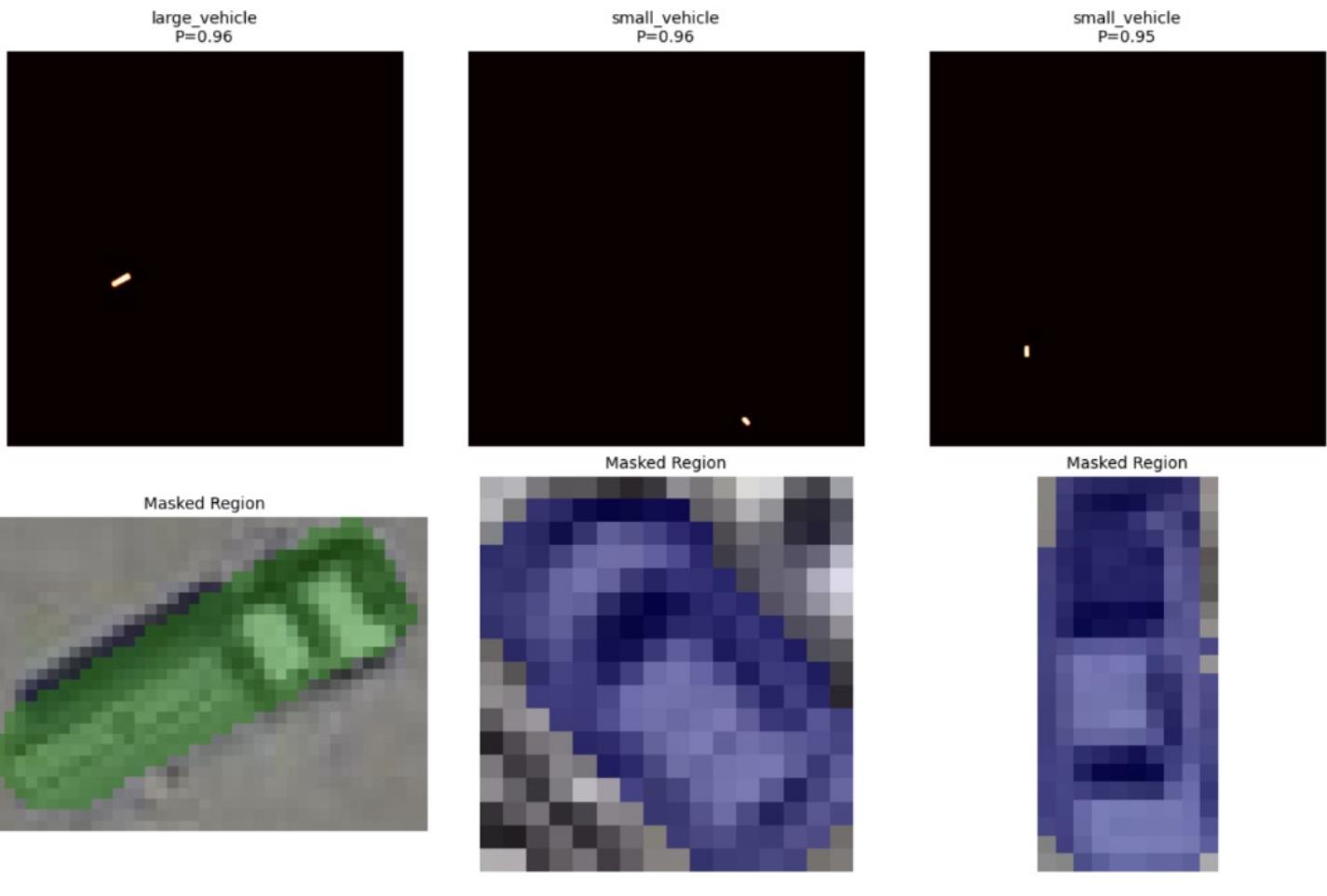


Masked Region

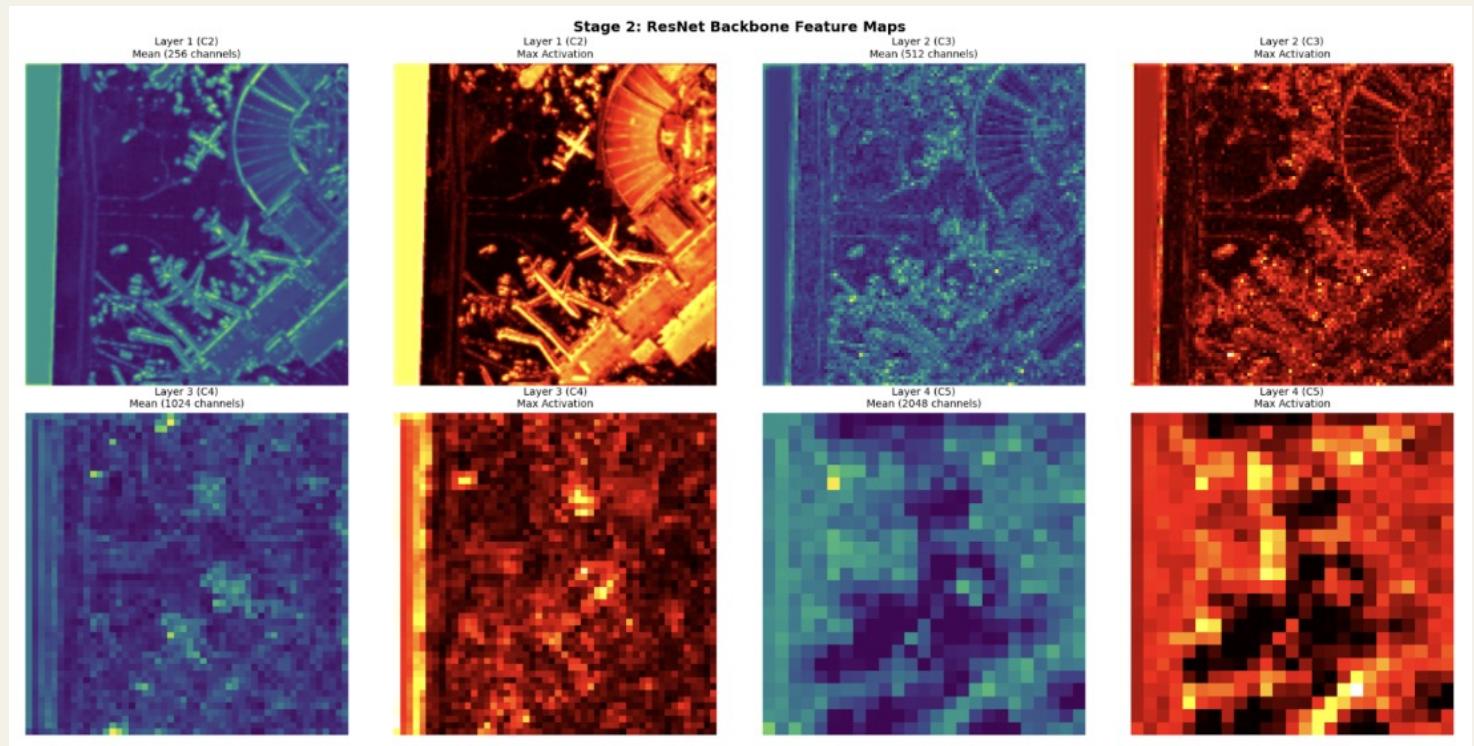


Masked Region

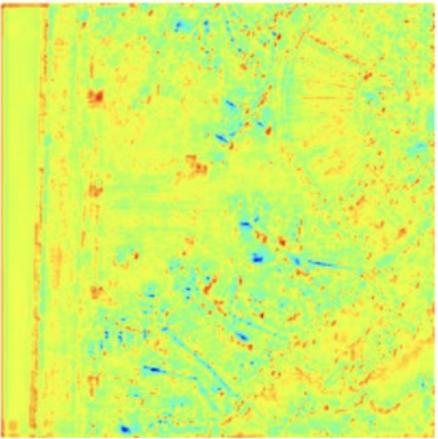




Mask R-CNN with ResNet 50 backbone

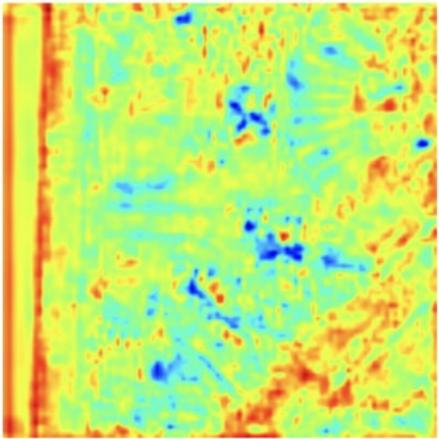


P2 Activation Map

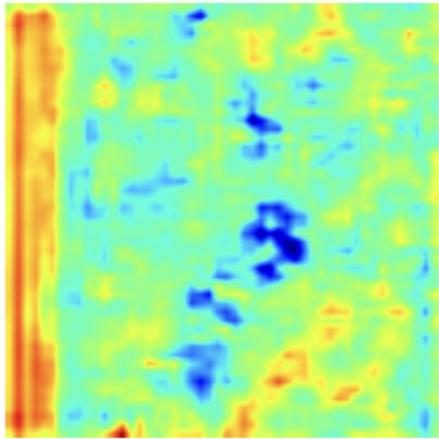


Stage 8: Grad-CAM Heatmaps - Where the Model Looks at Each FPN Level

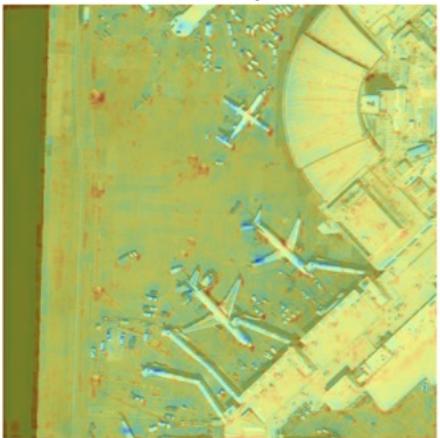
P3 Activation Map



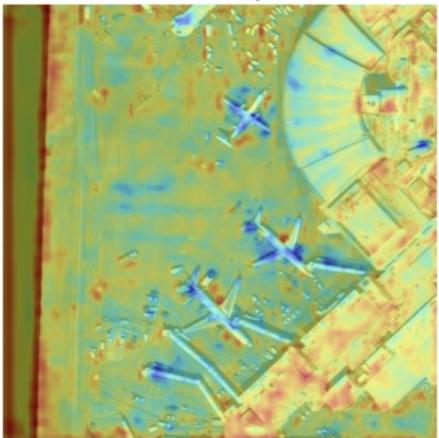
P4 Activation Map



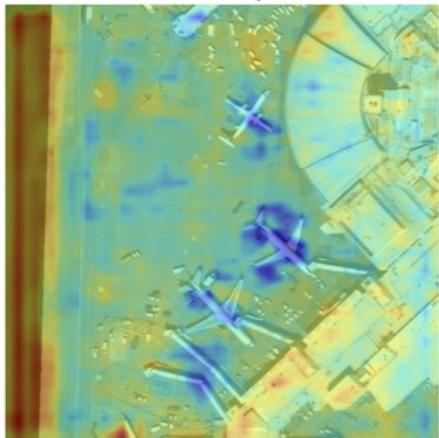
P2 Overlay



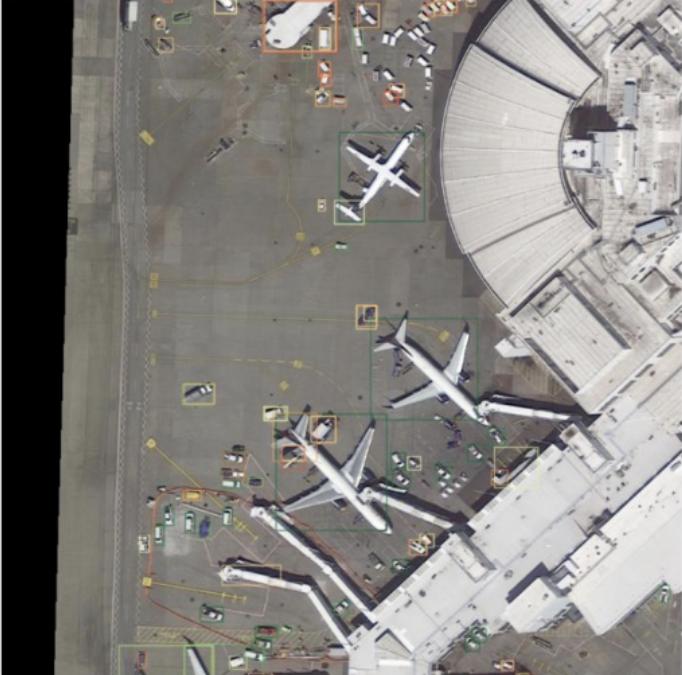
P3 Overlay



P4 Overlay



All Predictions (100 boxes)
Colored by confidence (red=low, green=high)



Stage 4: Region Proposals and NMS Results

High C_{IoU} > 0.5 Predictions (50 boxes)



Mask Predictions

plane
 $P=0.99$



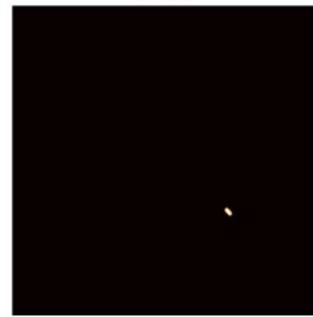
Masked Region

plane
 $P=0.98$



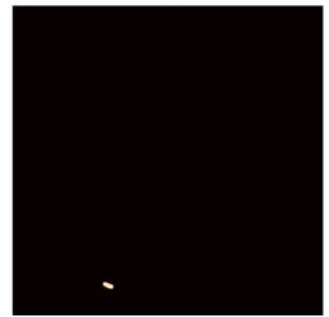
Masked Region

small_vehicle
 $P=0.98$



Masked Region

small_vehicle
 $P=0.97$



Masked Region

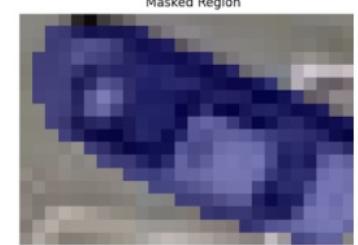
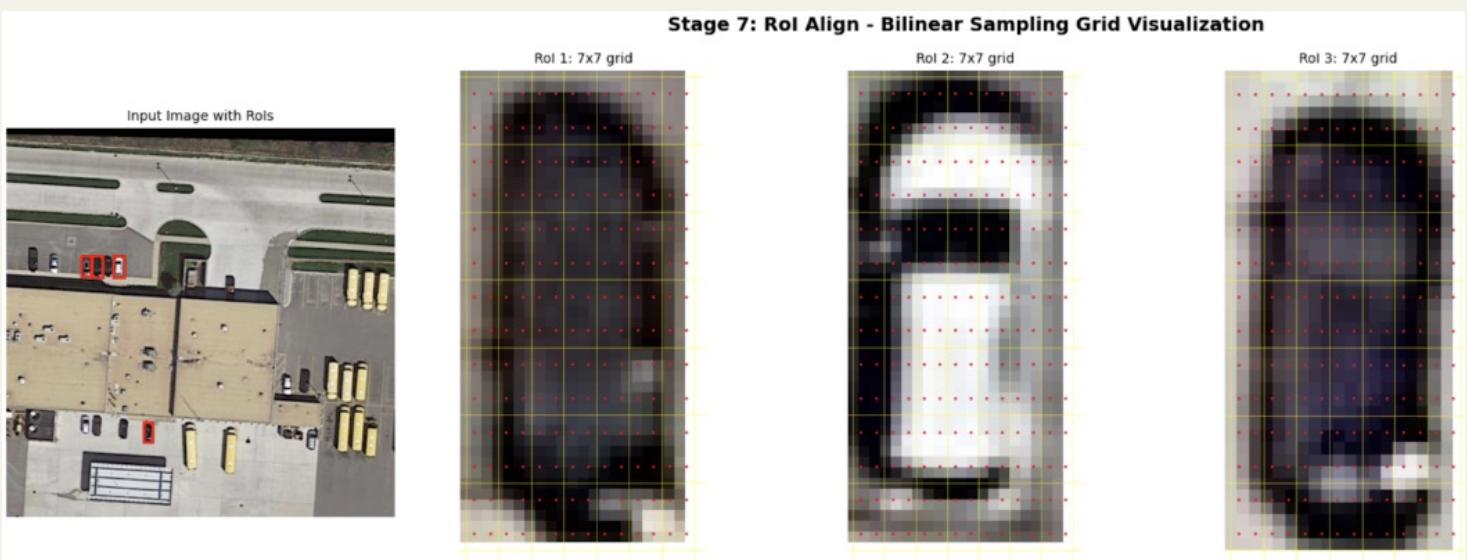
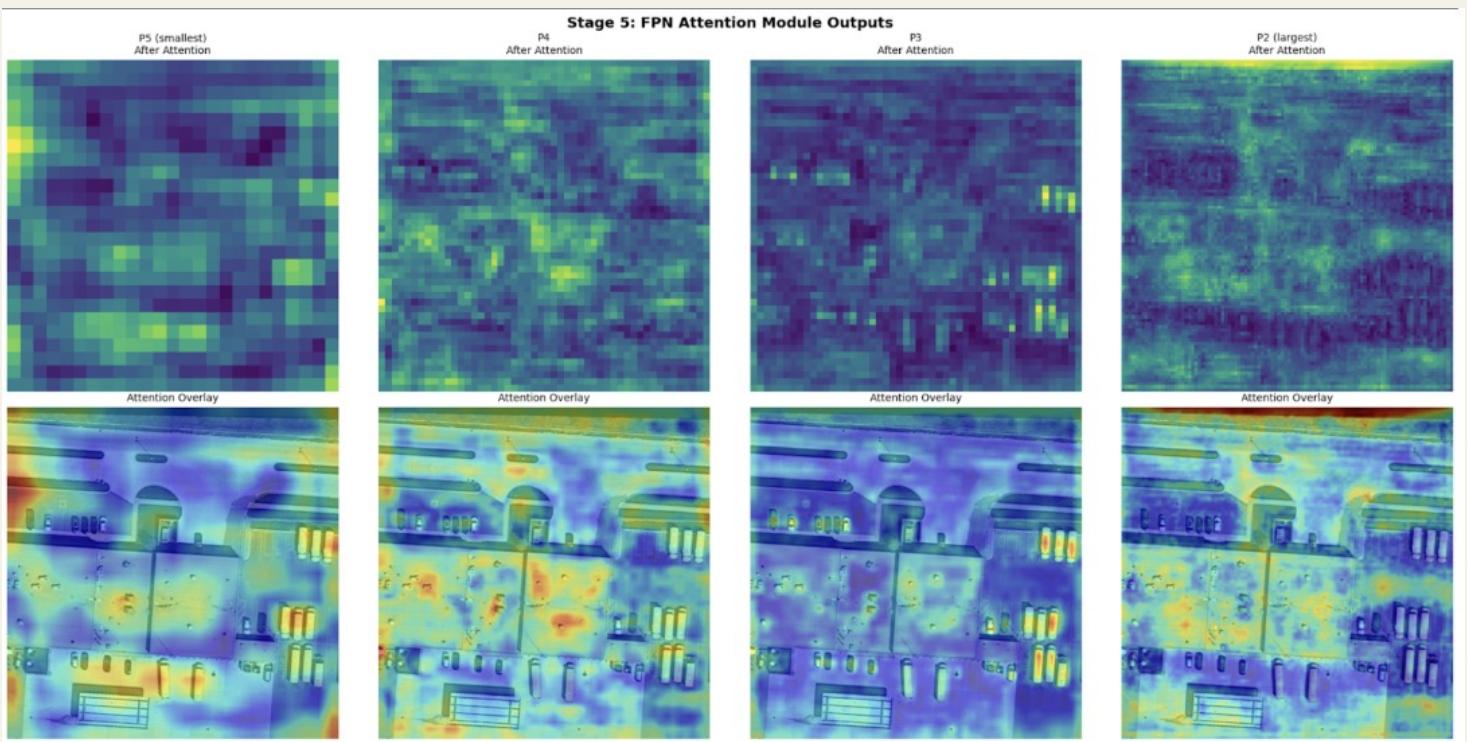
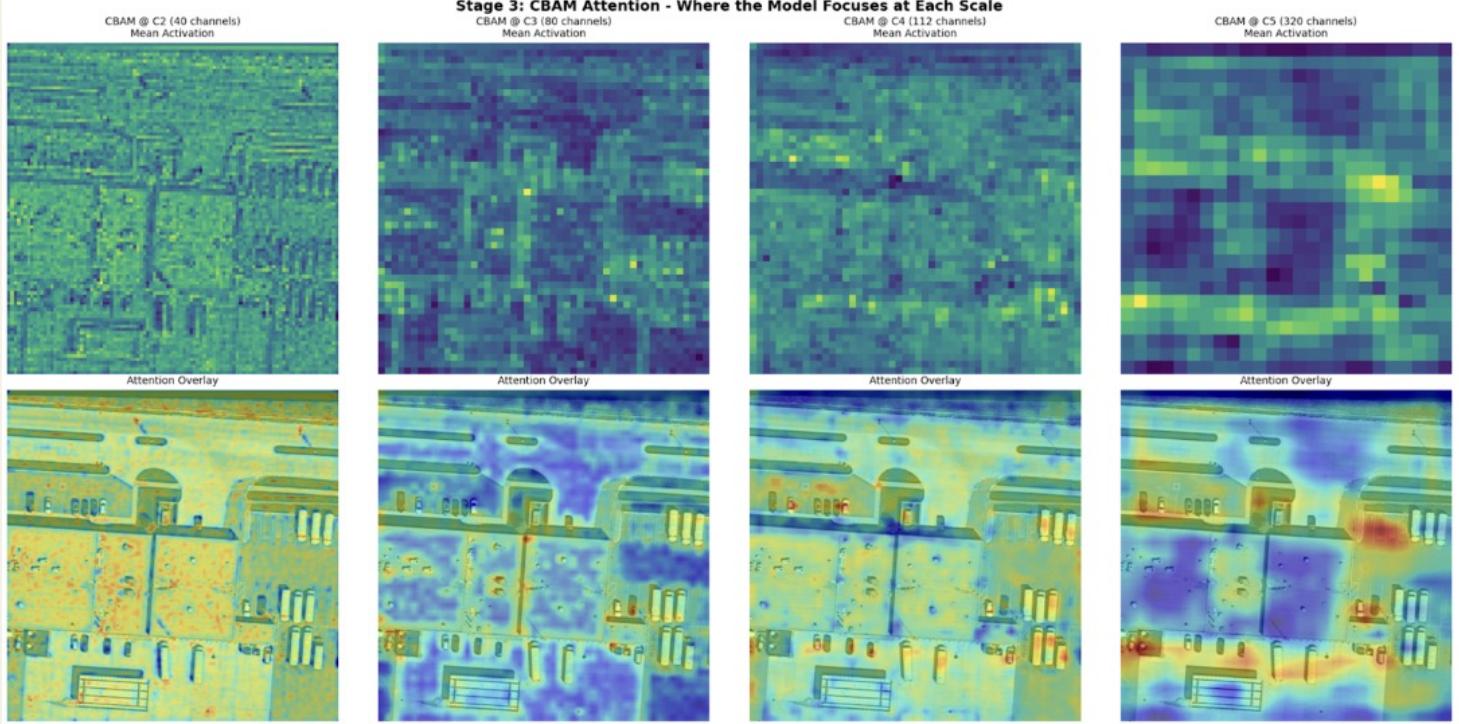


Image 2

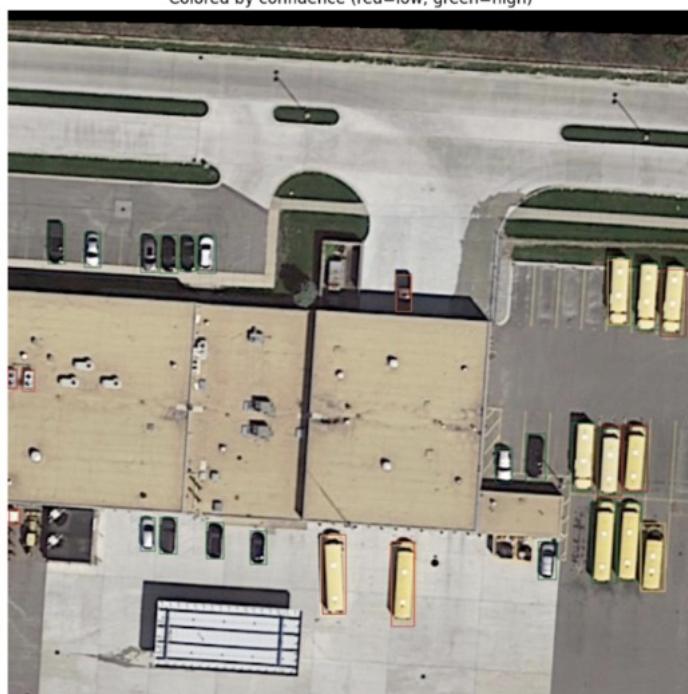


Custom Mask R-CNN with EfficientNet backbone

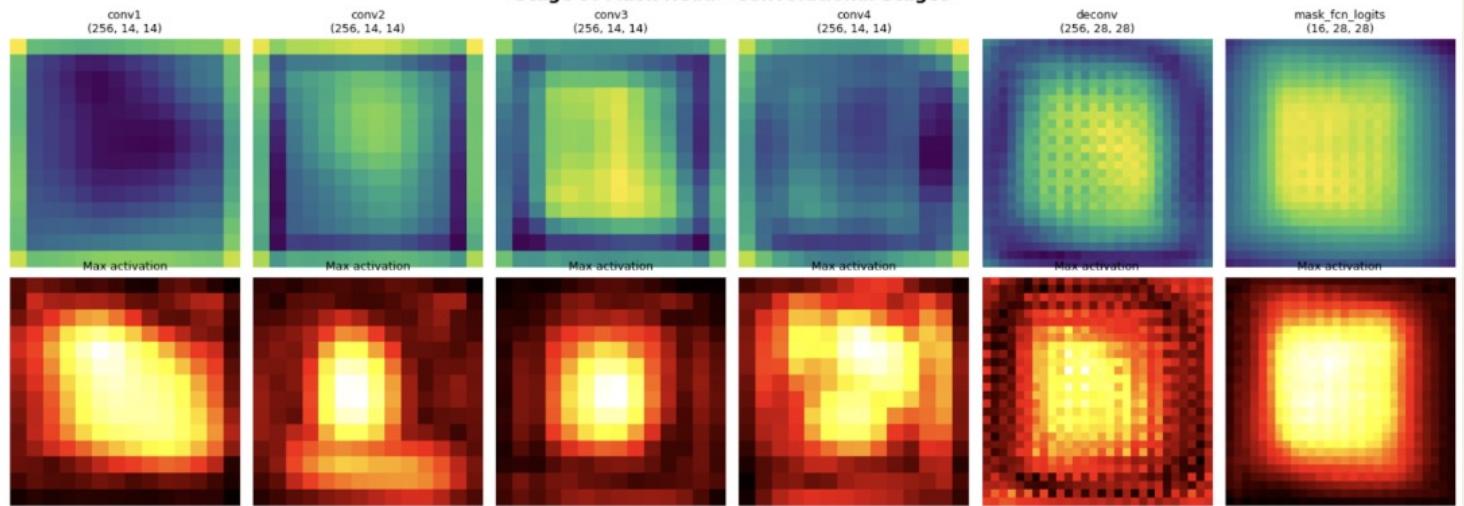


All Predictions (44 boxes)
Colored by confidence (red=low, green=high)

Stage 6: Region Proposals and NMS Results



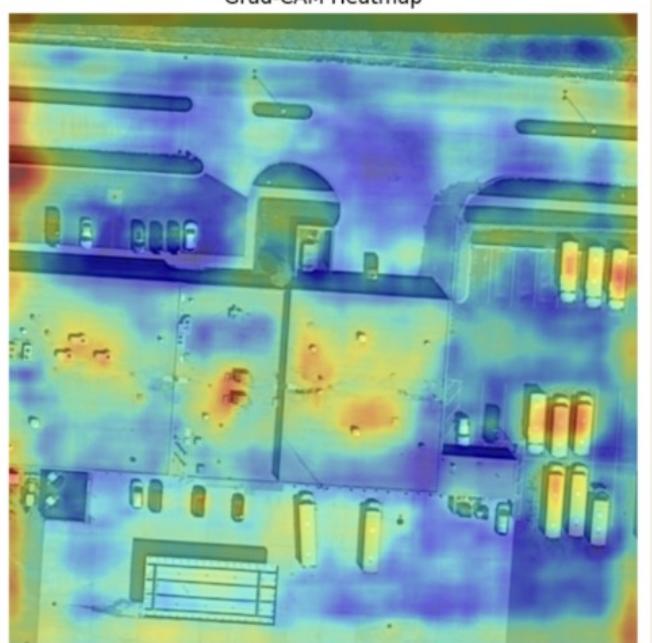
Stage 9: Mask Head - Convolutional Stages



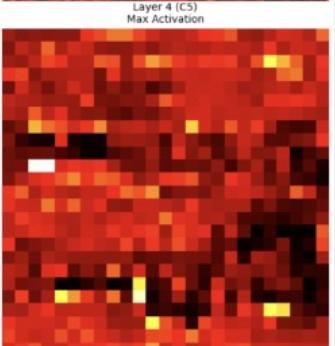
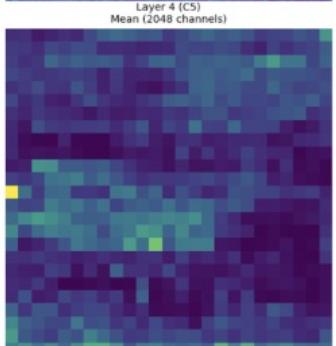
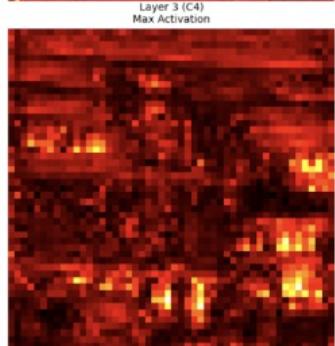
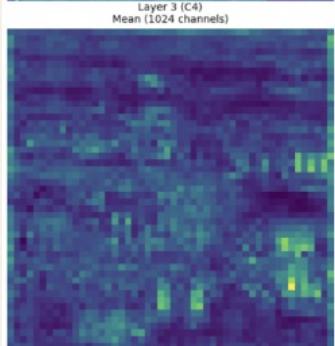
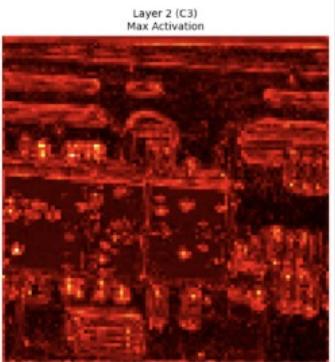
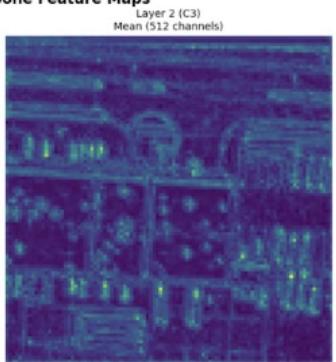
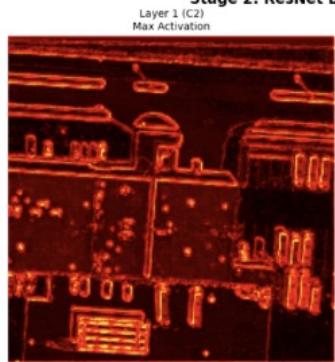
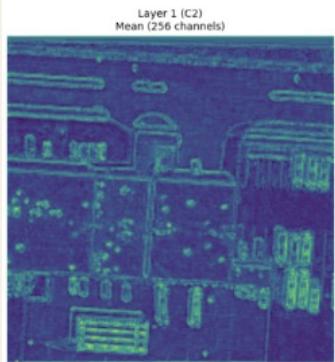
Stage 11: Final Predictions with Masks and Grad-CAM



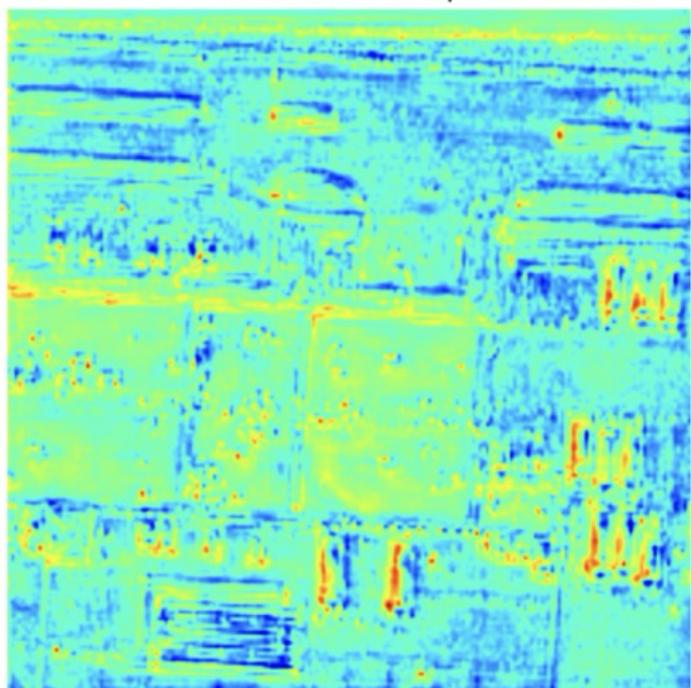
Grad-CAM Heatmap



Mask R-CNN with ResNet 101 backbone

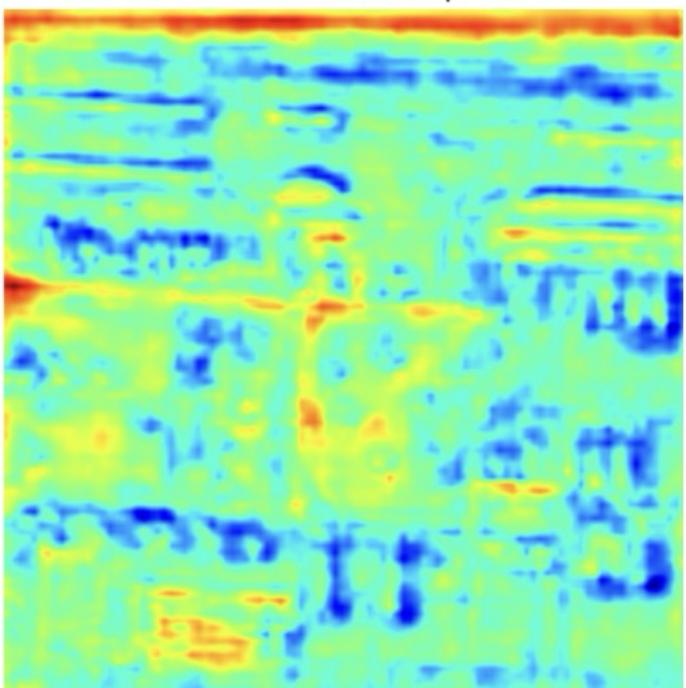


P2 Activation Map

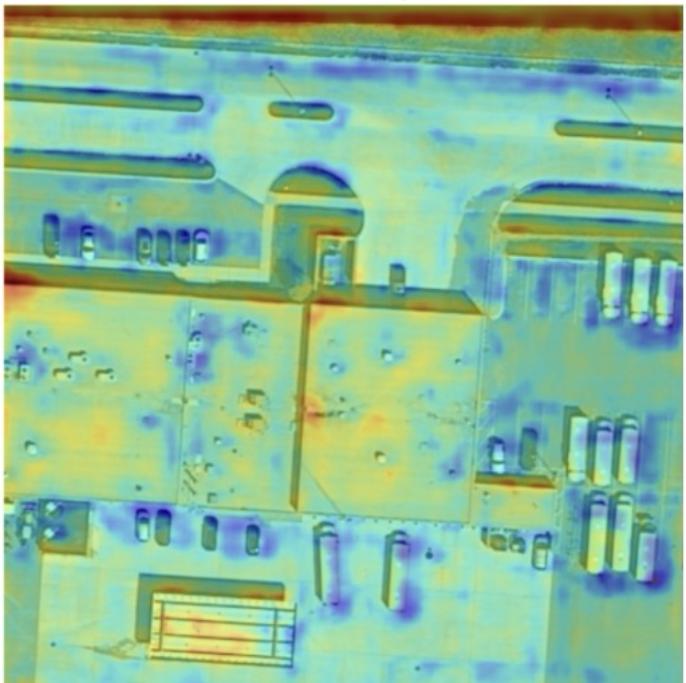
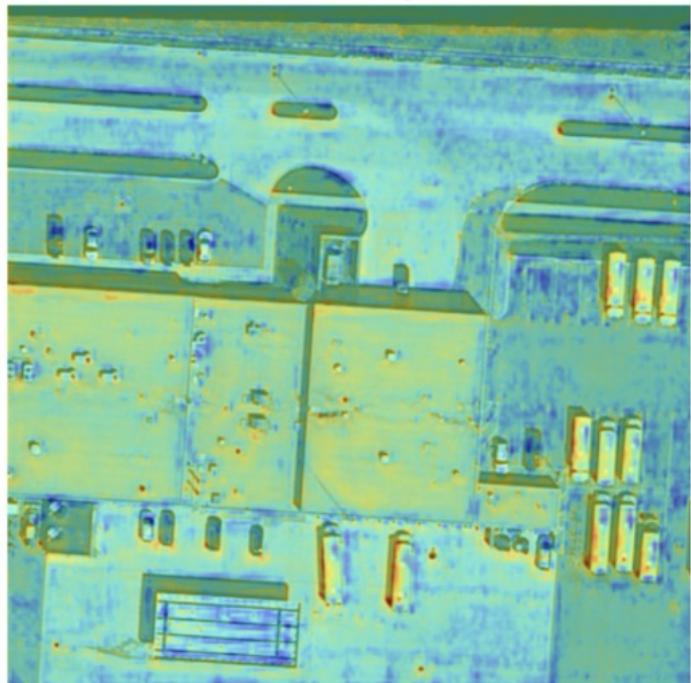


P2 Overlay

Stage 8: Grad-CAM Heatmaps - Wh
P3 Activation Map



P3 Overlay



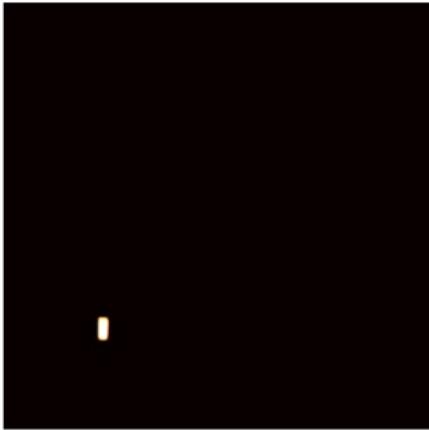
All Predictions (50 boxes)
Colored by confidence (red=low, green=high)

Stage 4: Region Proposals and NMS Results

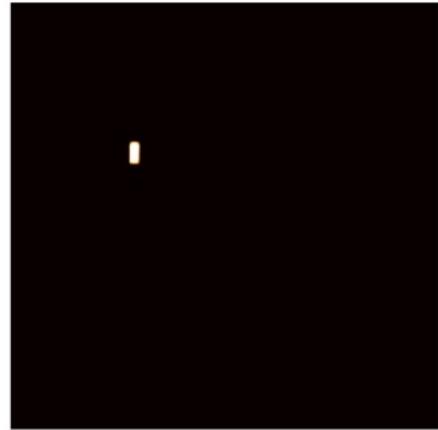
High Confidence (>0.5) Predictions (27 boxes)



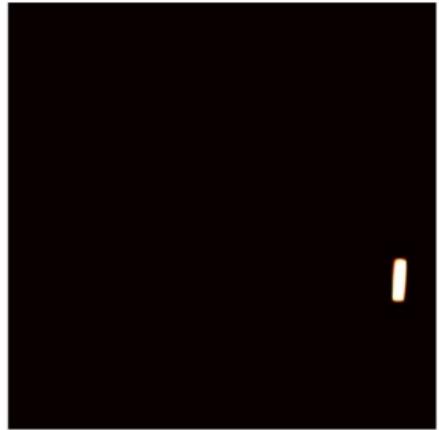
small_vehicle
 $P=1.00$



small_vehicle
 $P=1.00$



large_vehicle
 $P=1.00$



Masked Region



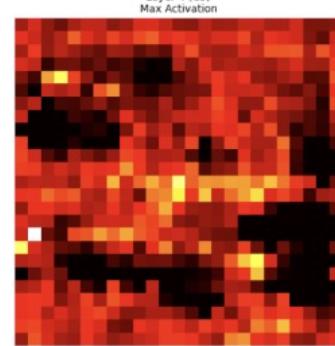
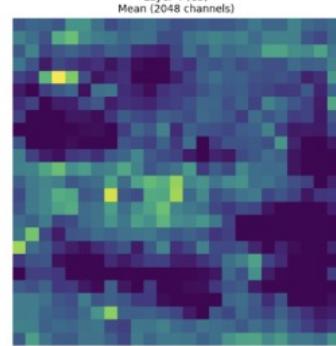
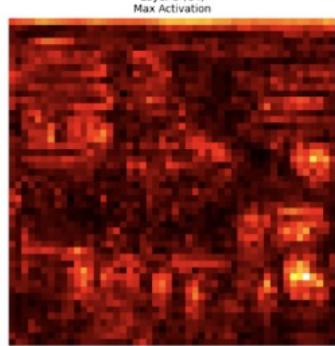
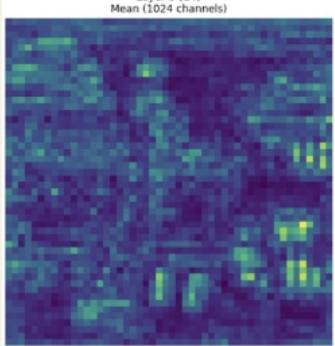
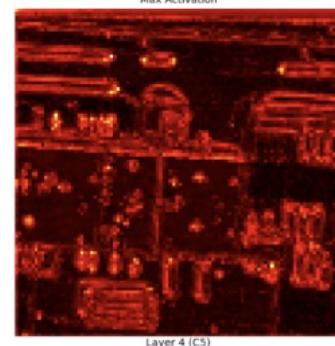
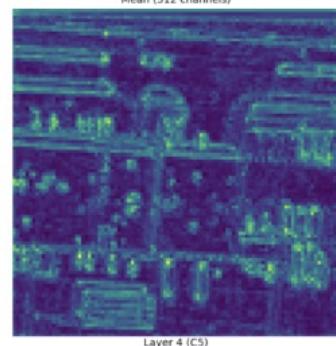
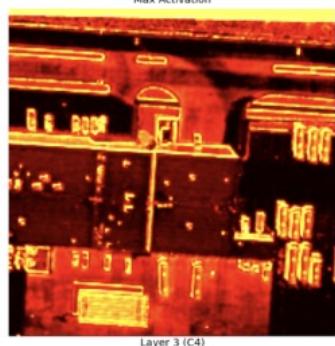
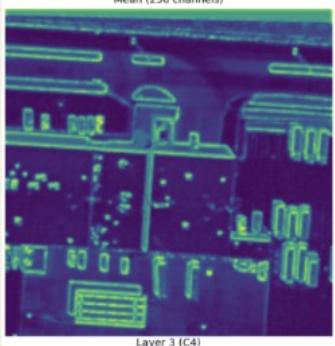
Masked Region



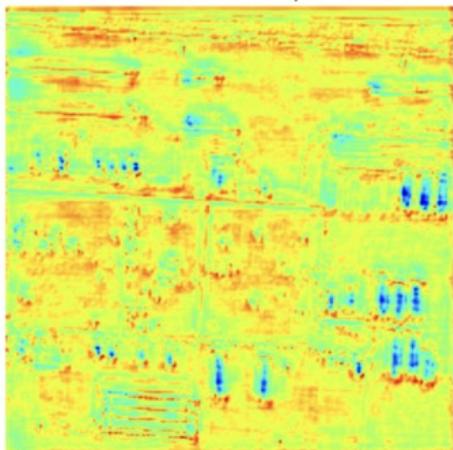
Masked Region



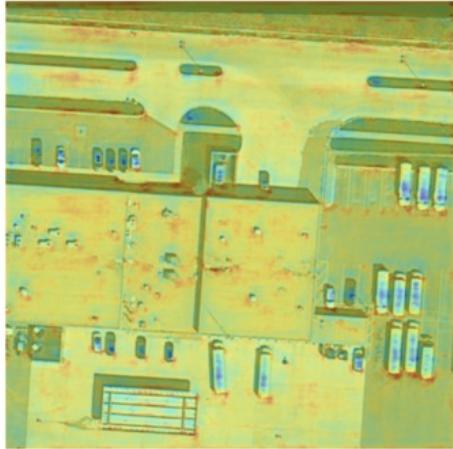
Mask R-CNN with ResNet 50 backbone



P2 Activation Map

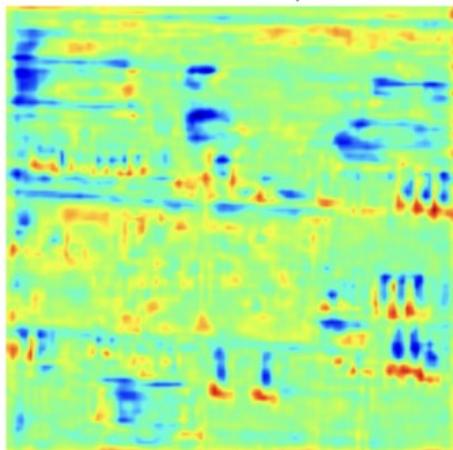


P2 Overlay

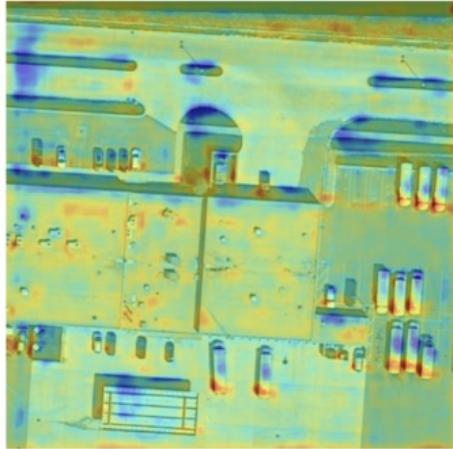


Stage 8: Grad-CAM Heatmaps - Where the Model Looks at Each FPN Level

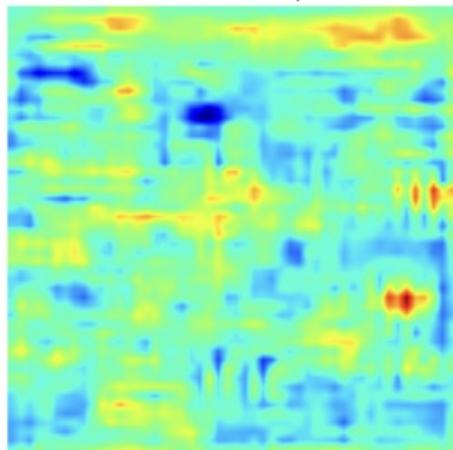
P3 Activation Map



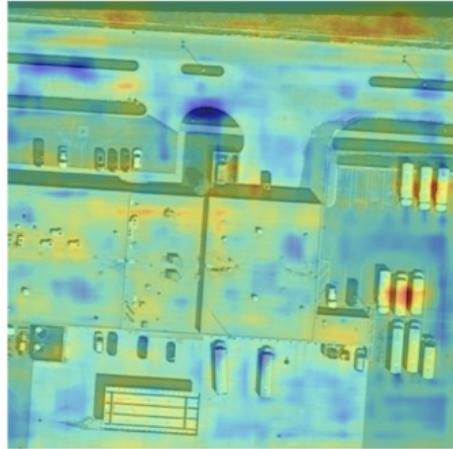
P3 Overlay



P4 Activation Map



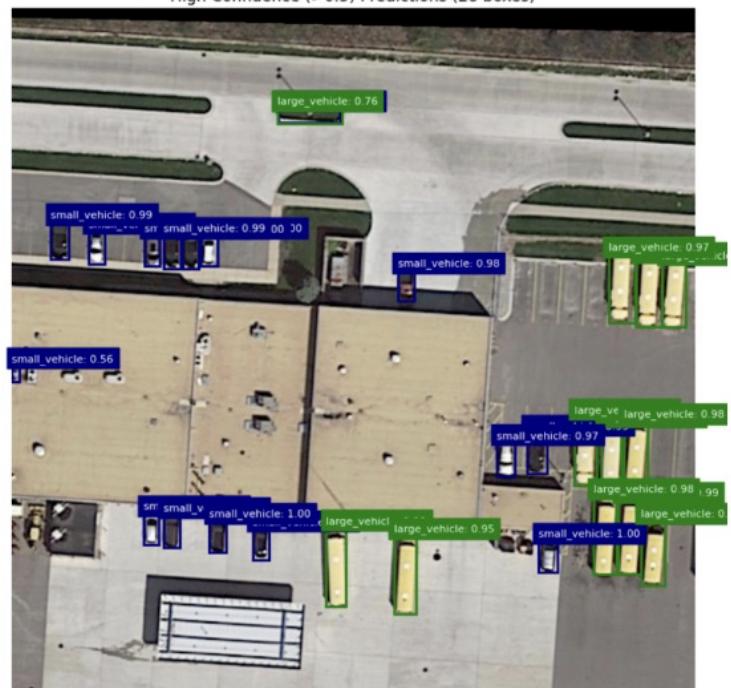
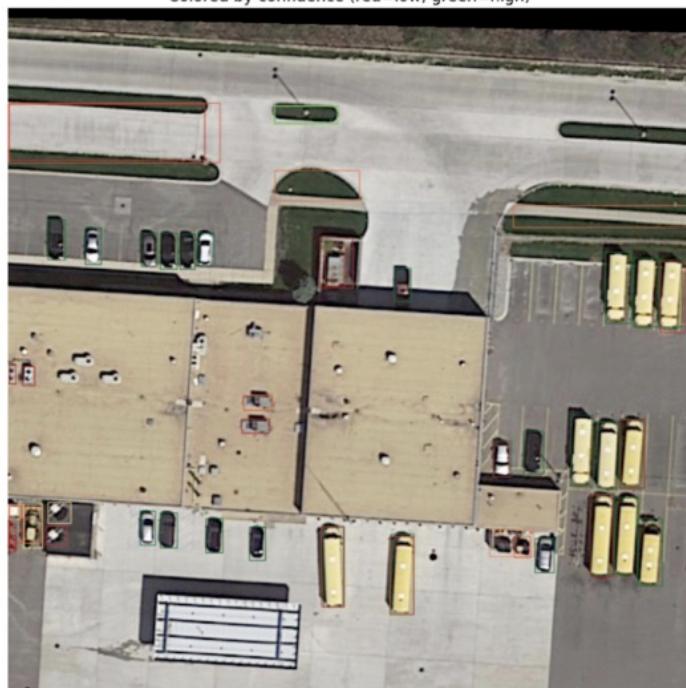
P4 Overlay



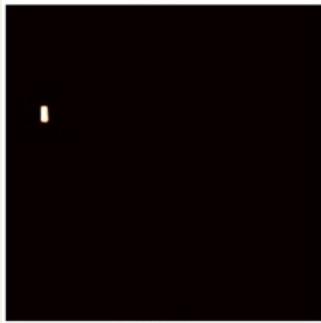
All Predictions (59 boxes)
Colored by confidence (red=low, green=high)

Stage 4: Region Proposals and NMS Results

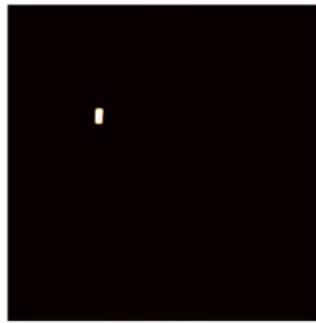
High Confidence (>0.5) Predictions (28 boxes)



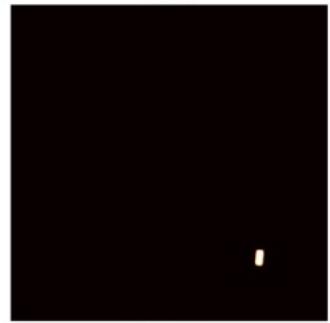
small vehicle
 $P=1.00$



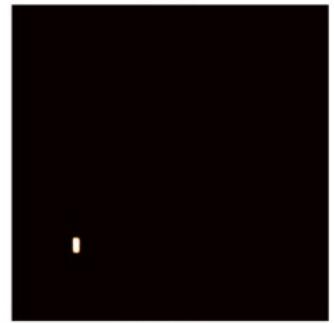
small vehicle
 $P=1.00$



small vehicle
 $P=1.00$



Stage 7: Individual
small vehicle
 $P=1.00$



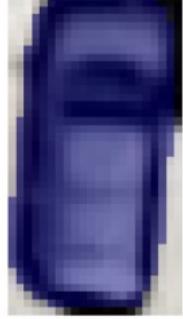
Masked Region



Masked Region



Masked Region



Masked Region

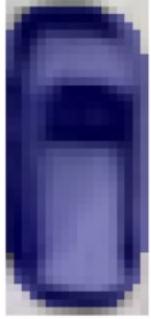
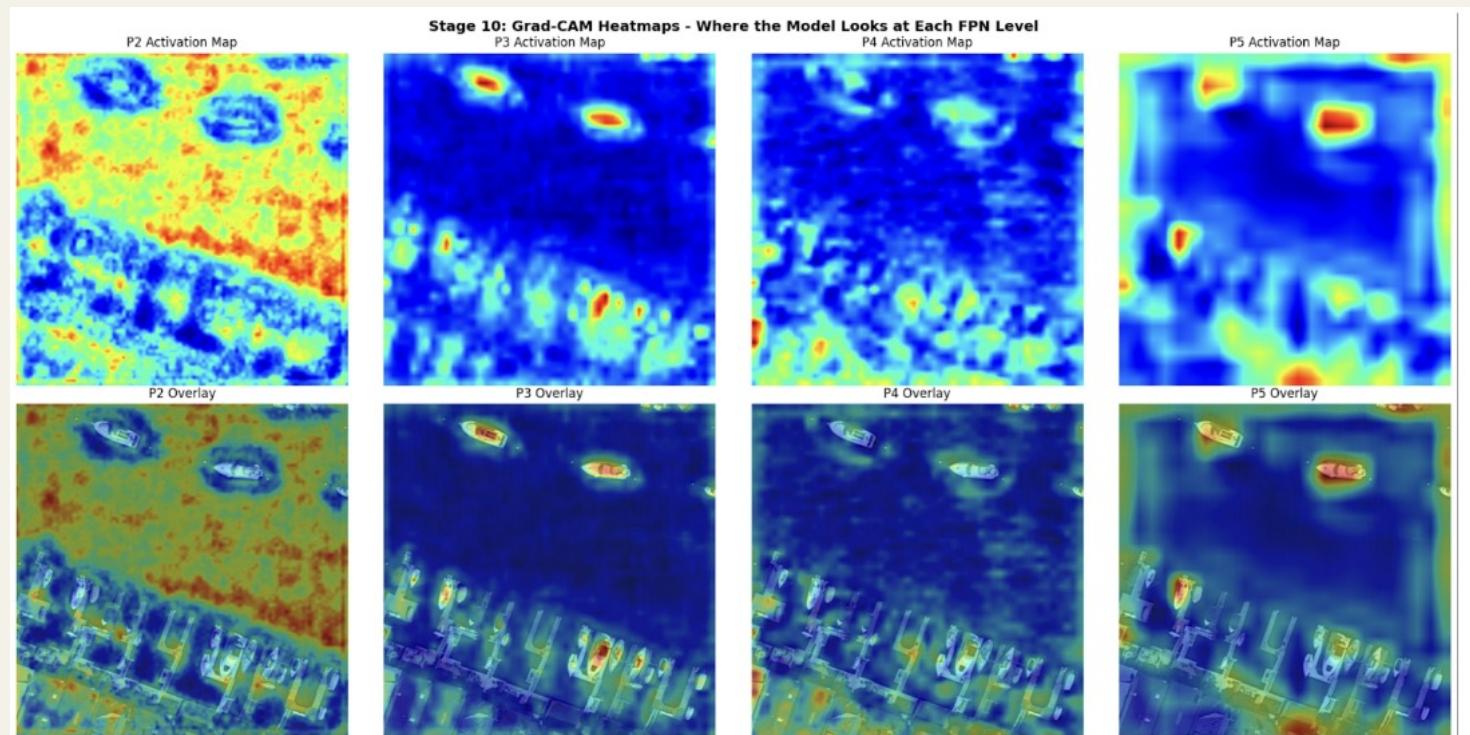
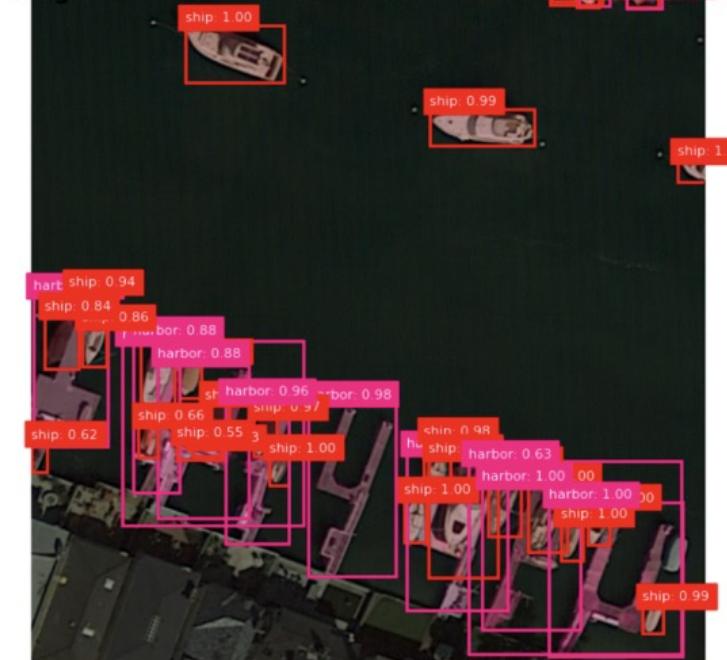


Image 3

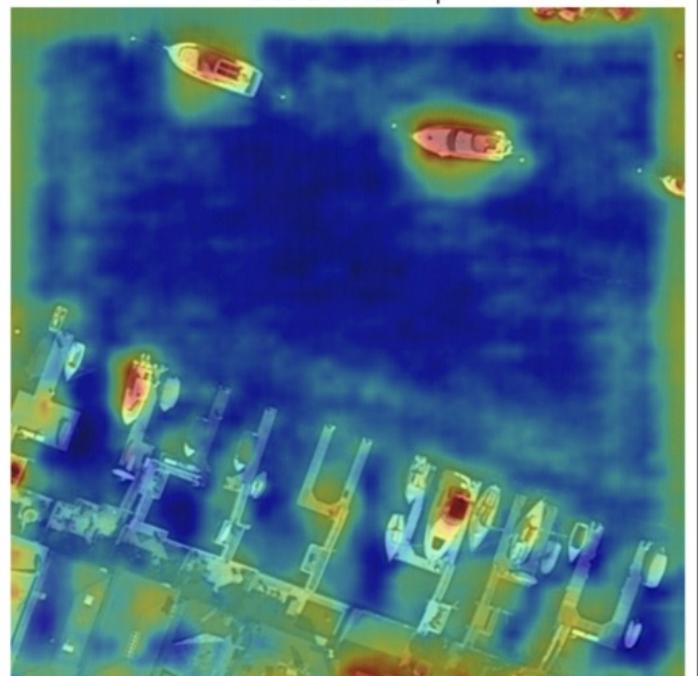
Custom Mask R-CNN with EfficientNet backbone



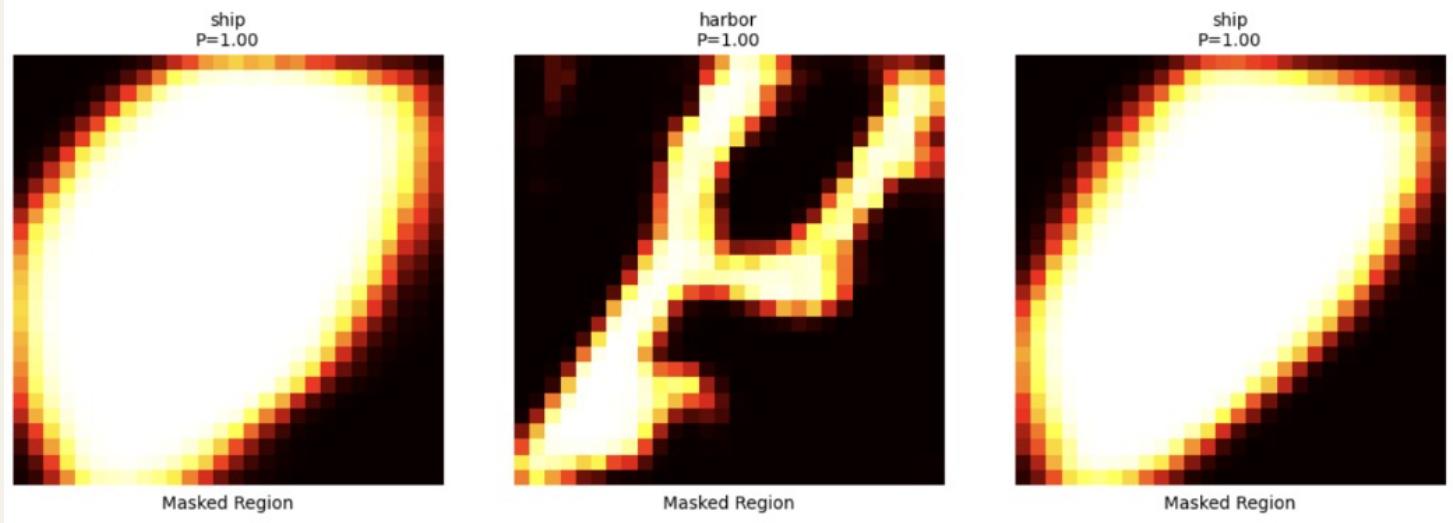
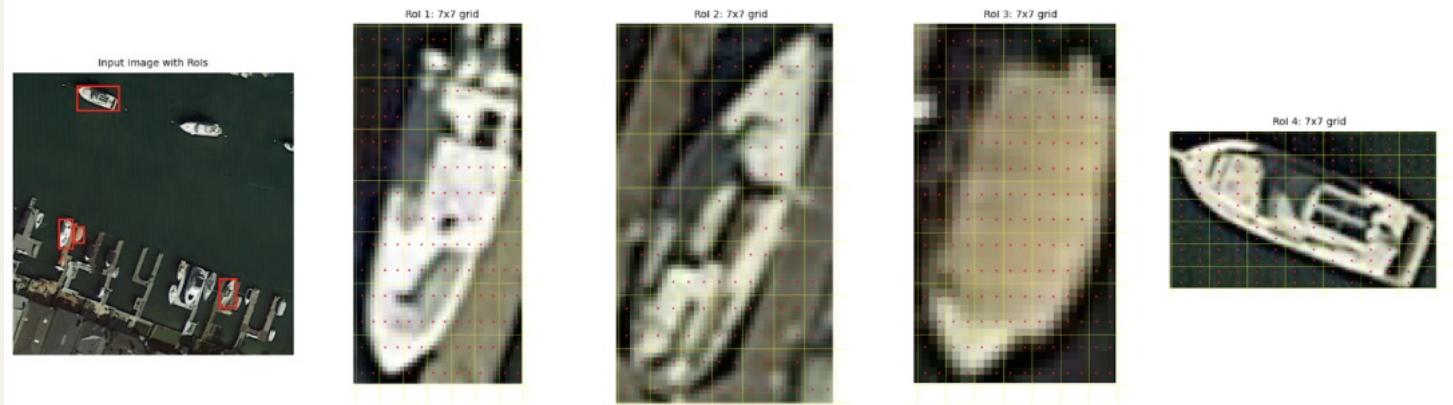
Stage 11: Final Predictions with Masks and Grad-CAM



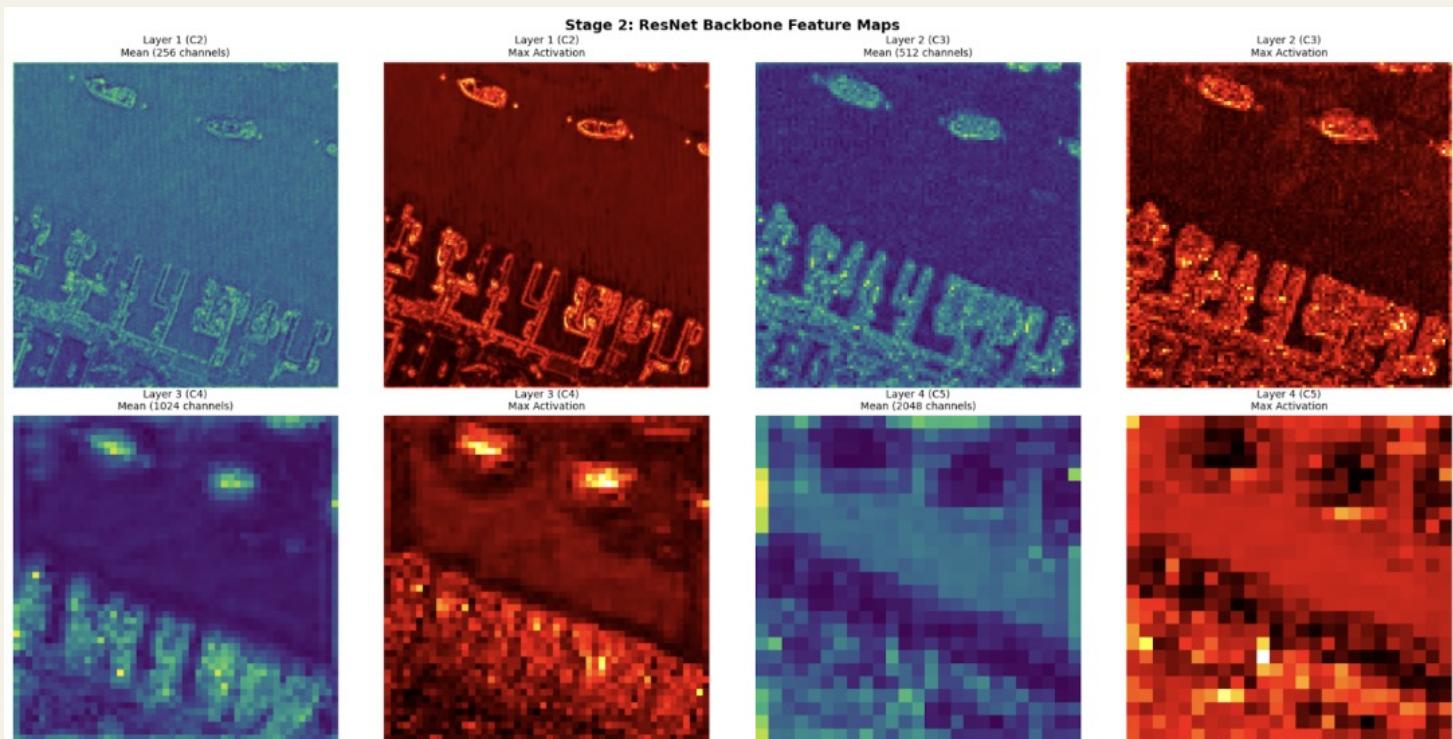
Grad-CAM Heatmap



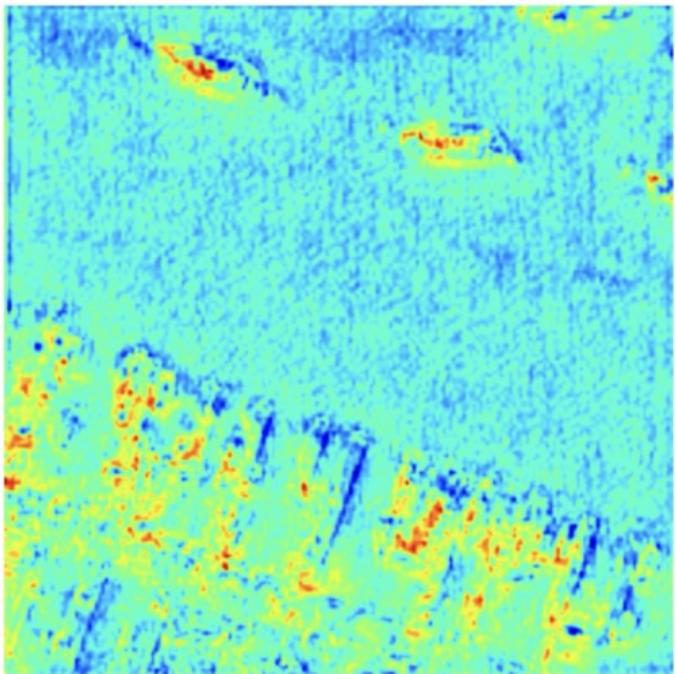
Stage 7: ROI Align - Bilinear Sampling Grid Visualization



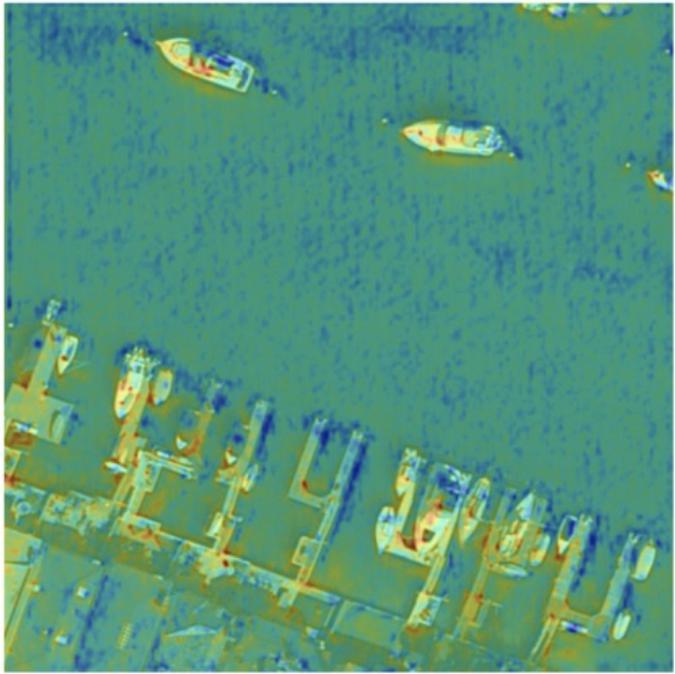
Mask R-CNN with ResNet 101 backbone



P2 Activation Map

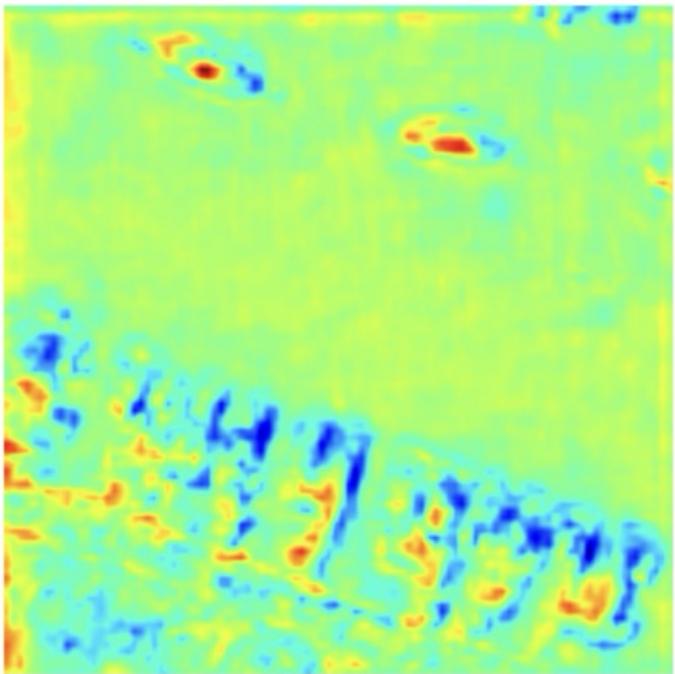


P2 Overlay

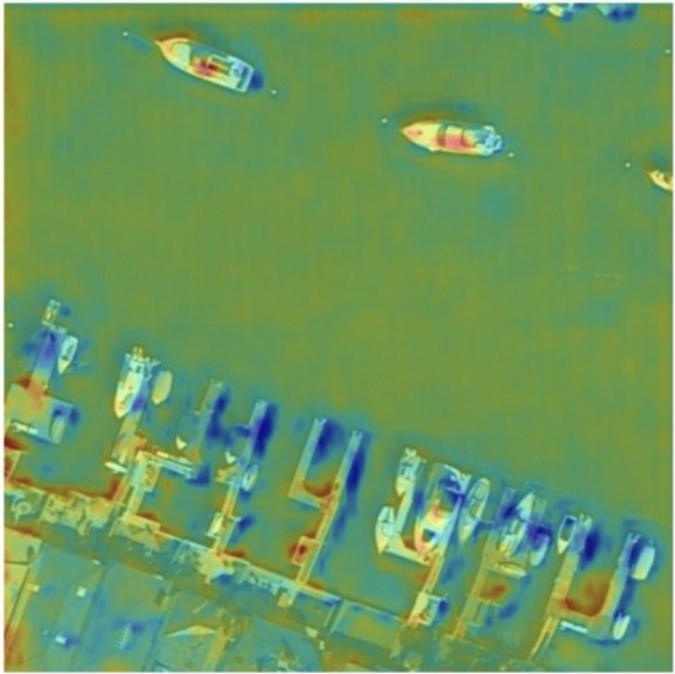


Stage 8: Grad-CAM Heatmaps - Where

P3 Activation Map



P3 Overlay

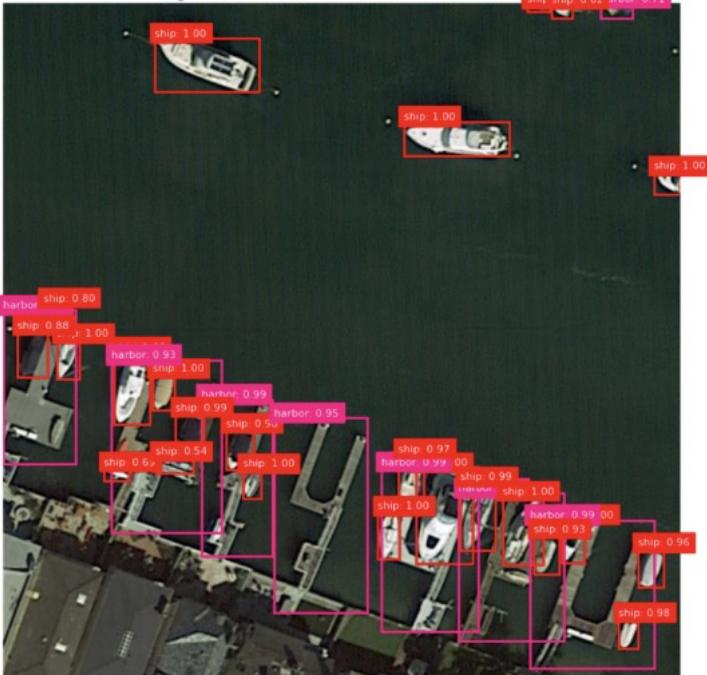


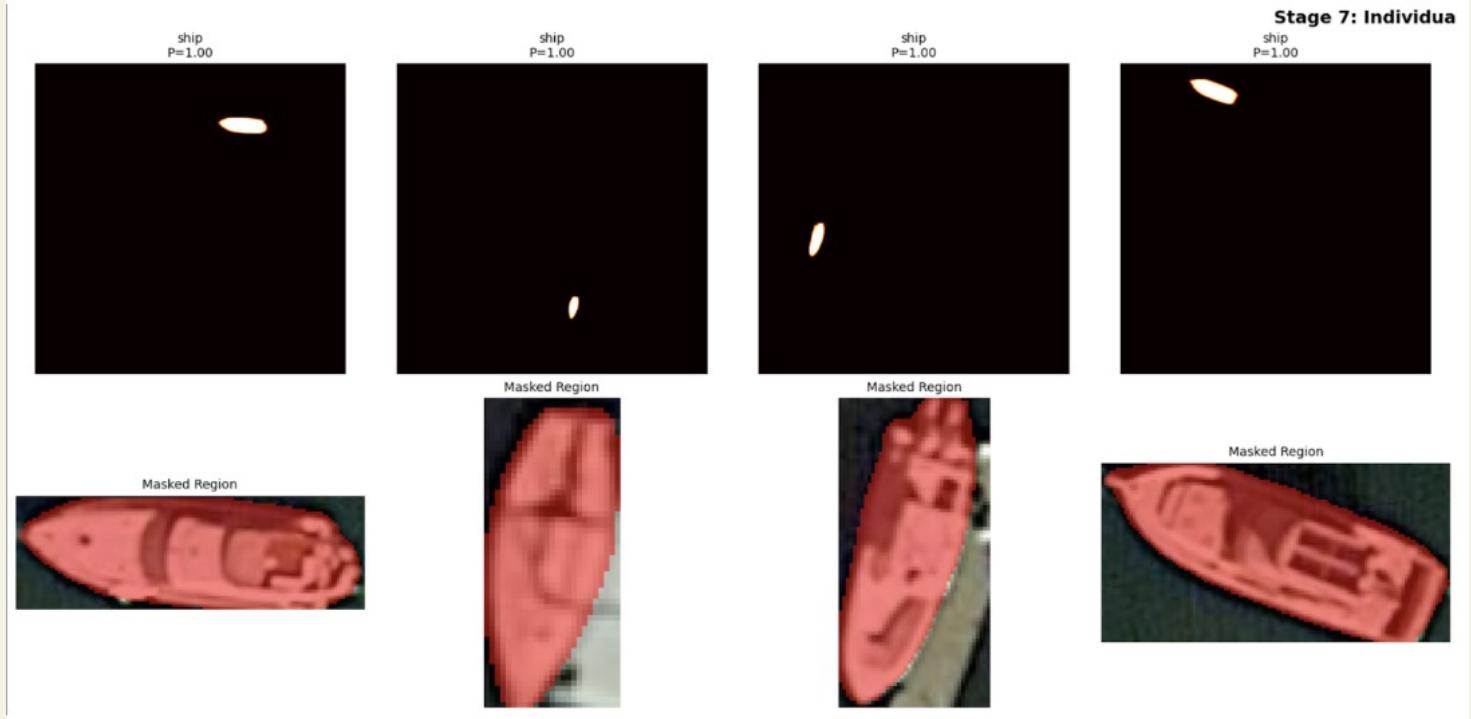
All Predictions (53 boxes)
Colored by confidence (red=low, green=high)

Stage 4: Region Proposals and NMS Results

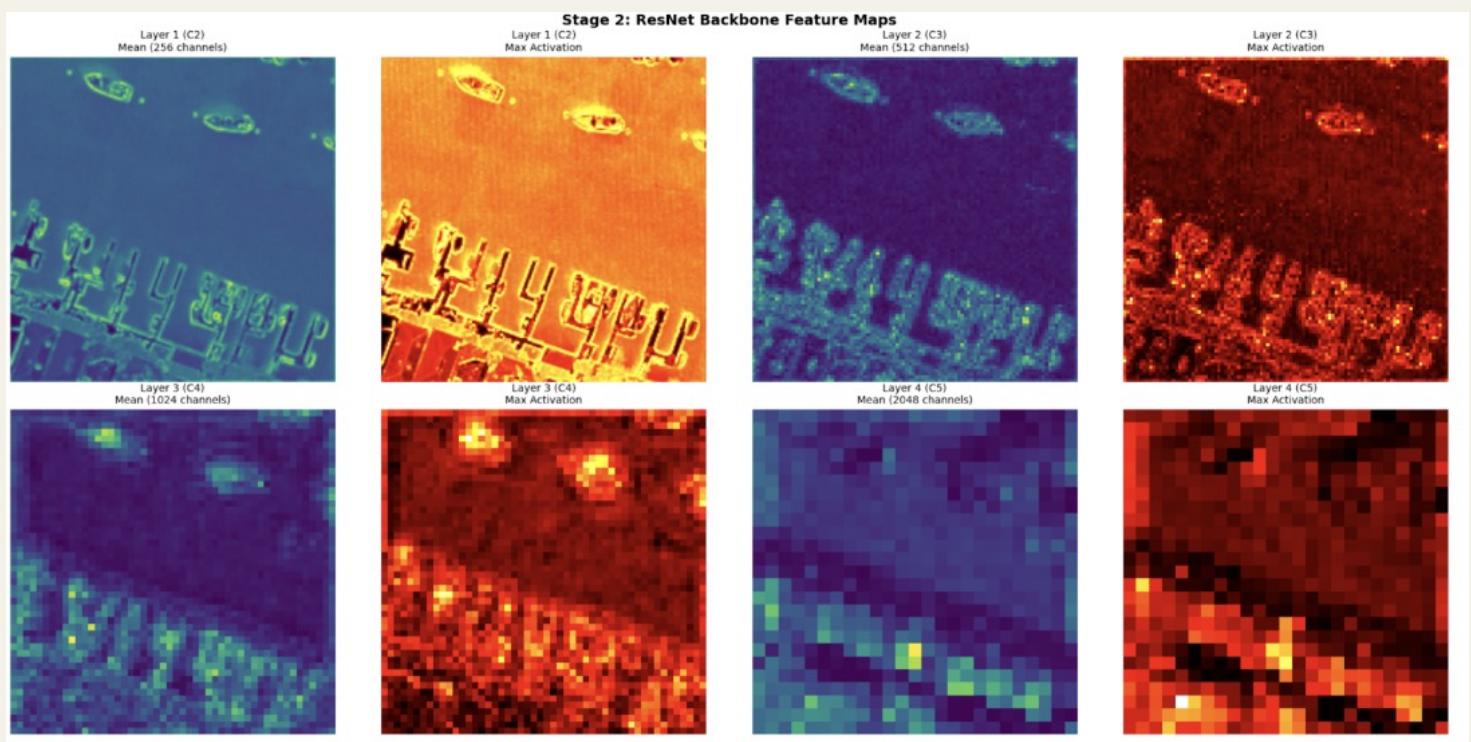


High Confidence (>0.5) Predictions (32 boxes)





Mask R-CNN with ResNet 50 backbone

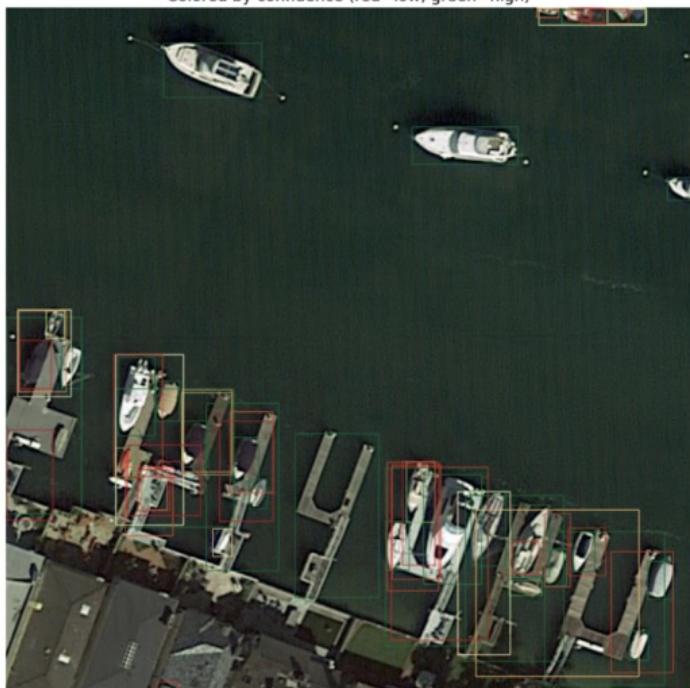


All Predictions (65 boxes)
Colored by confidence (red=low, green=high)

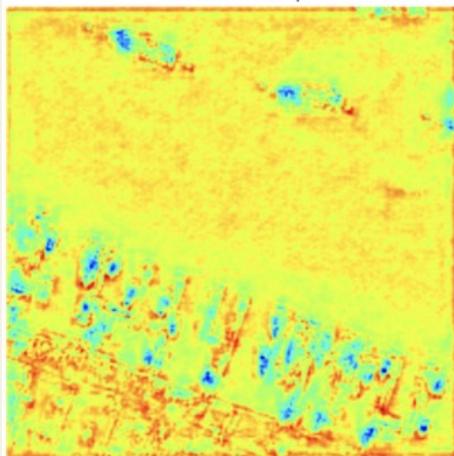
Stage 4: Region Proposals and NMS Results

High Confidence (>0.5) Predictions (34 boxes)

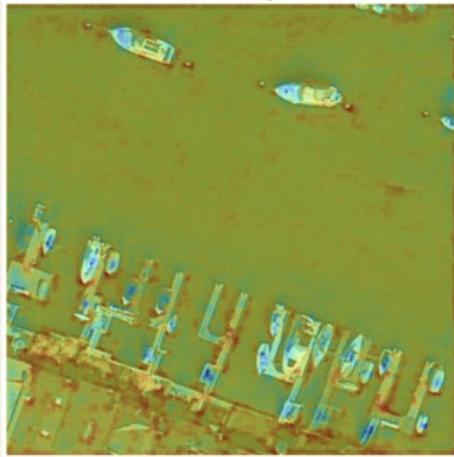
harbor: 0.54, harbor: 0.55



P2 Activation Map

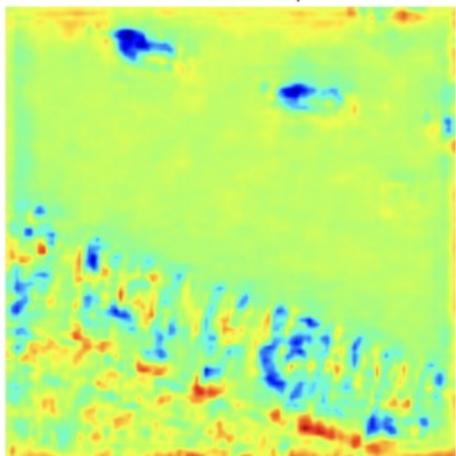


P2 Overlay

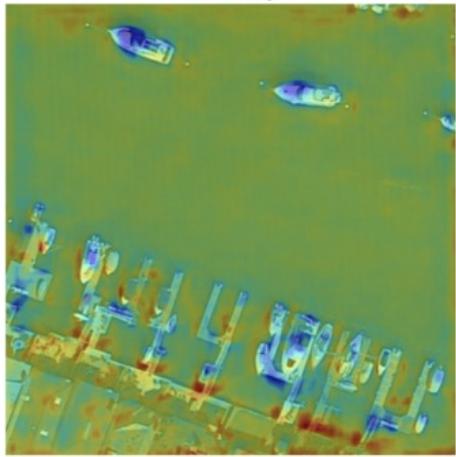


Stage 8: Grad-CAM Heatmaps - Where the Model Looks at Each FPN Level

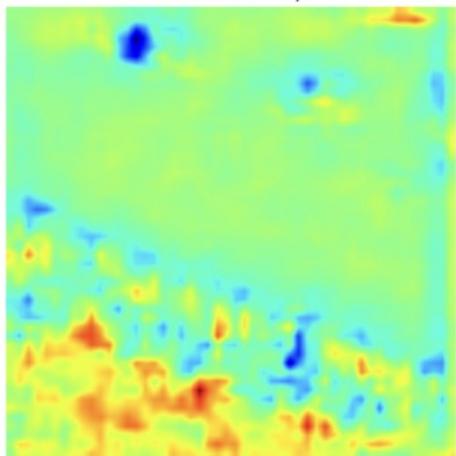
P3 Activation Map



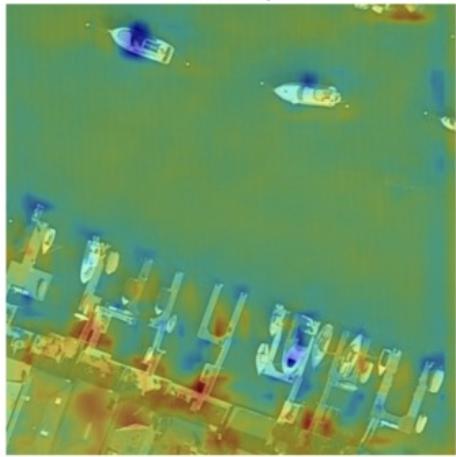
P3 Overlay



P4 Activation Map



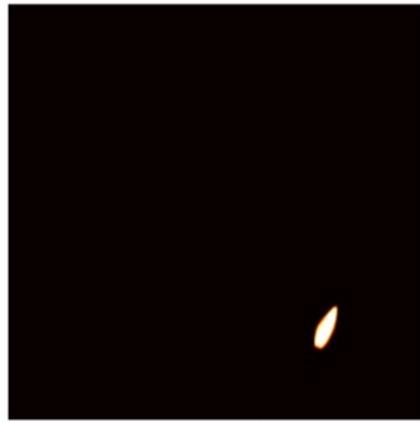
P4 Overlay



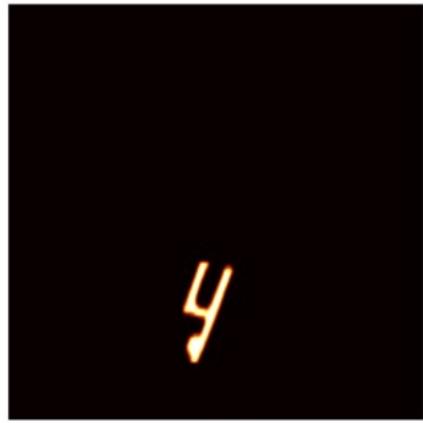
ship
 $P=1.00$



ship
 $P=1.00$



harbor
 $P=1.00$



Masked Region



Masked Region



Masked Region

