Focal Length Optimization Study
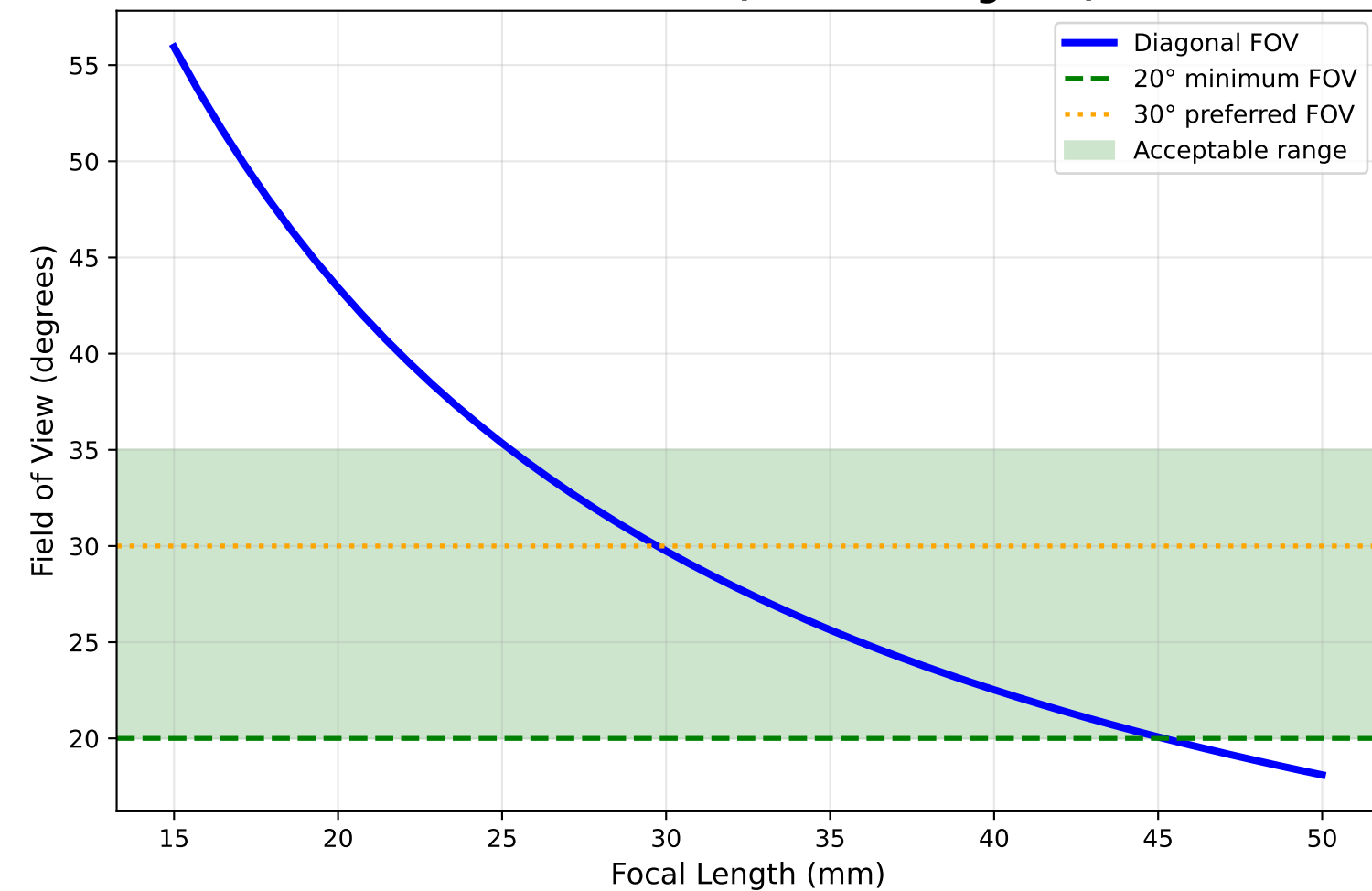**Accuracy vs Field-of-View Trade-offs**
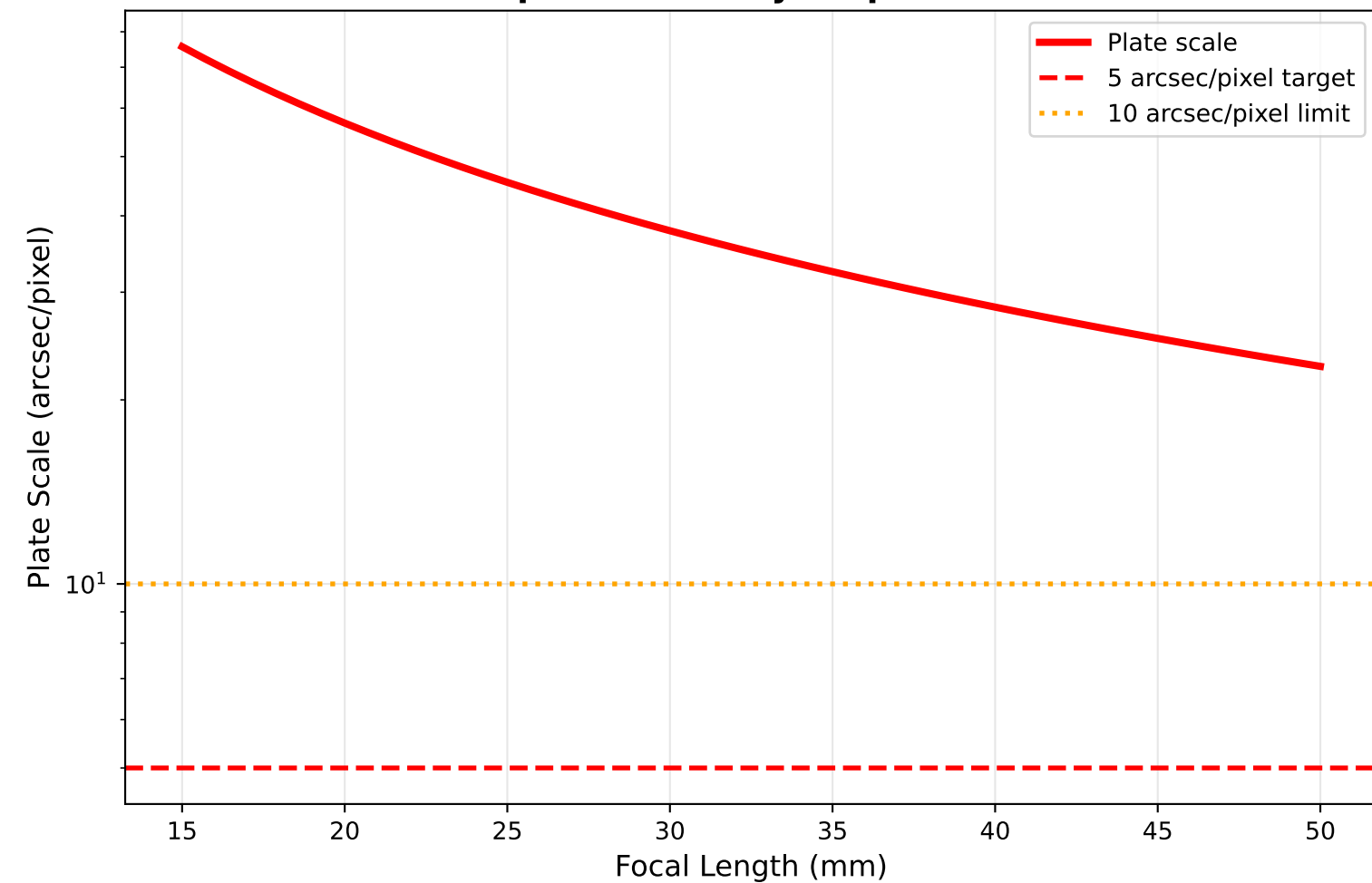
Field of View vs Focal Length
CMV4000 Sensor (11.3mm diagonal)
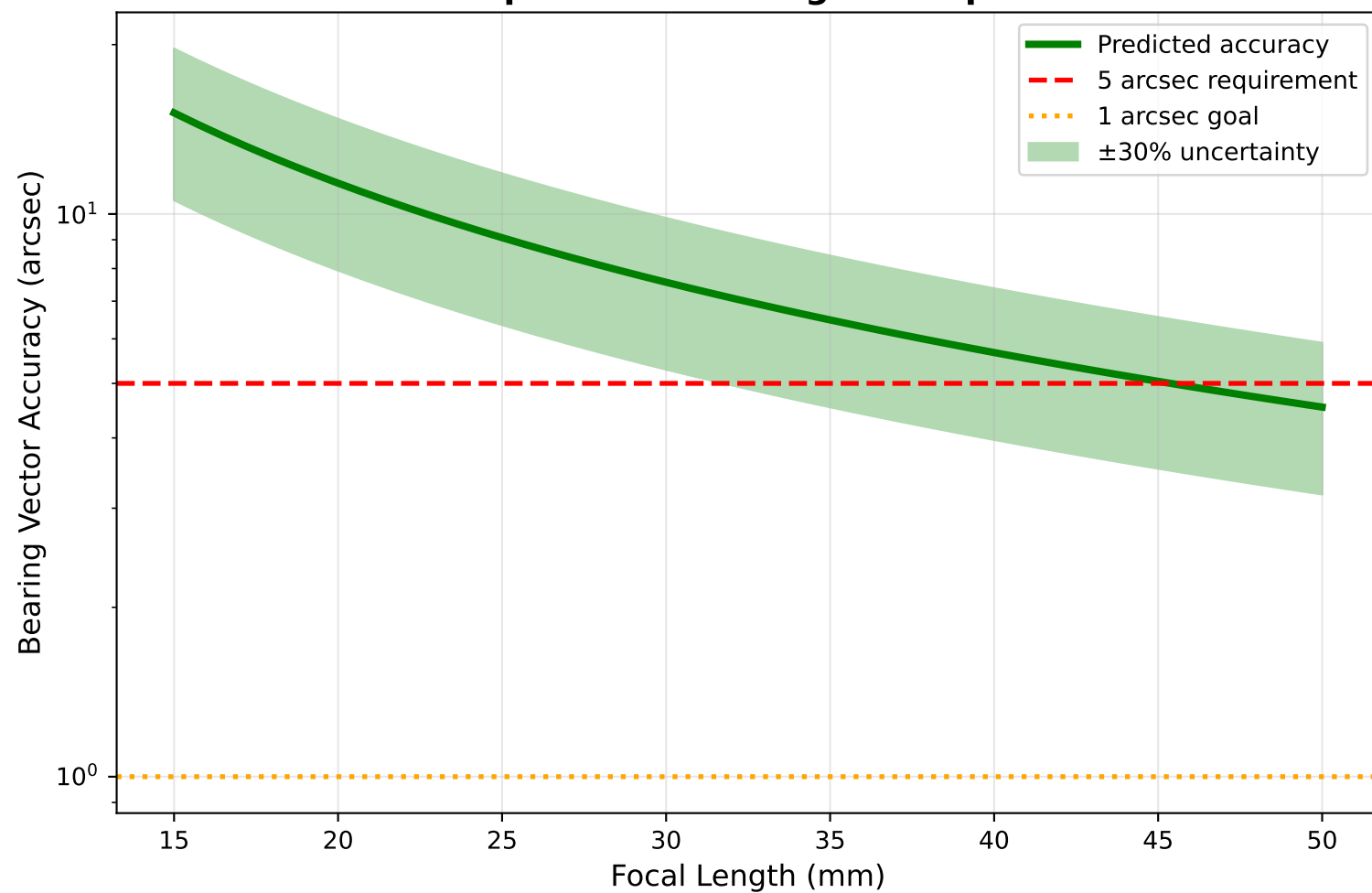
- Diagonal FOV
- 20° minimum FOV
- 30° preferred FOV
- Acceptable range

Angular Resolution vs Focal Length
Sub-pixel Accuracy Requirements

- Plate scale
- 5 arcsec/pixel target
- 10 arcsec/pixel limit

Predicted Bearing Vector Accuracy
0.2 pixel centroiding assumption

- Predicted accuracy
- 5 arcsec requirement
- 1 arcsec goal
- ±30% uncertainty

Multi-Objective Optimization
FOV vs Accuracy Trade-off

- Balanced (50/50)
- Accuracy priority (30/70)
- FOV priority (70/30)
- Balanced optimum: 15.0mm
- Accuracy optimum: 50.0mm
- FOV optimum: 15.0mm
- Selected design: 25.0mm