Quick Setup: FREE Copernicus Satellite Data

✅ Why This is Better

OLD: AlphaEarth (Paid service - $$$ per month)
NEW: Copernicus Data Space Ecosystem (**100% FREE**)

🚀 5-Minute Setup

1. Create FREE Account

☞ Go to: https://dataspace.copernicus.eu
☞ Click "Register" (top right)
☞ Fill in email, password, accept terms
☞ Verify email
☞ **Total cost: $0 forever**

2. Get API Credentials (FREE)

☞ Login to: https://shapps.dataspace.copernicus.eu/dashboard/
☞ Click "Create new credentials"
☞ Copy **Client ID** and **Client Secret**
☞ No credit card required!

3. Update .env File

```
# Replace these in your .env file:
COPERNICUS_CLIENT_ID="your-client-id-from-step-2"
COPERNICUS_CLIENT_SECRET="your-client-secret-from-step-2"
COPERNICUS_BASE_URL="https://catalogue.dataspace.copernicus.eu/odata/v1"
```

4. Test It!

```
npm run dev
```

Visit: http://localhost:3005/discover

🎯 What You Get (FREE)

✅ Full access to Sentinel-2 satellite imagery
✅ 10m resolution Earth observation data
✅ Global coverage updated every 5 days
✅ 10 GB/day download limit (plenty for our app)
✅ Multiple API options (OData, STAC, Sentinel Hub, OpenEO)

☑ Climate data from Copernicus Climate Data Store
☑ No payment, no credit card, no expiration

📚 Resources

- **Registration**: https://dataspace.copernicus.eu
- **API Docs**: https://documentation.dataspace.copernicus.eu/APIs.html
- **Tutorials**: https://documentation.dataspace.copernicus.eu
- **Forum Support**: https://forum.dataspace.copernicus.eu

🆚 Feature Comparison

Feature	Copernicus (FREE)	AlphaEarth (PAID)
Sentinel-2 Data	☑ Yes	☑ Yes
Cost per month	**$0**	$199-999+
API Access	☑ Yes	☑ Yes
Data Processing	☑ Yes	☑ Yes
Pre-built AI	✕ No	☑ Yes
Hackathon Ready	☑ **Perfect**	⚠ Expensive

💡 Pro Tips

1. **Mock Data Works**: App works with mock data even without credentials (for development)
2. **Production Ready**: Copernicus is used by NASA, ESA, NOAA - enterprise-grade reliability
3. **Scalable**: Start free, upgrade to paid tier only if you need massive scale (unlikely)
4. **Cassini Approved**: Using official Copernicus data is **perfect** for Cassini Hackathon!

🎓 Learning Resources (All FREE)

- **EO College**: https://eo-college.org
- **EUMETSAT Training**: https://training.eumetsat.int
- **Sentinel Hub Tutorials**: https://www.sentinel-hub.com/develop/documentation/

🏆 Why This Matters for Cassini Hackathon

☑ **Official Copernicus Data** - Direct from the source
☑ **No Budget Concerns** - 100% free forever
☑ **Production Ready** - Can deploy without cost worries
☑ **Open Source Spirit** - Aligns with EU's open data initiative
☑ **Sustainable** - No vendor lock-in, no surprise bills

Bottom Line: You get professional-grade satellite imagery for **$0**. Perfect for hackathons, MVPs, and even production! 🚀