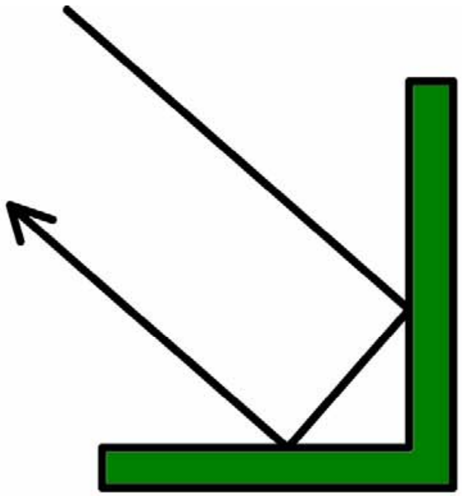
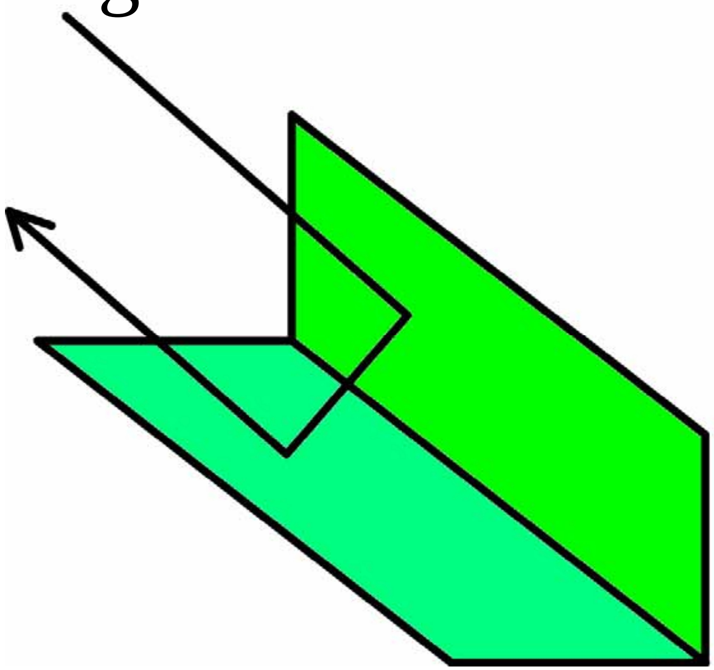
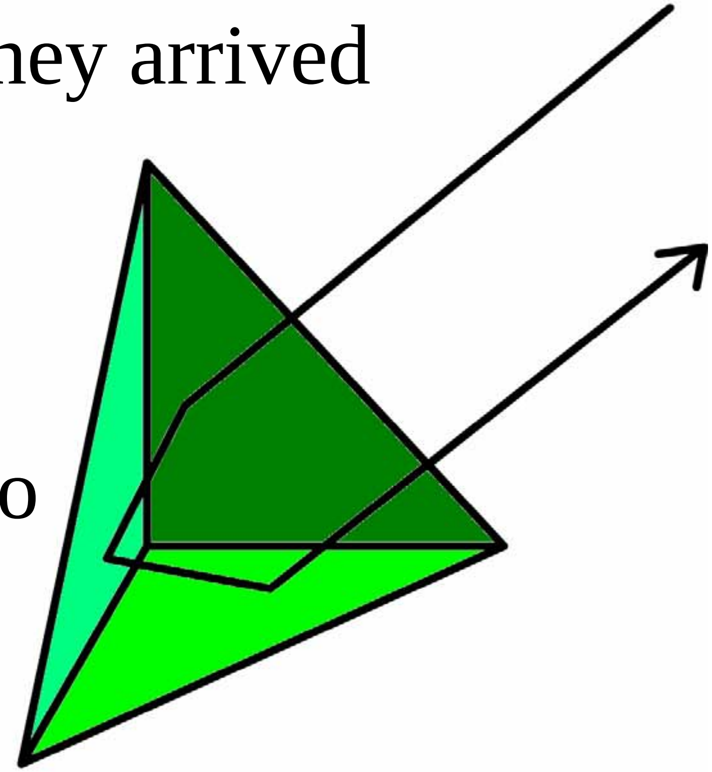


Corner reflectors send incident rays back in the same direction from which they arrived

Dihedral, must be aligned



Trihedral, no alignment necessary



They provide a strong return compared to natural materials

Corner reflectors are used on small boats so that they can be seen by radar from large vessels in the fog. Fiberglass is a “stealth” material, so otherwise you are invisible to others by radar. Guy on the right wears a radar reflecting hat.

How does this impact the pre-marking or signalizing of ground control points for radar imagery ?

Pre-marked ground control points for large scale aerial imagery are typically painted crosses or chevrons, or photo ID features.

Point BBLL off of Stadium Ave. between track & baseball field

Photo target for very large scale aerial imagery (3cm GSD)

4a

On jogging/bike trail east side of McCormick Road, just north of Fairway Lane intersection

4b

Top of concrete culvert at intersection of McCormick Road and Fairway Lane, west side of McCormick Road.

Photo ID’s for space imagery must be large features that are visible in the imagery.

Corner of Sidewalk

N39 37 53.7

W86 18 38.6

HAE 207.5m

L 28800,  S 10800

Corner of Sidewalk

N39 37 38.5

W86 12 13.5

HAE 171.9m

L 29500,  S 25800

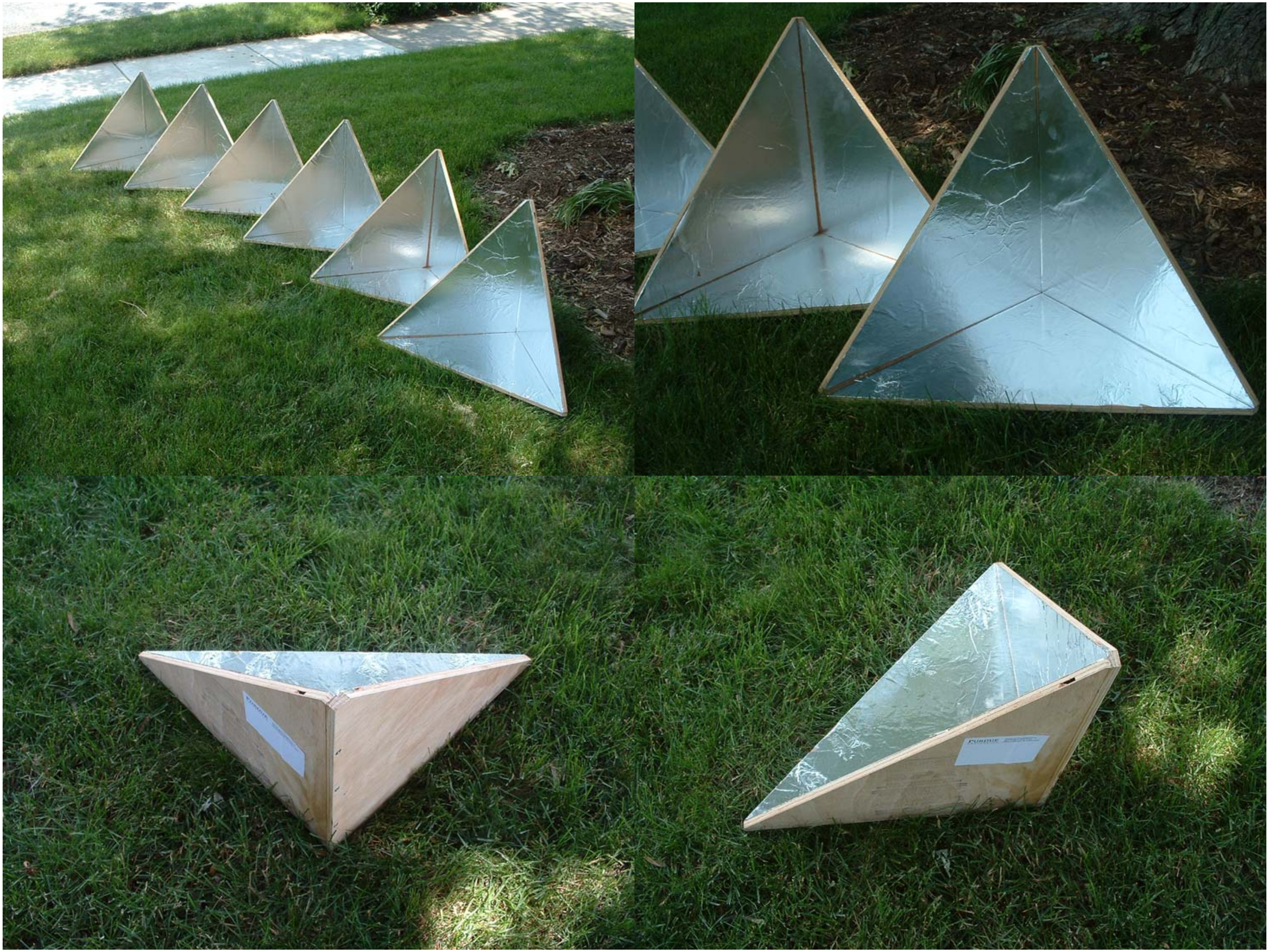
Optical

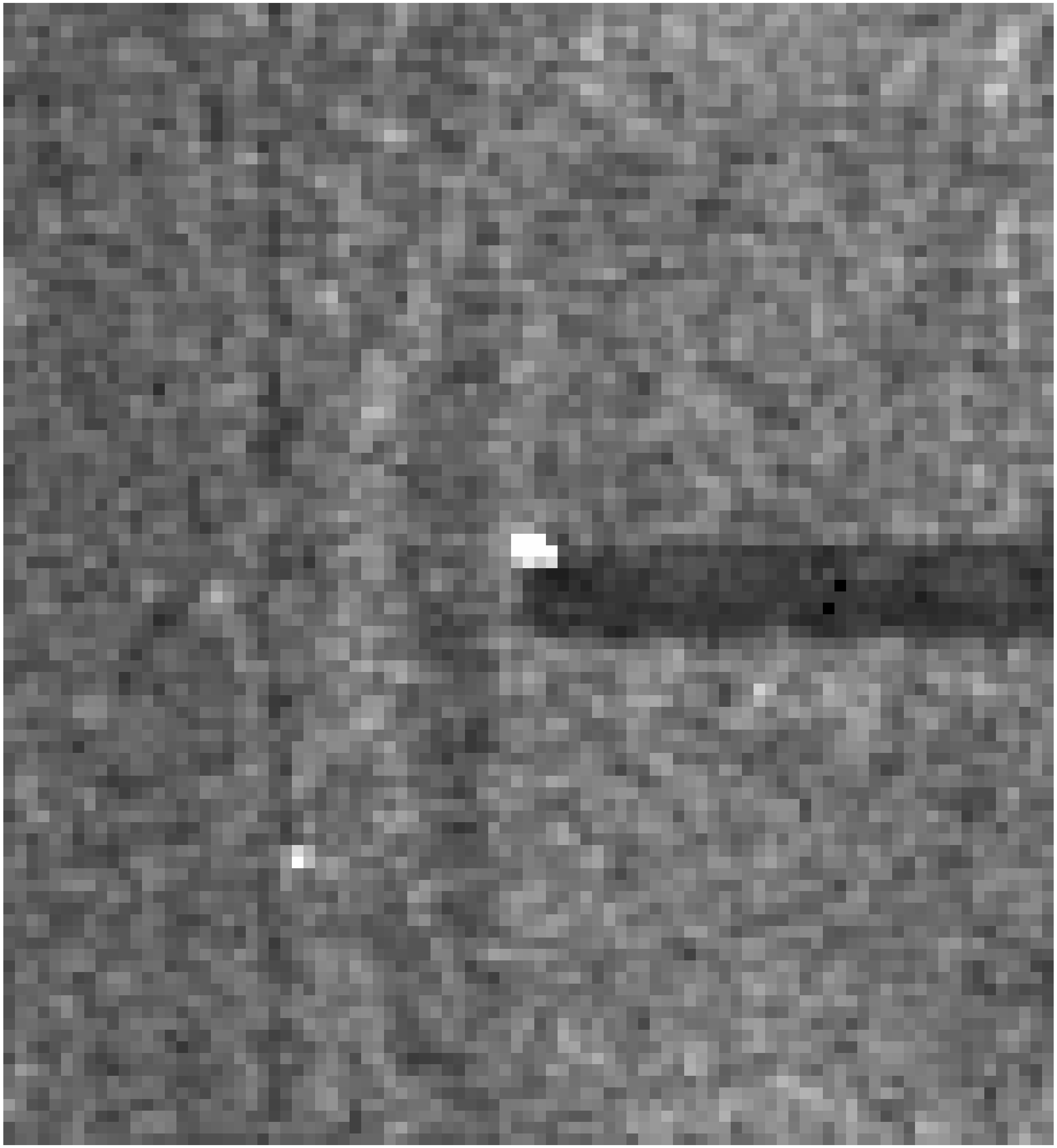
X-Band

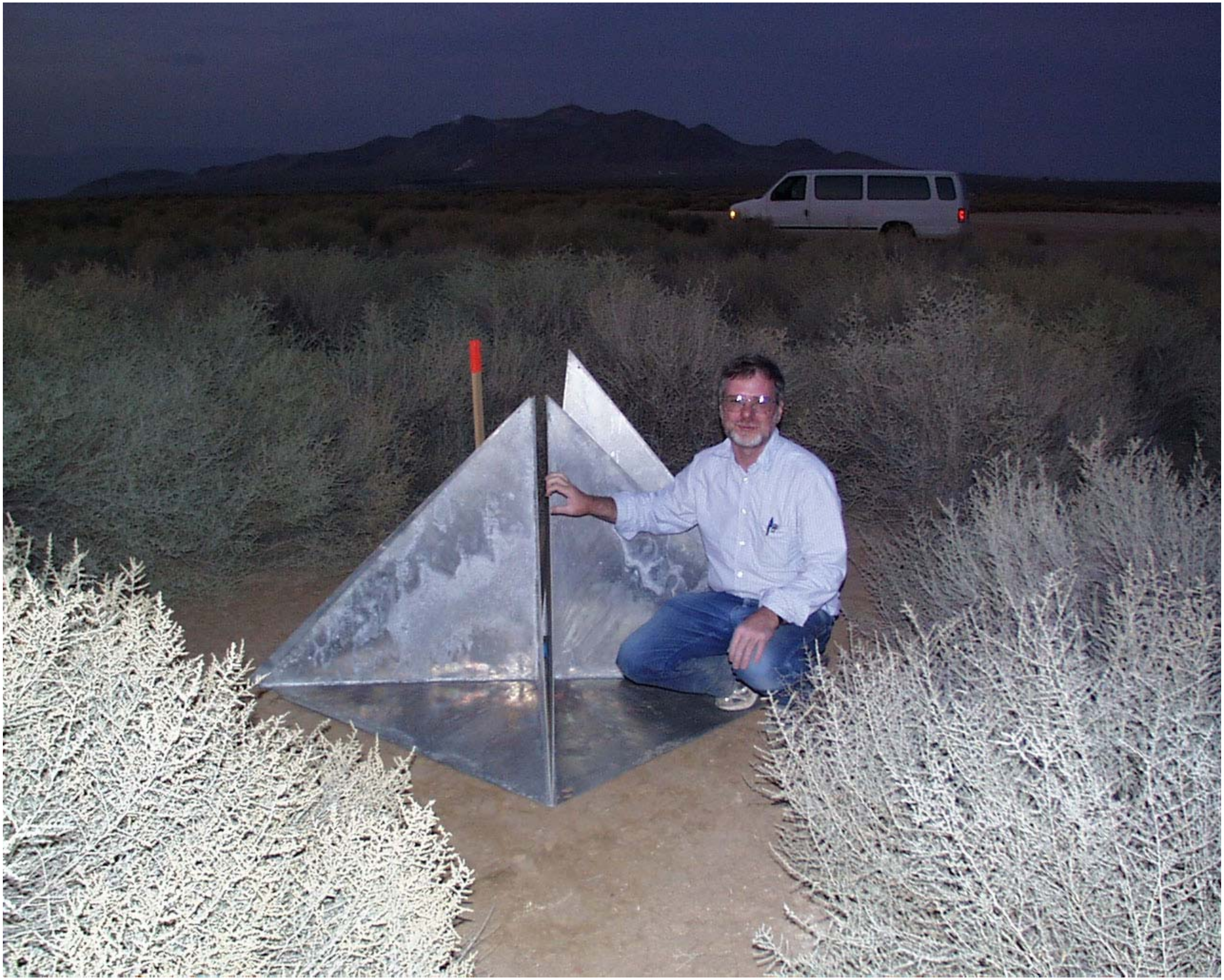
Ku-Band

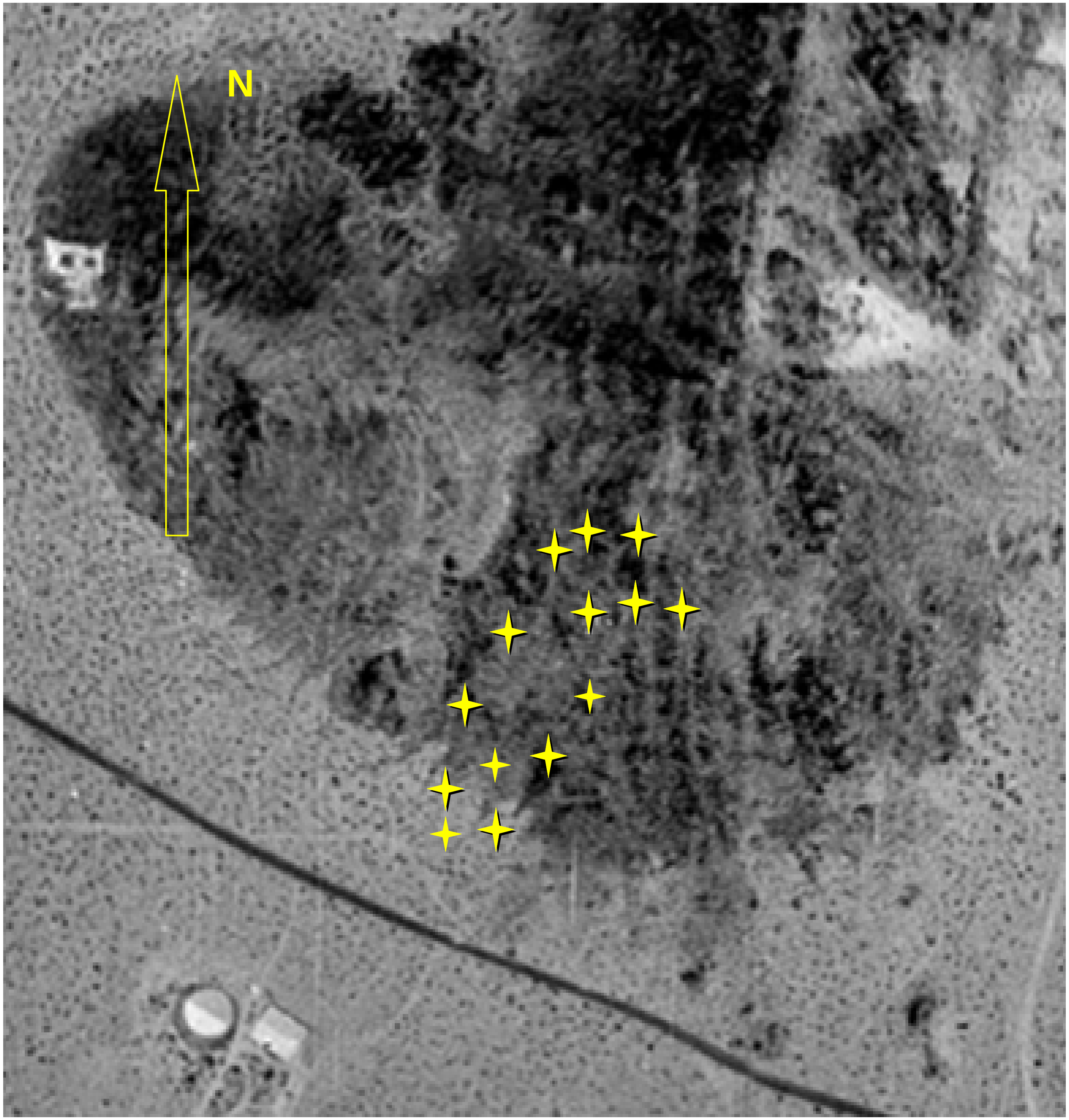
Careful with Photo IDs ! Three images of Purdue Airport. The runways and taxiways have good contrast in the visible, but have poor contrast or nearly disappear in the radar images. How can you guarantee that a feature will be visible in radar?

Make a trihedral with metallic surface, place it over the ground control point, orient it towards the radar instrument (if you do not have an omni-directional target then you must know the direction from which the radar will be transmitting), and you will have nice, high contrast response in the image of your control point.

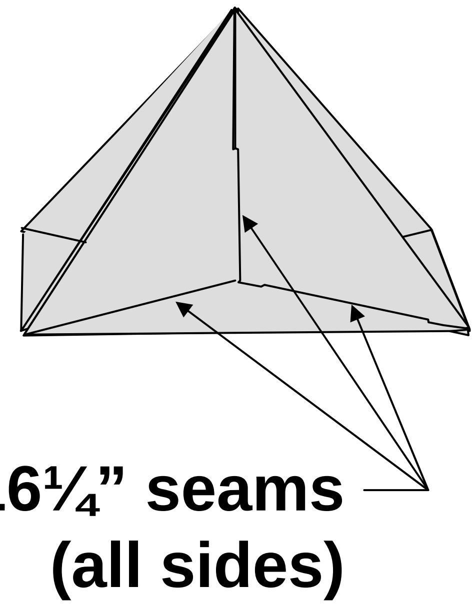






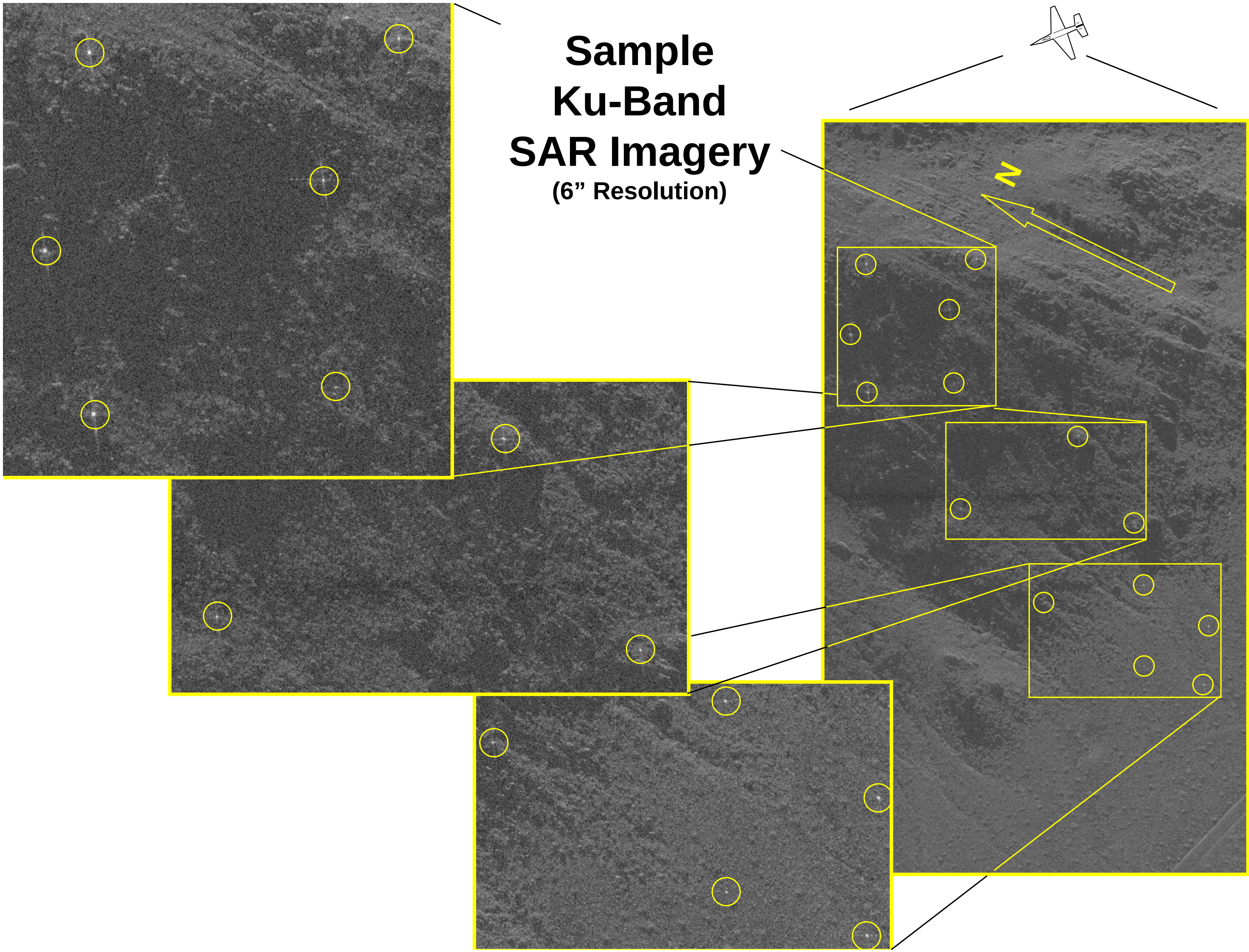


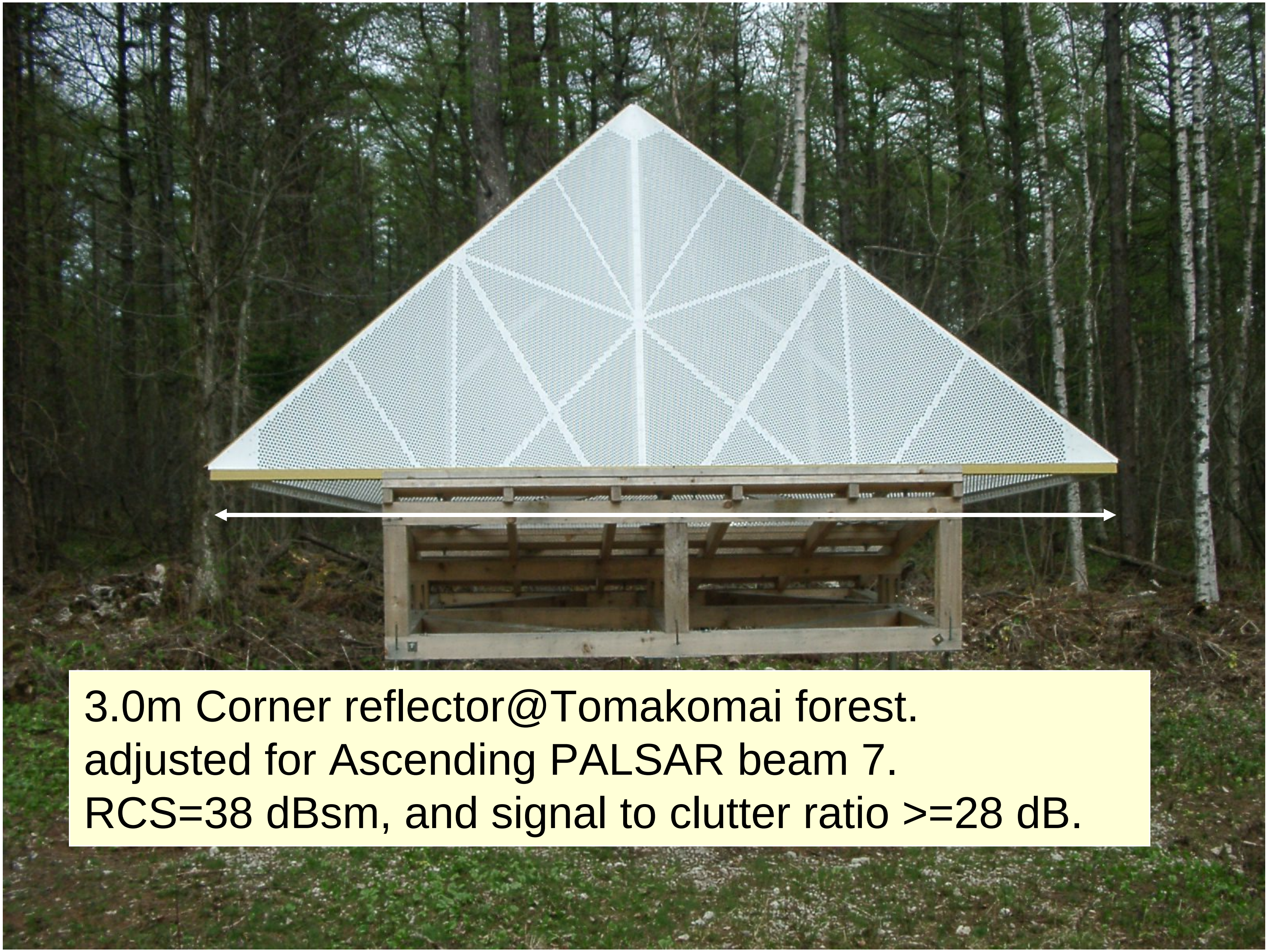

# Omni-Directional Radar Corner Reflector



# Sample Ku-Band SAR Imagery

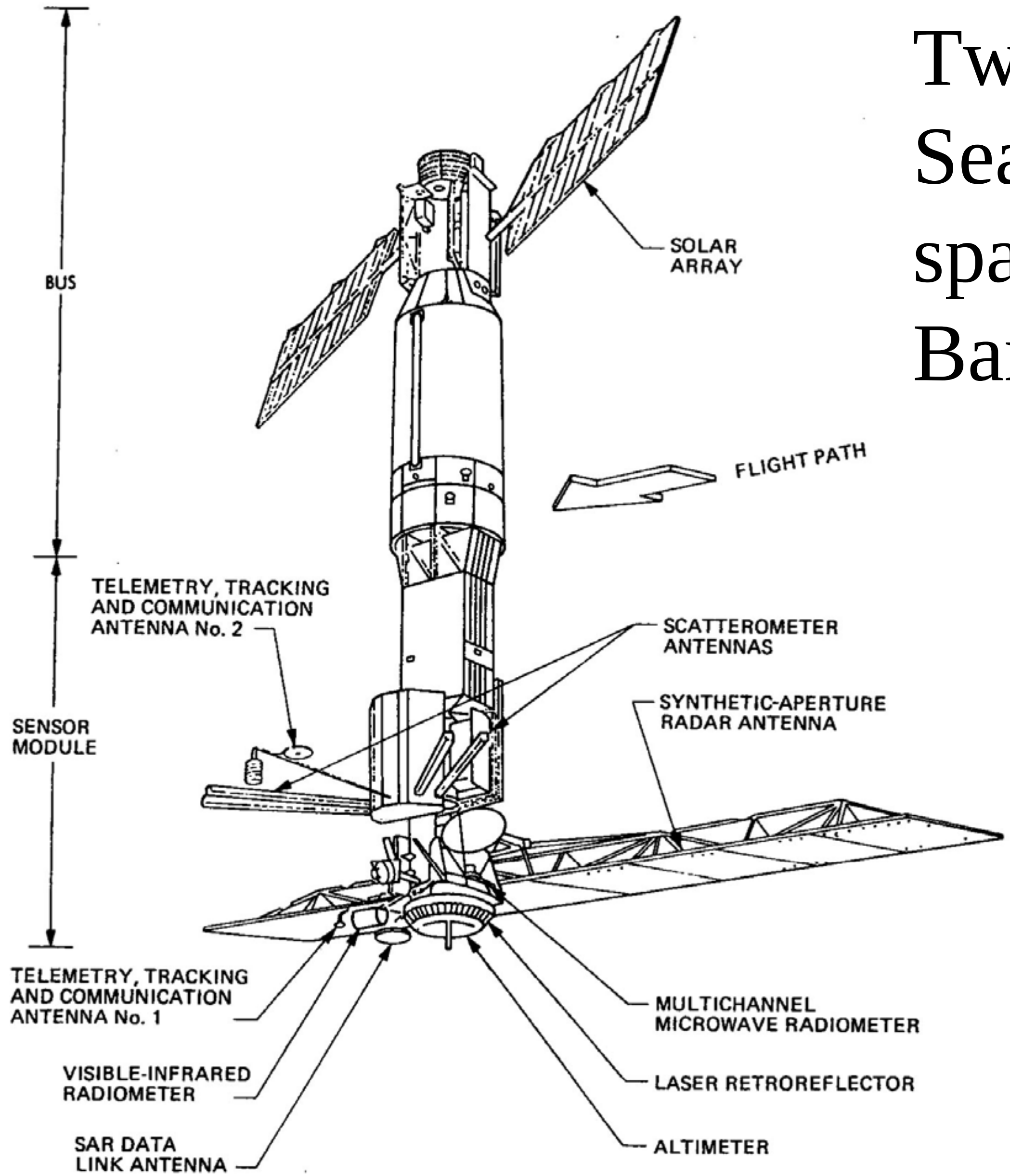
**(6” Resolution)**





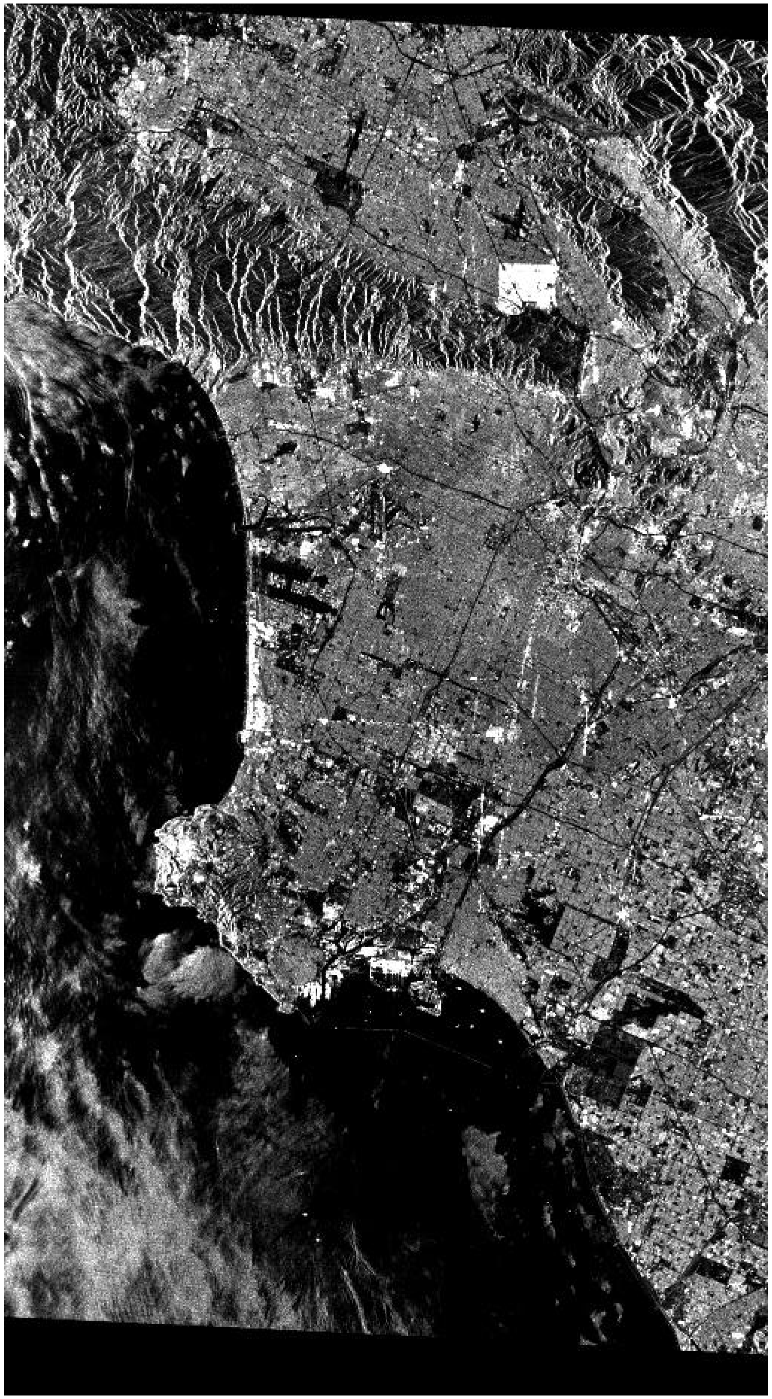
3.0m Corner reflector@Tomakomai forest.
adjusted for Ascending PALSAR beam 7.
RCS=38 dBsm, and signal to clutter ratio >=28 dB.

Two examples from Seasat, first NASA space based radar (L-Band)




Seasat bus and payload configuration.

**FIGURE 16.** Seasat bus and payload configuration.



Famous image from Seasat of greater Los Angeles, showing the “Burbank” effect. Street grid of Burbank happened to be aligned with the satellite orbit path and dihedrals from all of the aligned urban structures cause saturation.

Image from Landsat on the left over western desert in Egypt, Seasat strip overlaid on the right (L-Band) revealing the subsurface drainage features (wadis). They are invisible in the visible and near IR imagery.


Last example of corner reflector effect - railroad bridge over the Wabash with steel superstructure

# Same steel bridge from Google Street View

Ku-Band SAR image (airborne) is saturated in the neighborhood of the steel bridge because of the very strong reflection or backscatter from the dihedrals and trihedrals in the bridge truss. Aluminum guardrails along the bridges to the north also show some strong scattering behavior.