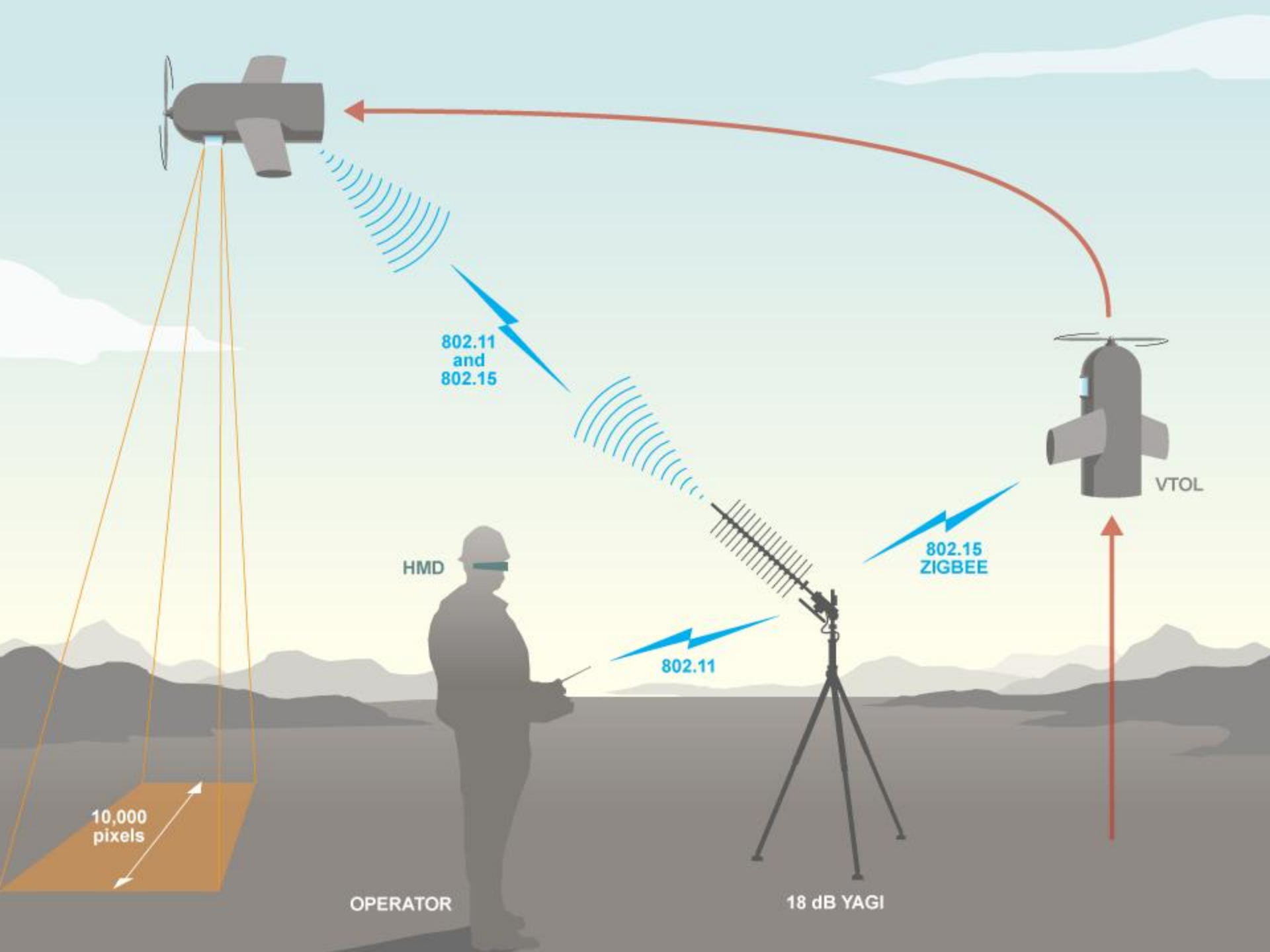


CM Airborne Telepresence Requirements

- One person ops -- Suitcase size
- 10 km radius coverage -- 4 hr
- VTOL, horizontal flight, hover
- 1cm res @ 200m -- 10cm @2000m
- 10cm geolocation accuracy
- 10,000 pixel swath
- 18MP single frame
- Real-time image downlink
- HMD and hand controller
- \$10,000 manufacturing cost



Decimeter GPS

Today: ~3m for <\$1000

Key errors:

- Ionosphere: 1-3m
- Ephemeris: 1-2m

The screenshot displays a GPS application interface with the following data:

Latitude	30.32106486°	2.55m
Longitude	-86.13716793°	3.41m
Hgt. (MSL)	17.925m ±	5.37m

Solution type: Single
Iono correction: Unknown
AdVanced RTK status: N/A
Solution age: 0 second
Differential age: 0 second

of satellites Used in solution: 7

	L1	L2	L5
	L1	L2	
	E1	E5	ALTBOC

Solution Status: Computed

Mon 29/10/2012 16:04:13 GMT
Mon 29/10/2012 11:04:13 Local

Satellite Constellation Diagram: A circular diagram showing 7 satellites (numbered 2, 4, 8, 9, 10, 17, 28) in various positions relative to the Earth's horizon. The diagram includes cardinal directions (N, S, E, W) and concentric circles representing signal strength or distance.

Legend:
 7/7
 0/0
 0/0
No SV selected

A red arrow points from the text 'Key errors' to the error values (2.55m, 3.41m, 5.37m) in the position data table.

10-DOF motion sensing

GPS + IMU > attitude sensing



1990 (\$100K)



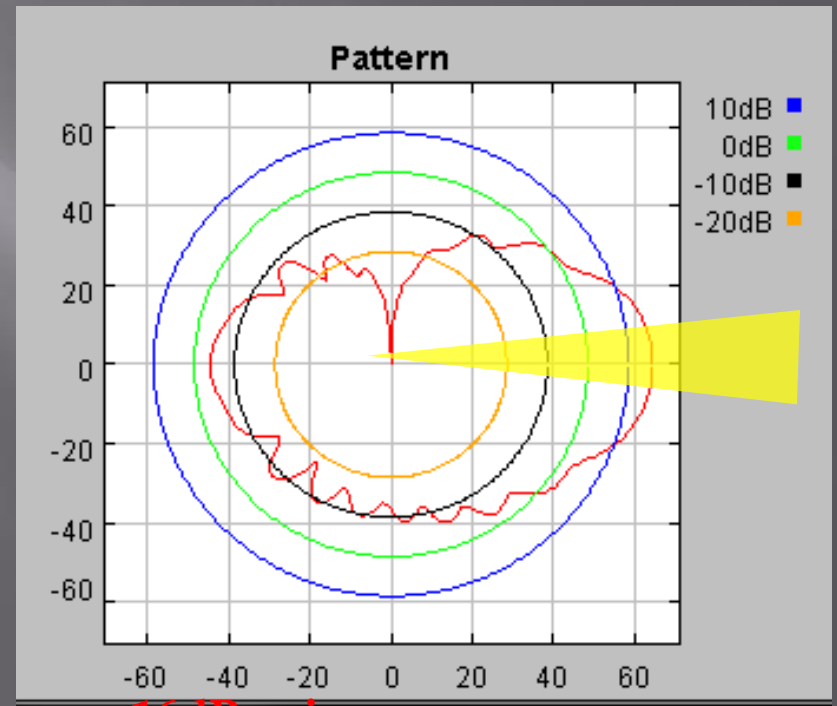
2000 (\$30K)



2010 (\$1.5K)

Directional Antennas

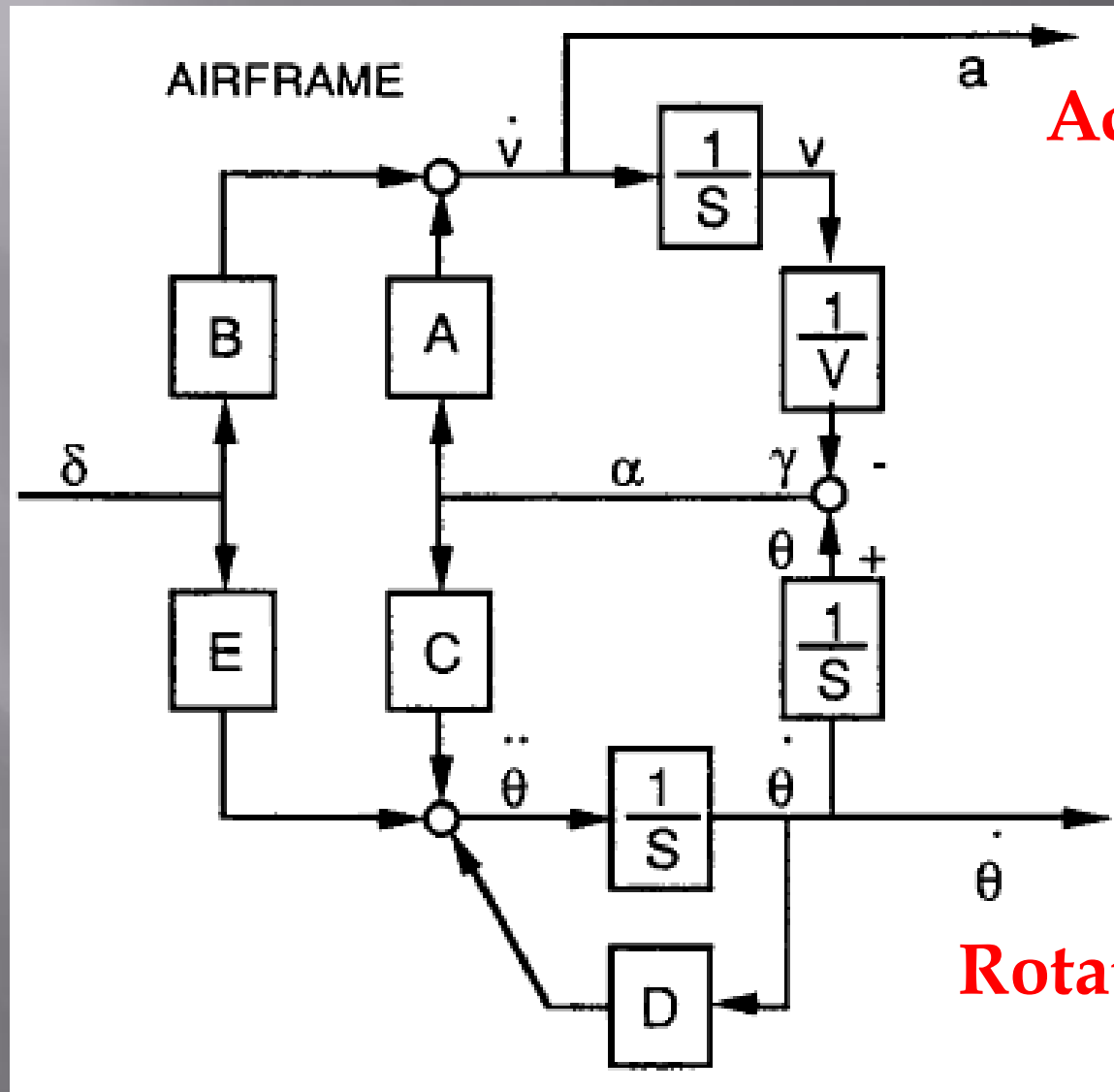
Each 6dB gain doubles range



16dB gain

10 deg beamwidth

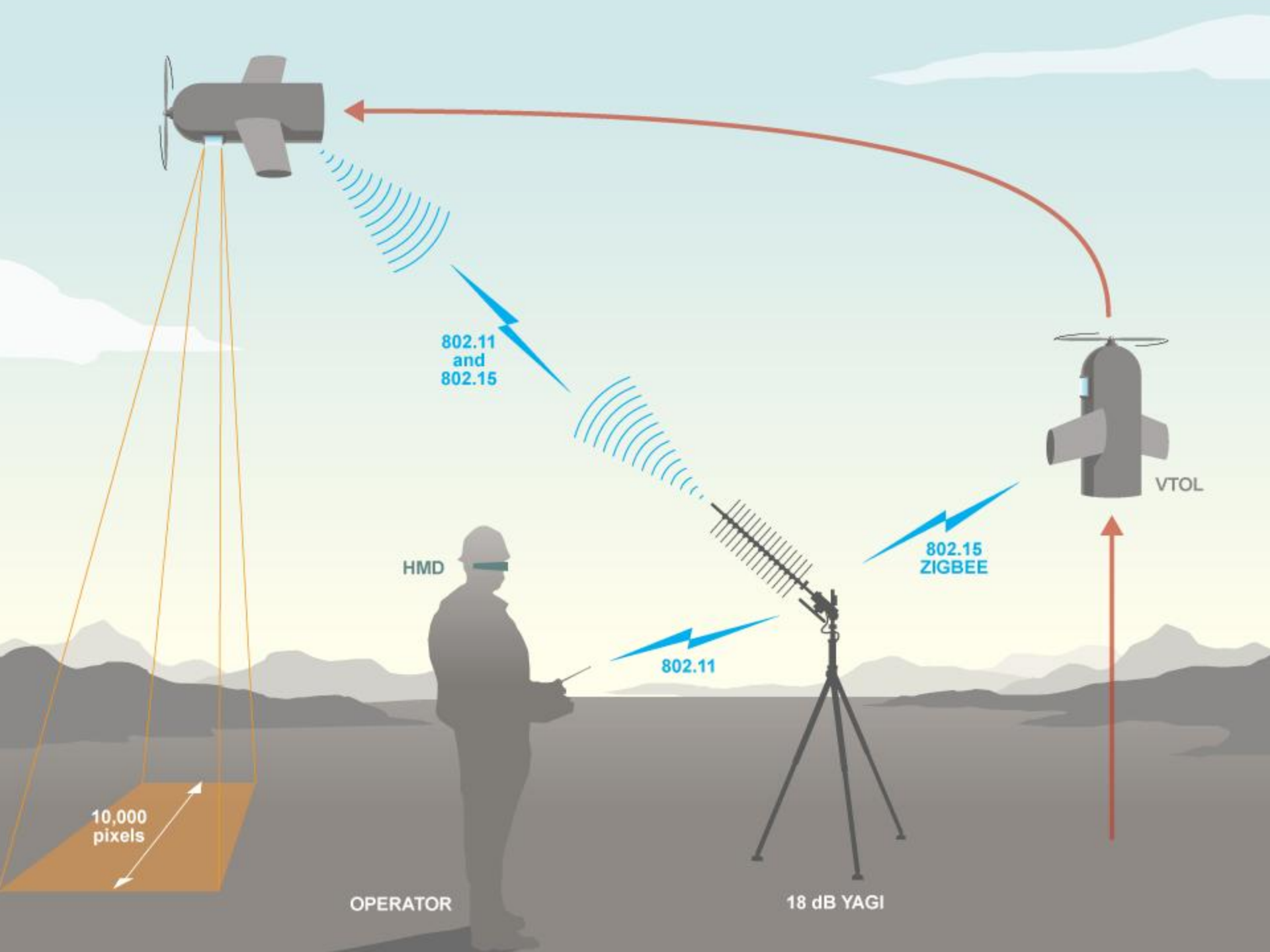
Adaptive Airframe Controller



Acceleration

Control deflection

Rotation rate

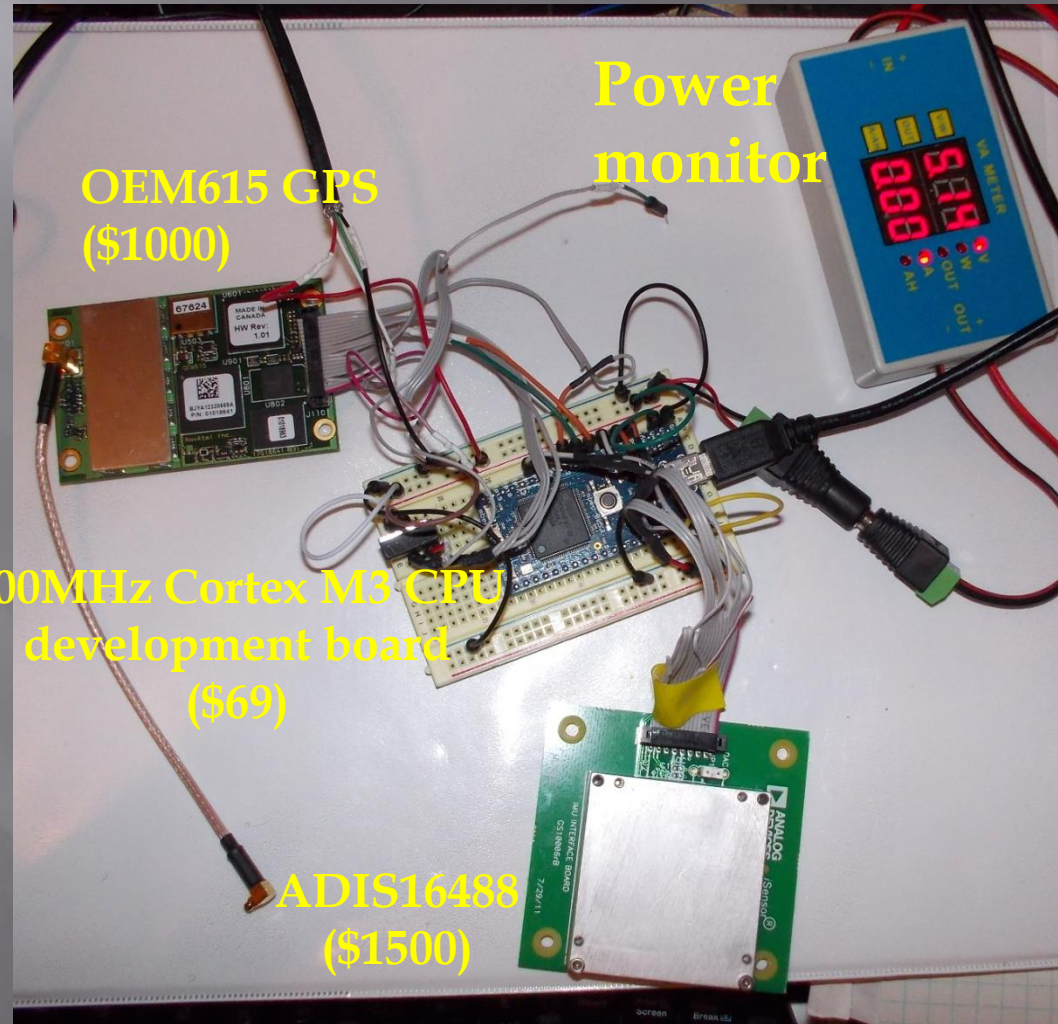
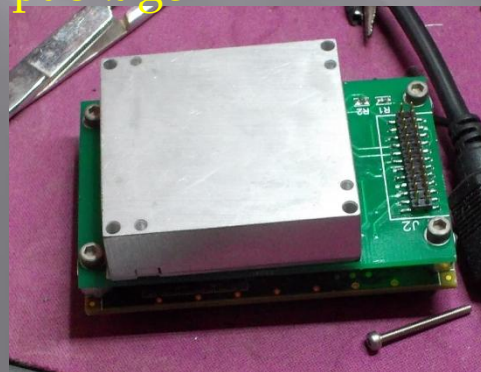


Unlimited CPU

ARM has changed everything!

**Avionics
Development
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avionics
package



OEM615 GPS
(\$1000)

Power
monitor

100MHz Cortex M3 CPU
development board
(\$69)

ADIS16488
(\$1500)

HMD Controller

Head movement controls camera pointing in hover



“Google Glass is actually a fairly full-blown computer”

