LCCMD Threat Matrix

- **Mach 0.9 Cruise Missiles**
  - 2g maneuver, 30 - 100 m altitude, 0.1 square me rcs
  - Typically ramjet or turbofan propulsion

- **Rotary Wing**
  - unmanned or manned
  - 3g maneuver, up to 4500 m altitude, slow (< 100 knots), 1 - 10 sq. m. rcs
  - May employ reciprocal engine propulsion

- **Fixed Wing**
  - unmanned or manned
  - 2g maneuver, 150 - 7500 m altitude, speed < 200 knots, 1 -10 sq. m. rcs
  - Typically reciprocal engine propulsion

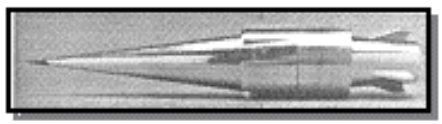
- **Moving Ground Targets**
  - 1g maneuver, 5 - 35 knots, rcs > 7 sq. m.

LCCMD Program History

Architecture Studies (1997 - 1998)

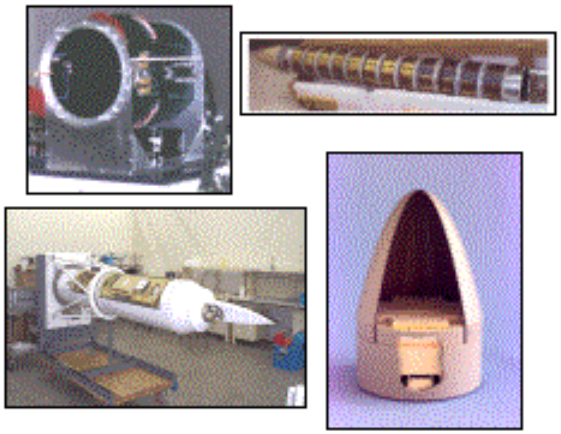
Unmanned Aerial Vehicle

Radar Missile Interceptor

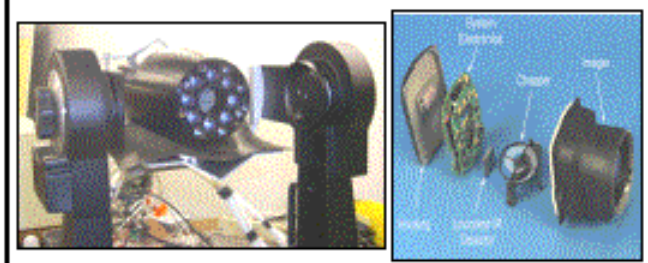


Command Guided Interceptor

Seeker Design / Component Testing (1999 - 2001)



Radar



Infrared

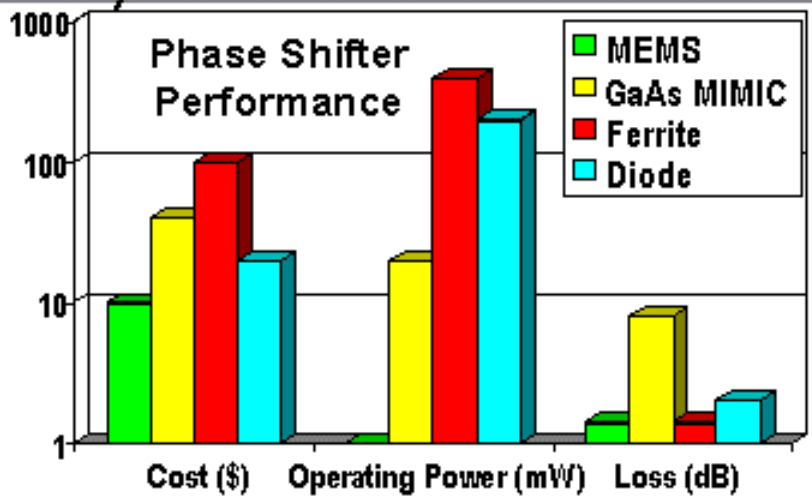
Seeker Testing (2002 - 2005)

MEMS ESA Seeker

MicroElectroMechanical System (MEMS) Potential

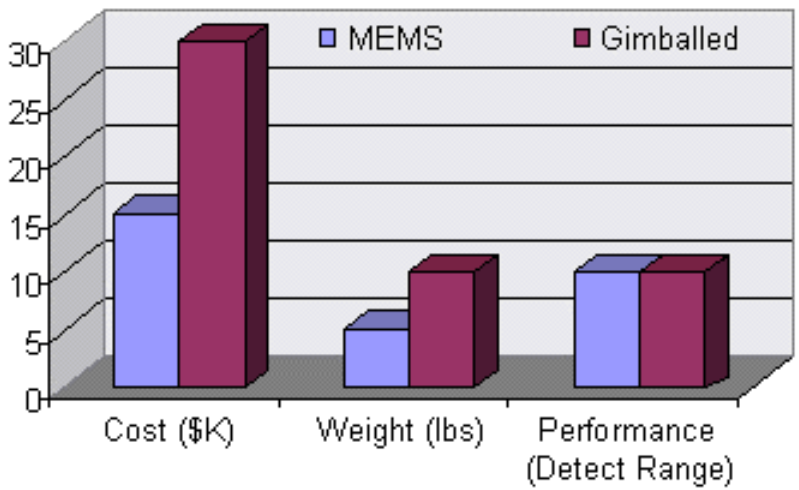
Achieve Lower Cost By:

- **Eliminating Seeker Gimbal**
  - Requires electronically steered antenna (ESA)
- **Reducing phase shifter cost and enhance phase shifter performance**
  - Translates into low cost ESA

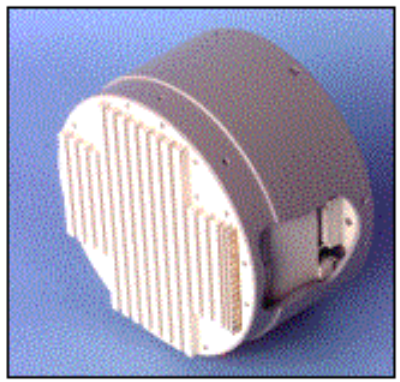


MEMS is the choice for cost and performance

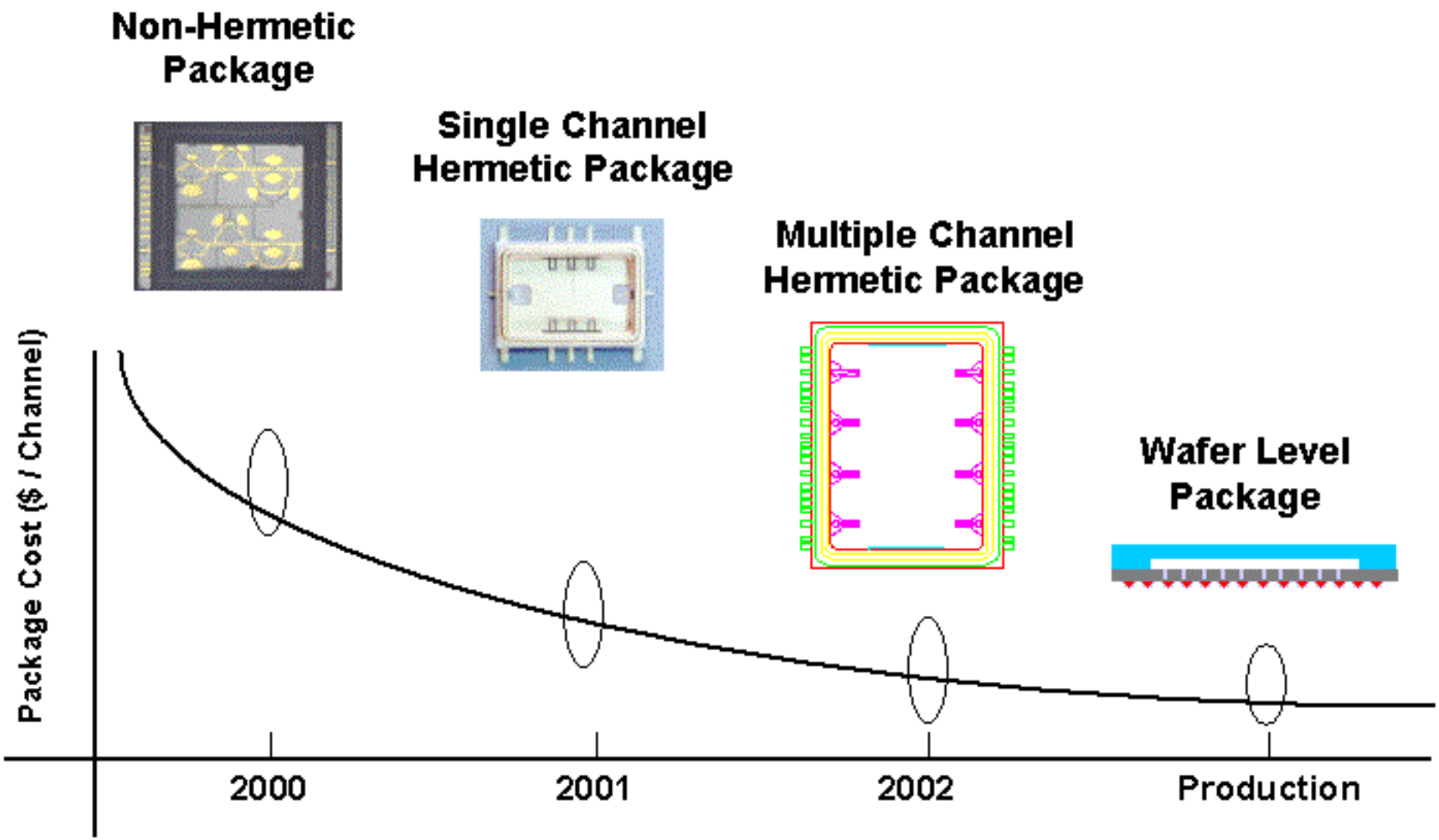
Gimbal with Conventional Antenna vs. MEMS ESA



DARPA MEMS ESA



6" Ka-Band MEMS ESA

- **> 600 MEMS Phase Shifters**
- **30 Watts Peak Power**
- **$40K Seeker Cost in 3K Quantity**

MEMS Packaging