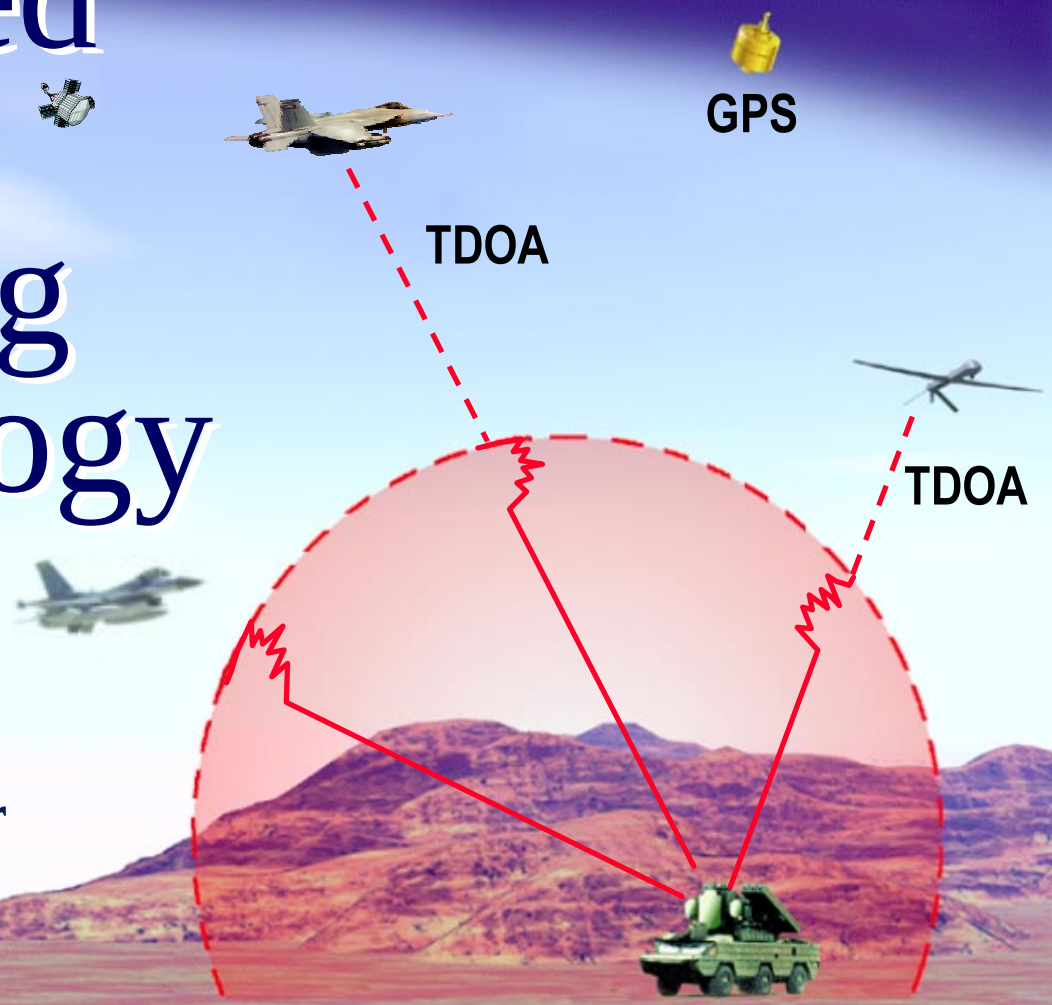
Advanced Tactical Targeting Technology (AT3)



Lt Col Beth M. Kaspar
DARPA / SPO
bkaspar@darpa.mil
(703) 248-1520

Importance

- Surface-to-Air Threat Proliferation, Sophistication, and Mobility Is a Significant Threat to US Air Power
- Destruction of Mobile Air Defense Units is the Central Issue

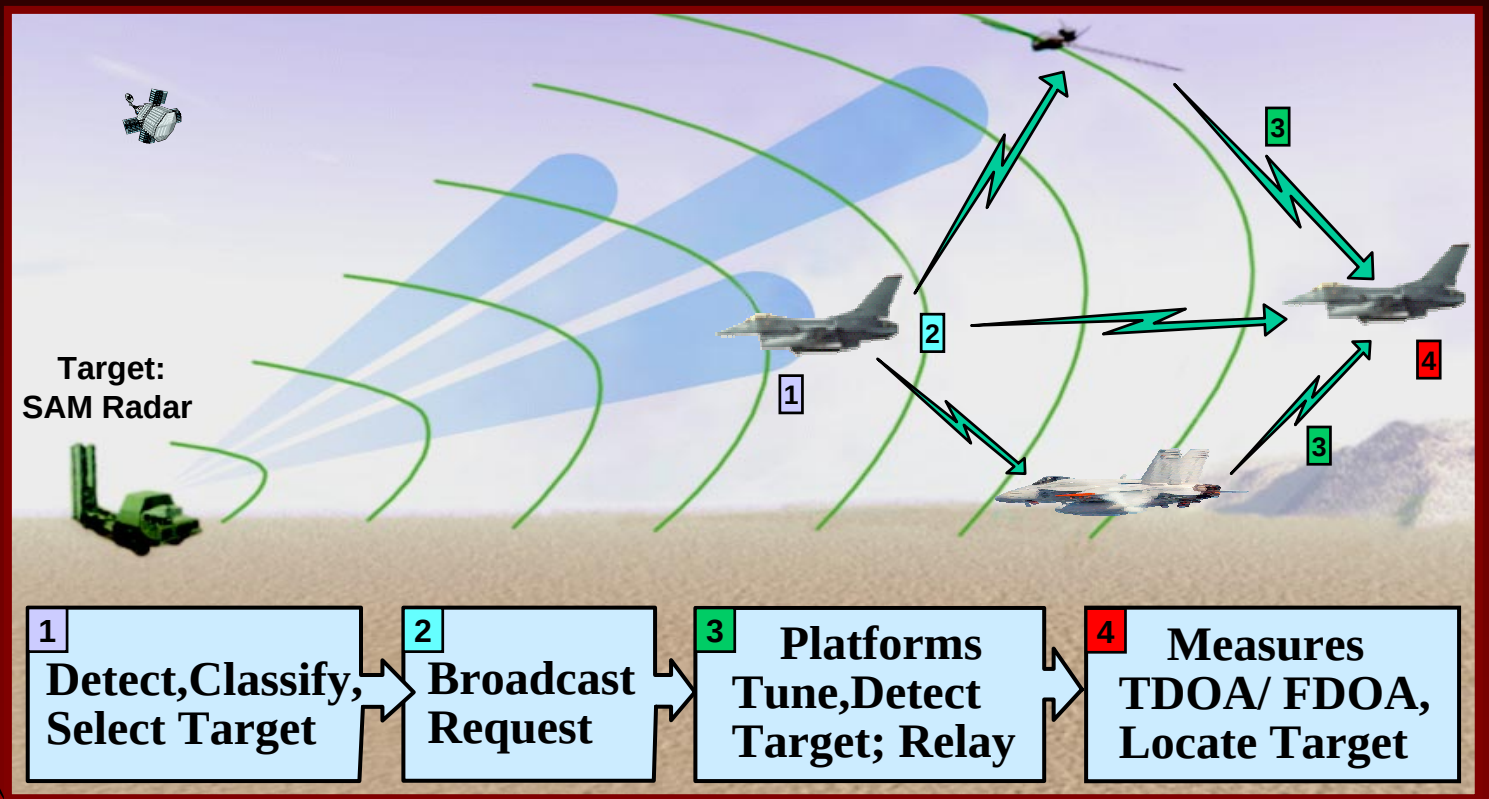
- Accuracy / Timeline Sufficient for PGM Weapon Delivery

AT3

Develop and Demonstrate Enabling Technologies for A Cost Effective Tactical Targeting System for Lethal Suppression of Enemy Air Defenses (SEAD)

K9905003

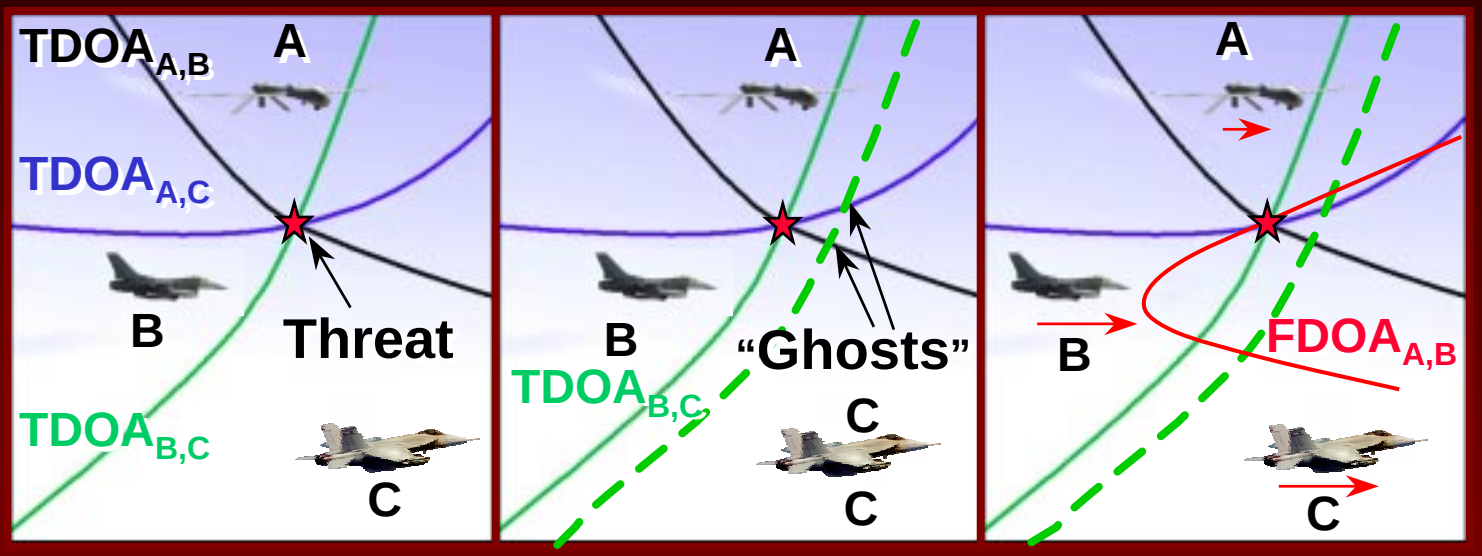
Targeting Concept



1 Detect,Classify, Select Target → 2 Broadcast Request → 3 Platforms Tune,Detect Target; Relay → 4 Measures TDOA/ FDOA, Locate Target

K9905003

Location

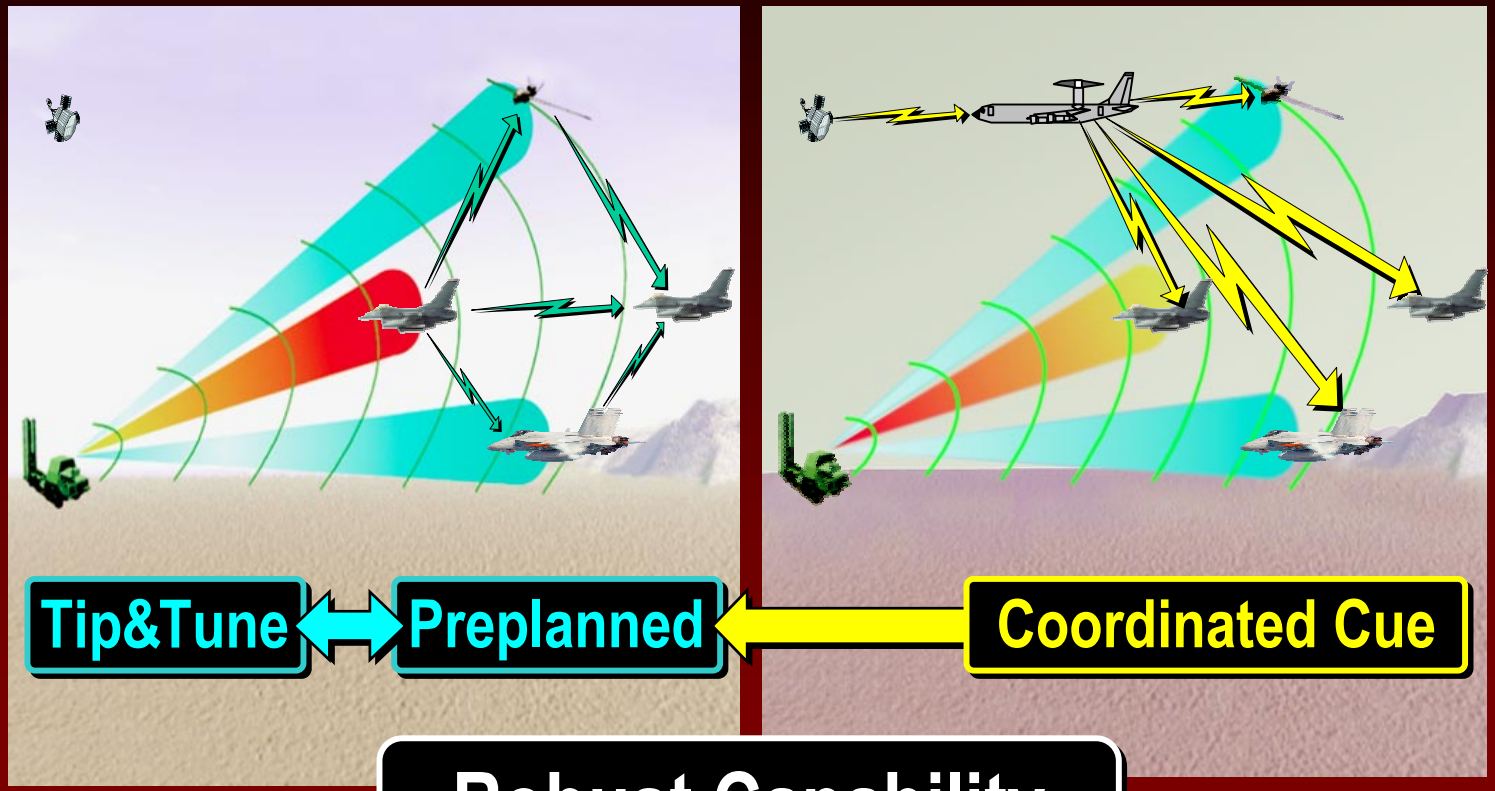


TDOA	Ambiguities	TDOA & FDOA

K9905003

Target Acquisition

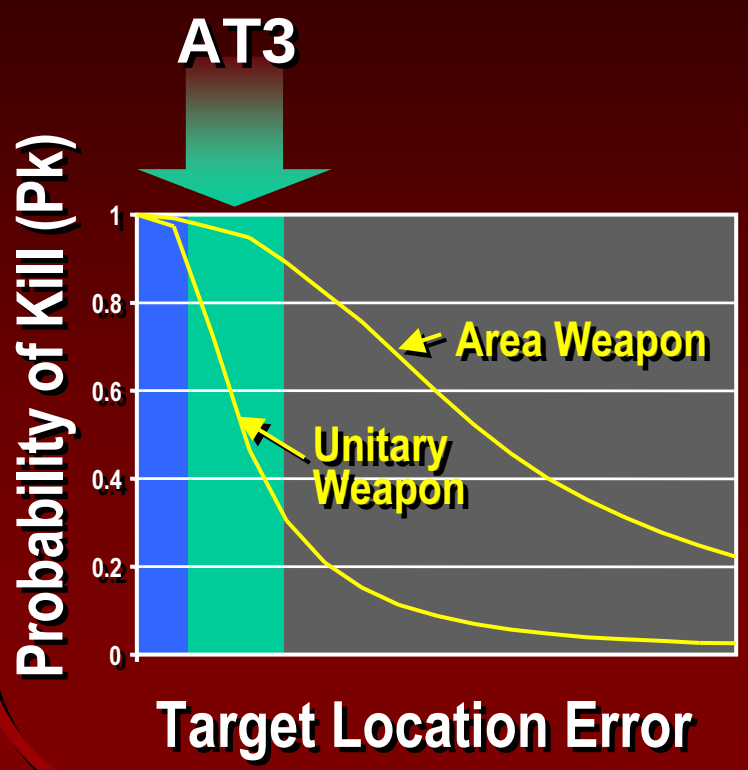
SPO

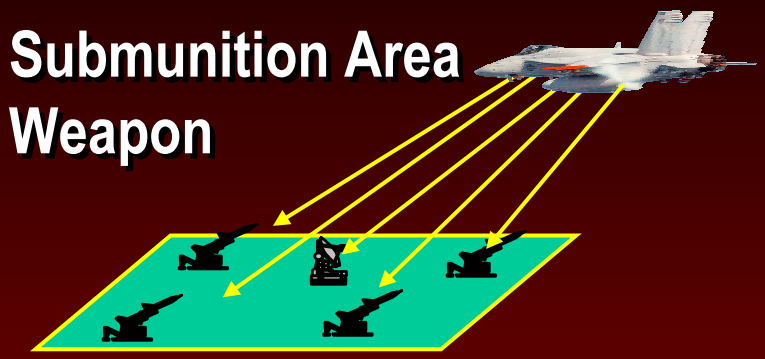


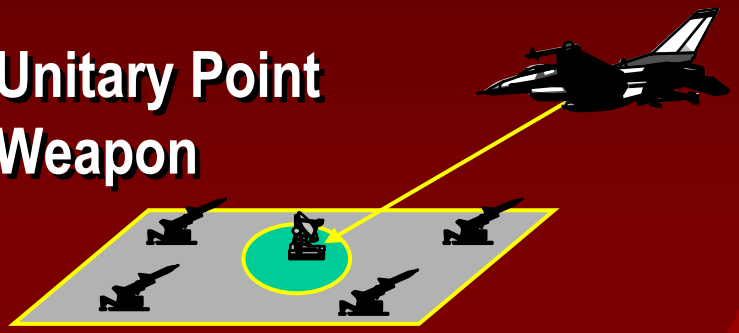
Robust Capability

K9905003

AT3 Uniqueness: TLE

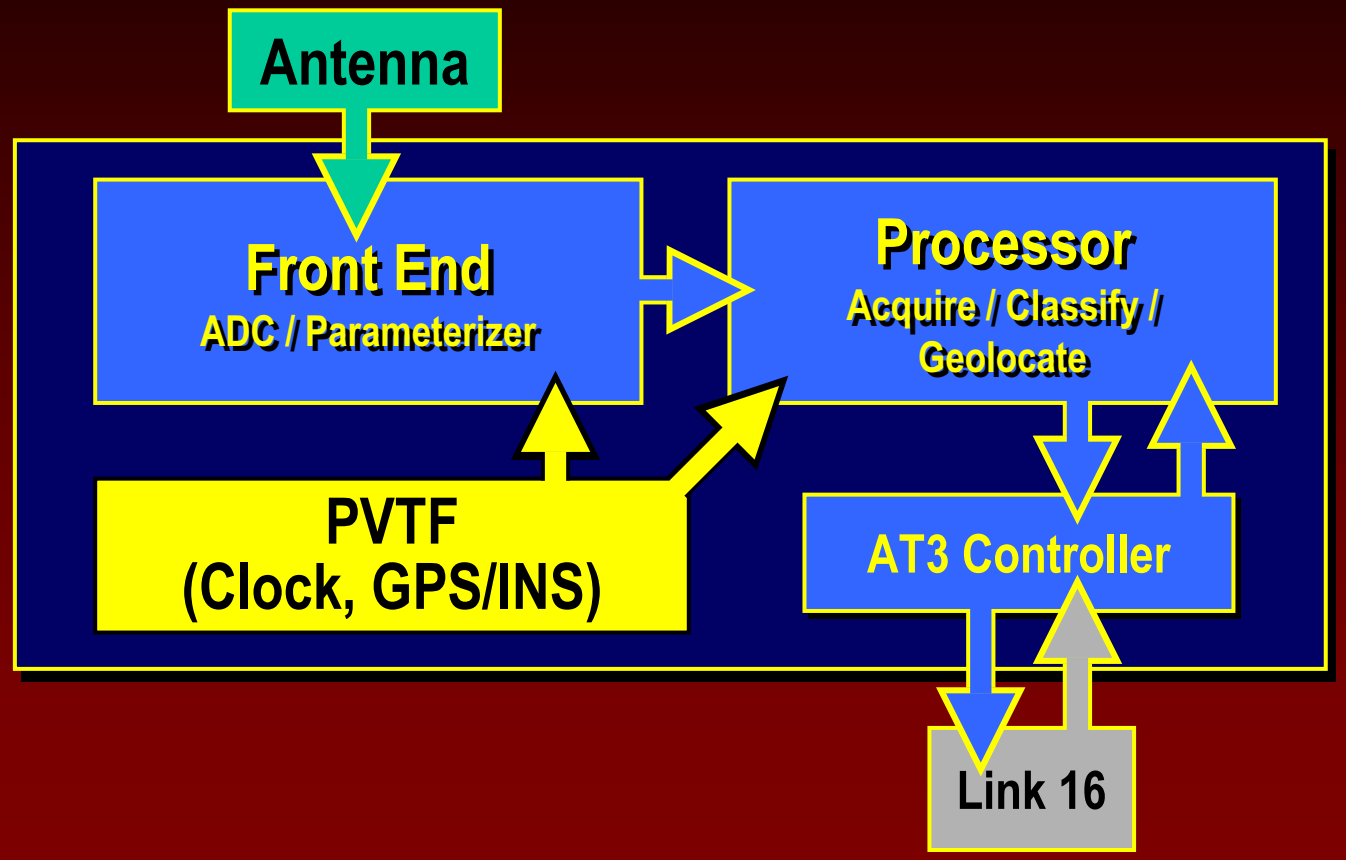






K9905003

AT3 Receiver



K9905003

Challenges

- **Common Pulse:** Space / Time / Freq Alignment & Pulse Correlation
- **Threat Sidelobes:** Digital Receiver
- **Network Management:** Link 16 Access Control & Data Compression
- **Multipath Resilience**
- **Geolocation Algorithms**

Common Pulse

SPO

Collector A

- Detect
- Deinterleave
- Classify

Collector B

- Detect
- Deinterleave
- Classify

Collector C

- Detect
- Deinterleave
- Classify

- Pulse Train Match
- Pulse Match
- CAF or FFT Processing
- TDOA/FDOA Measurement

Geolocation

K9905003

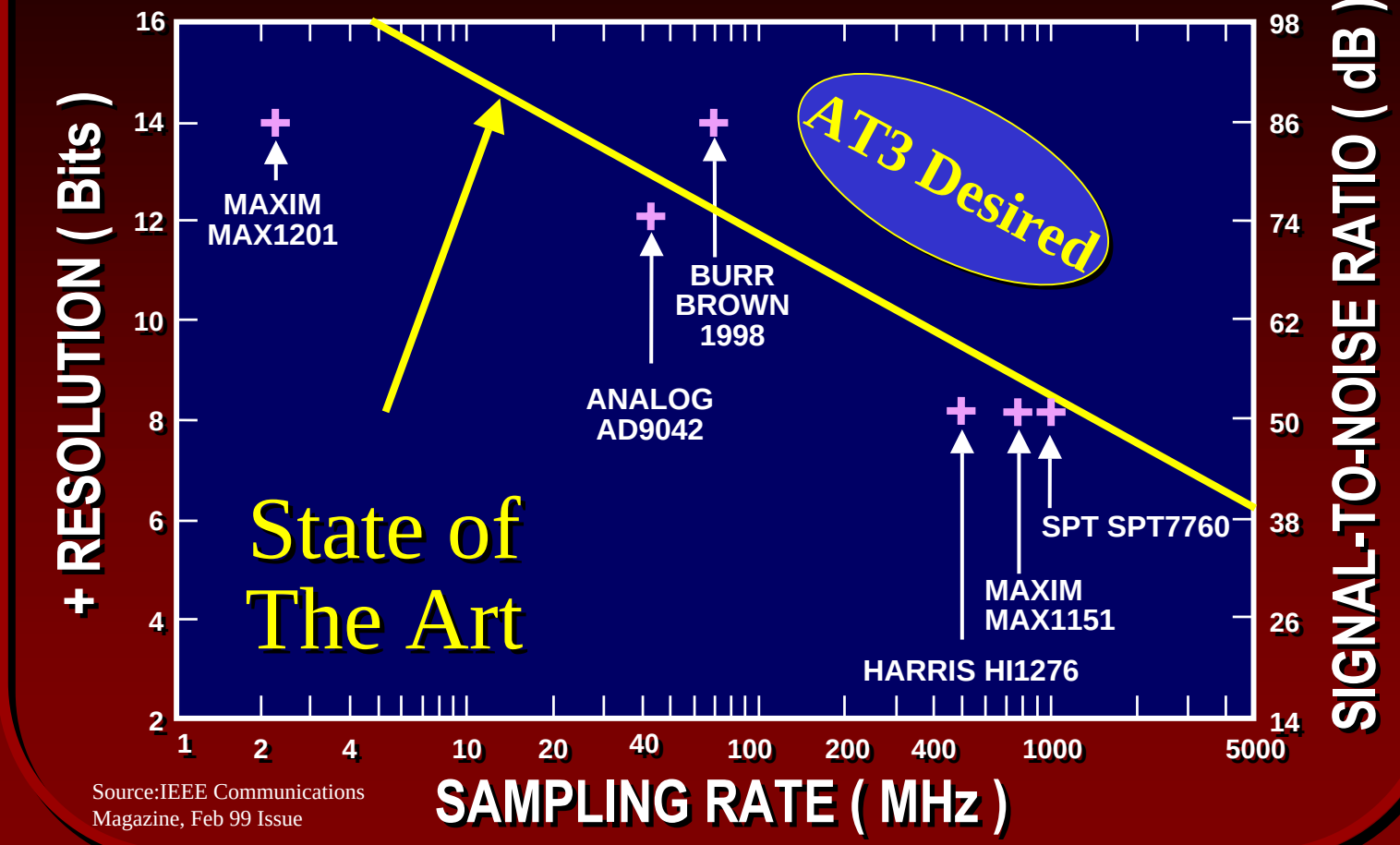
7D Registration

Commonly Registered 3 meter, 0.03 m/sec, 5 nano-sec P-V-T

Miniaturized Precision Clocks

GPS Guidance Package

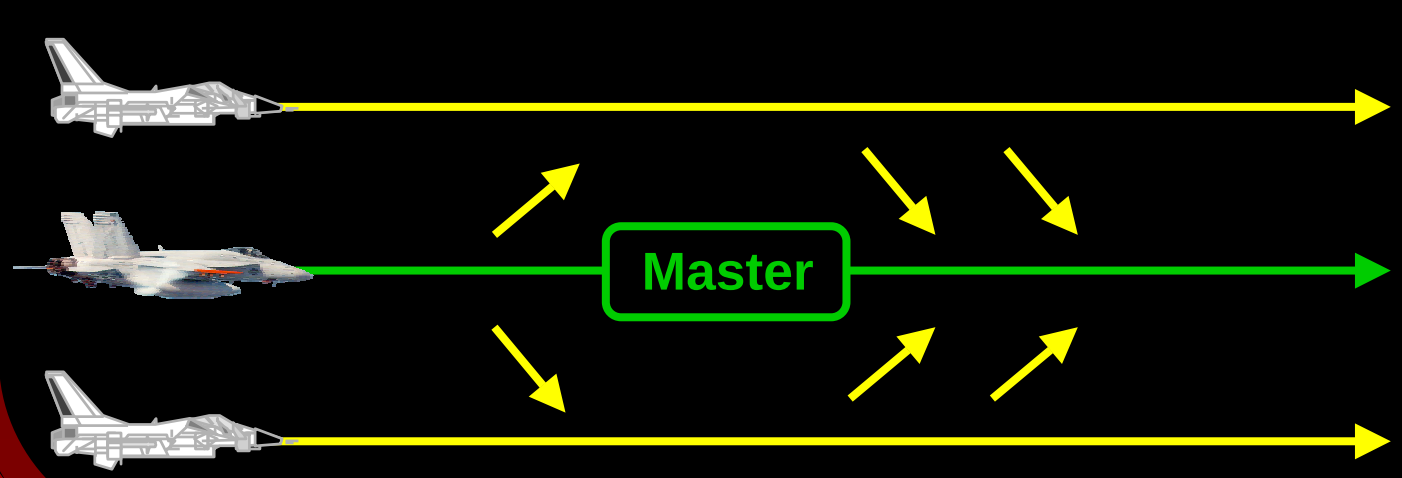
A/DC Performance



Source:IEEE Communications Magazine, Feb 99 Issue

K9905003

AT3 Timeline



K9905003

Link Management

SPO

Net 1

Net 2

Net 3

Request	Own Nav State LSB	Target Characterization: Type, RF, SNR, etc.	TOA MSB	Sampled Waveform

Net 4

Sampled Pulse 1

Sampled Pulse 2

TOA1 LSB

TOA2 LSB

(etc.)

K9905003

Data Compression

- Match Data Link
- > 3:1 for Sending Sampled Pulses for Coherent Processing
  - –Wavelets
- Pulse Descriptor Words for Non-Coherent Processing

Schedule

Phase 1

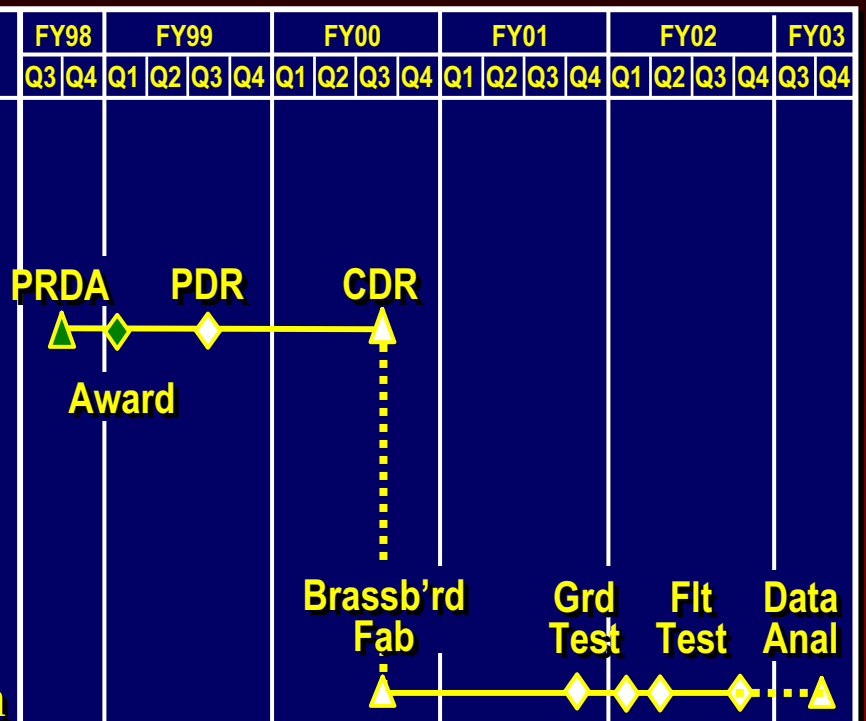
Design

- Simulations
- Component Demos

Phase 2

Fabricate and Test

- Algorithm Validation
- Multipath Evaluation



K9905003

Opportunities

- Advanced Geolocation Algorithms / Technology
- Multipath / DTED Exploitation / Geometry
- Reconfigurable Digital Receiver