GROUND AIR TASK ORIENTED RADAR (G/ATOR)

Program Description

G/ATOR is a three-dimensional short-to medium-range tactical radar designed to detect, identify, and track low level cruise missiles, manned aircraft, and Unmanned Aerial Vehicles (UAV) as well as rockets, mortars, and artillery fire. G/ATOR capabilities include the ability to track hostile UAVs, assist in air traffic control, serve as a fire control system, support ground-based air defense, and detect rockets, artillery, and mortars in order to direct the counter fire.

Developed by prime contractor Northrop Grumman Electronic Systems in Baltimore, Md., G/ATOR will replace legacy radar systems to perform air surveillance, cue air defense weapons, determine hostile indirect fire firing locations, and provide data to air traffic controllers.

Program Status

In late July 2012, Northrop Grumman announced the delivery of its AN/TPS-80 G/ATOR system to Surface Combat Systems Center Wallops Island in eastern Virginia for the government to begin its first and second phases of Developmental Testing (DT). The final phase of DT and the Operational Assessment for G/ATOR will be conducted in Yuma, Arizona, in 2013.

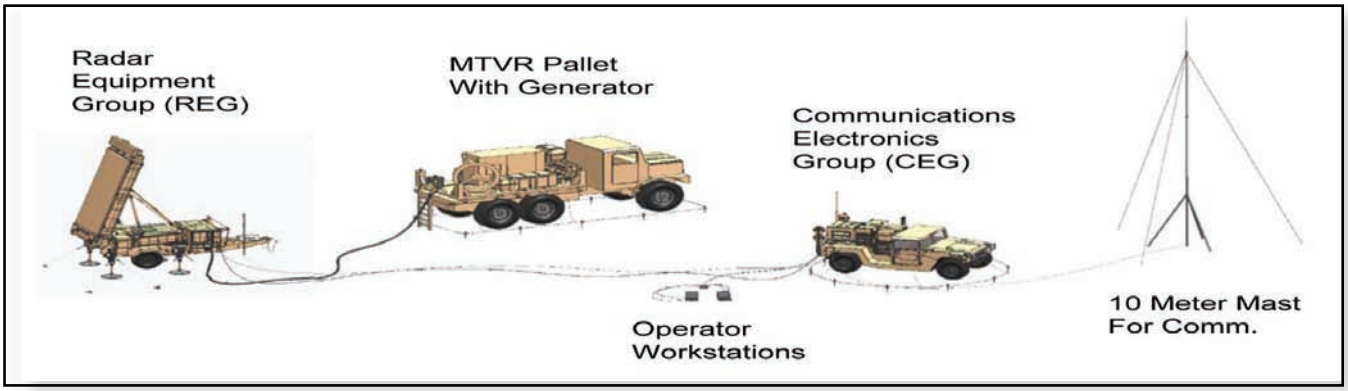
G/ATOR's Top Three Program Technology Issues:

1. Lowering Manufacturing Costs

Technologies are needed that reduce manufacturing costs across multiple areas of production, including: 1) Air ducts that provide precise mounting and cooling of the Transmit/Receive (T/R) Modules and array elements. The air duct is very time consuming to produce and assemble and thus very expensive. 2) T/R module packaging requires expensive materials and hermetic sealing which reduces yield. 3) Circulator Isolator Resistor Filter boards required for T/R Module require multi-step medium yield manufacturing process.

2. T/R Module Efficiency

The G/ATOR system currently operates at the limit of its prime power source. As the largest aggregate

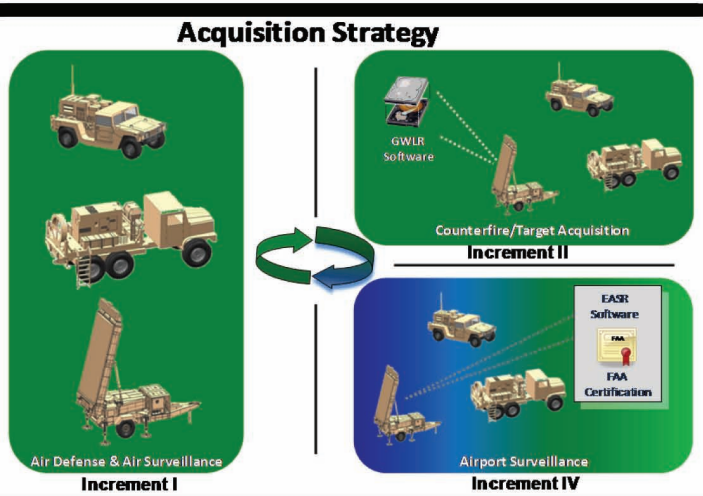


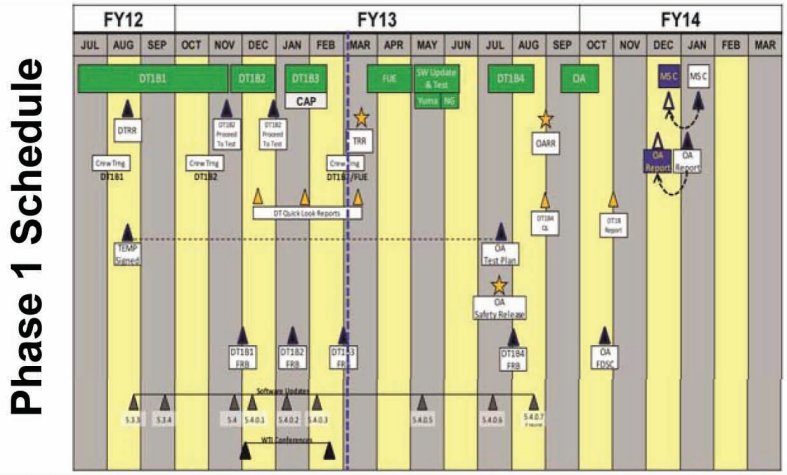
consumer of power, technologies are required for the T/R modules that increase power efficiency, such as: 1) higher efficiency power amplification; 2) higher efficiency DC/DC power supply; and 3) greater integration of components.

3. GaN Reliability

Technologies are needed that enhance the GaN based integrated circuits and potentially reduce costs and increase performance for the T/R modules of the radar.

Ground/Air Task Oriented Radar
AN/TPS-80 G/ATOR





Mission & Requirements

- 3D, short/medium range multi-role radar designed to detect unmanned aerial systems, cruise missiles, air breathing targets, rockets, artillery and mortars.
  - Satisfies Warfighters' expeditionary needs across MAGTF spectrum
- Replaces five legacy radar systems with a single MAGTF solution:

AN/UPS-3 Tactical Defense Alert	GB1	Air Defense/Surveillance
AN/MPQ-62 Continuous Wave Acq	GB1	Air Defense/Surveillance
AN/TPS-63 Air Surveillance	GB1	Air Defense/Surveillance
AN/TPQ-46 Counter-Battery/ Target Acq	GB2	Ground Weapons Locating
AN/TPS-73 Air Traffic Control	GB4	Air Traffic Control

Capability/Improvements

- Increased range, accuracy, tactical mobility and reliability
- One system through tech insertion leveraged from prior variants:

GB1:	Air Defense/Surveillance Radar (ADSR)	Qty 17
GB2:	Ground Weapons Locating Radar (GWLR)	Qty 28
GB4:	Expeditionary Airport Surveillance Radar (EASR)	Qty 12
		AAO Qty 57

Recent History

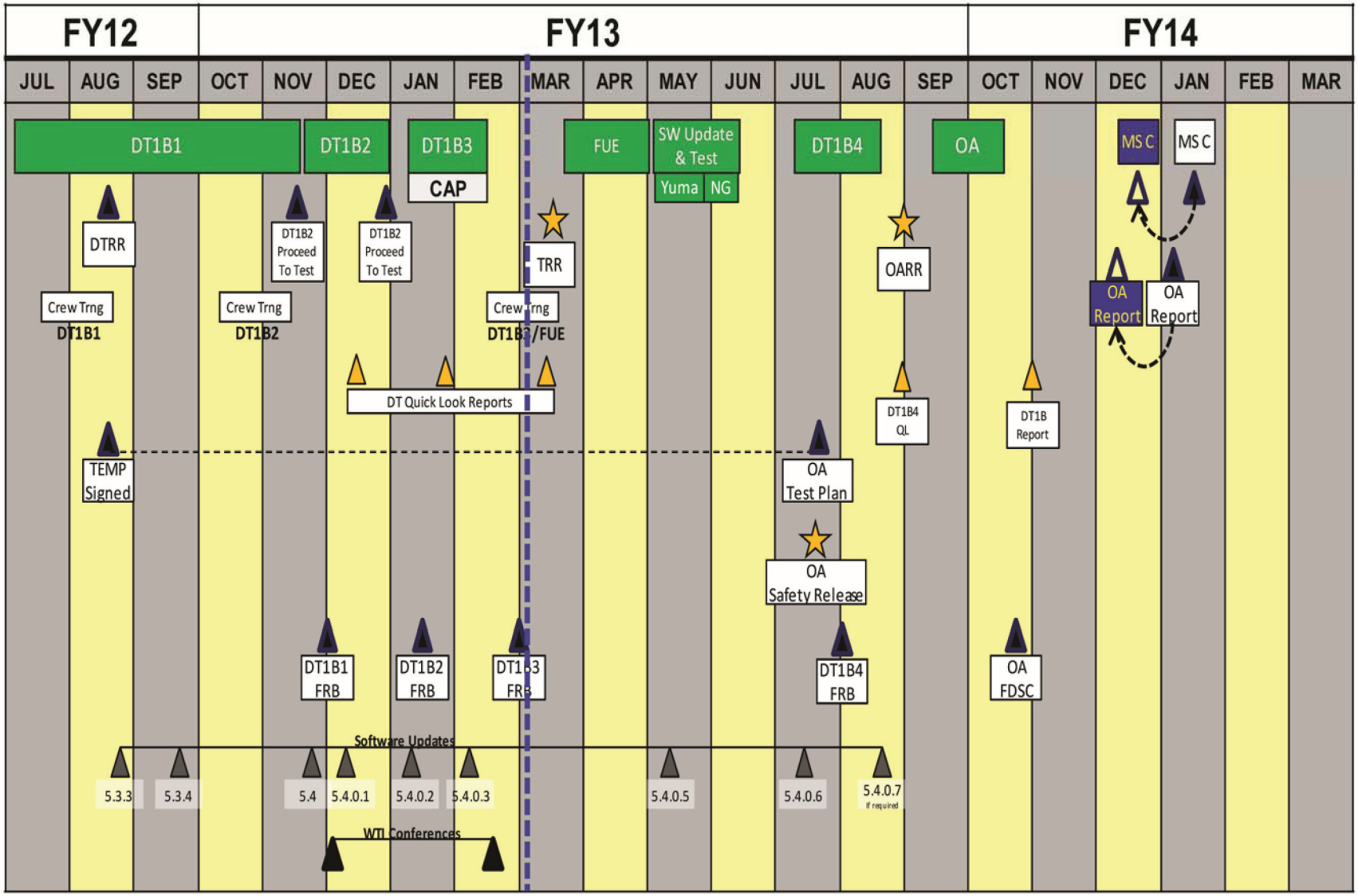
- MROC of March 2010 endorsed proposed program plan
- GB3 Mode 5/S capability absorbed into GB4-all other GB3 capabilities deferred
- Resourced in PB 12, PB 13, and OSD 14
- GB4 funding is now a BISOG 15 issue
- Designated ACAT IC by AT&L ADM 28 Oct 2011
- ACAT IC ACQ STRAT approved 12 March 2012
- ACAT IC APB approved 22 May 2012
- Block 1 CPD approved 3 Dec 2012
- Developmental Testing: DT 1B1/1B2 complete

Upcoming Events

- FY12
  - Developmental Testing: DT 1B3 at Wallop's Island and MCAS Yuma
- FY13
  - Production Readiness Review
  - DT1B3 and Operational Assessment: MCAS Yuma
  - Milestone C Decision
  - LRIP contract award

Ground/Air Task Oriented Radar
AN/TPS-80 G/ATOR

Phase 1 Schedule



G/ATOR Technical Issue # 1 Lowering Manufacturing Costs

G/ATOR	2012	2013	2014	2015	2016	2017	2018
Program Milestones/ Insertion Points			C MS-C		FRPD IOC		
Active and Potential Investment Opportunities	Atomic Layer Deposition Technology for Gallium Nitride Microwave Monolithic Integrated Circuits (PM GBAD-G/ATOR SBIR I) ($0.83M) 6 T PM GBAD-G/ATOR						
D&I E&D FNC SBIR Other TARDEC							
Concept to Capability Issue Mapping Alignment Process	MCCL 5.2 → MCGL 15-3.2-G2 → STO'S C2 STO 1 C2 STO 3 → Technology -Atomic Layer Deposition Technology for Gallium Nitride → Venues SBIR → TTA → POM Funding → T; MCTL MCT1 MCT 2 MCT 3						

Funding Profiles ($M)	FY 12	FY 13	FY 14	FY15	FY 16	FY 17	FY 18
S&T (6.2 / 6.3)	0.08	0.25	0.25	0.25			

6.1 ← → Science & Technology ← → 6.3 6.4 ← → System Development ← → 6.7

G/ATOR Technical Issue # 2 T/R Module Efficiency (Power)

G/ATOR	2012	2013	2014	2015	2016	2017	2018

Program Milestones/ Insertion Points

MS-C (C) — FRPD — IOC

Active and Potential Investment Opportunities

G/ATOR Micro Power Supply Producibility/Testability Enhancements & Cost ($2.00M)
6 — T — PM GBAD-G/ATOR

Atomic Layer Deposition Technology for Gallium Nitride Microwave Monolithic Integrated Circuits (PM GBAD-G/ATOR SBIR I) ($0.83M)
6 — T — PM GBAD-G/ATOR

Advanced Power Component Integration for Ground-Based AESA Radar DC/DC Converters ($2.00M)
6 — T — PM GBAD-G/ATOR

D&I | E&D | FNC | SBIR | Other | TARDEC

Concept to Capability Issue Mapping Alignment Process

MCCL 5.2 → MCGL 15-3.2-G2 → STO'S C2 STO 1 C2 STO 3 → Technology -Atomic Layer Deposition Technology for Gallium Nitride → Venues SBIR → TTA → POM Funding → T

MCTL MCT1 MCT 2 MCT 3

Funding Profiles ($M)	FY 12	FY 13	FY 14	FY15	FY 16	FY 17	FY 18
S&T (6.2 / 6.3)	2.08	1.25	0.25	0.25			

6.1 ← → Science & Technology ← → 6.3 6.4 ← → System Development ← → 6.7

G/ATOR Technical Issue # 3 GaN (Gallium Nitride) Reliability

G/ATOR	2012	2013	2014	2015	2016	2017	2018

Program Milestones/ Insertion Points

MS-C (C) — FRPD — IOC

Active and Potential Investment Opportunities

Atomic Layer Deposition Technology for Gallium Nitride Microwave Monolithic Integrated Circuits (PM GBAD-G/ATOR SBIR I) ($0.83M)

6 — T — PM GBAD-G/ATOR

Advanced Coatings for Non-Hermatic Low Cost G/ATOR T/R Modules RIF ($2.84M)

6 — T — PM GBAD-G/ATOR

D&I | E&D | FNC | SBIR | Other | TARDEC

Concept to Capability Issue Mapping Alignment Process

MCCL 5.2 → MCGL 15-3.2-G2 → STO'S C2 STO 1, C2 STO 3 → Technology -Atomic Layer Deposition Technology for Gallium Nitride -Advanced Coatings for Non-Hermatic Low Cost G/ATOR T/R Modules RIF → Venues SBIR → TTA → POM Funding → T

MCTL MCT1, MCT 2, MCT 3

Funding Profiles ($M)	FY 12	FY 13	FY 14	FY15	FY 16	FY 17	FY 18
S&T (6.2 / 6.3)	0.98	0.25	0.25	0.25			

6.1 ← → Science & Technology ← → 6.3 6.4 ← → System Development ← → 6.7