

# Unmanned Systems: What's New, What's Not

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# Northrop Grumman 2007 Sales

CHAIRMAN & CEO



Ron Sugar

PRESIDENT & COO



Wes Bush

*Northrop Grumman Corporation*

**Total Sales 2007: \$32B\***

## OPERATING SECTORS

MISSION SYSTEMS



\$6.1B

Command, Control and Intelligence  
Land Forces / Digitized Battlefield  
ICBM Systems Management  
Missile Defense BMC3  
Information Warfare

INFORMATION TECHNOLOGY



\$4.5B

Enterprise Systems and Security  
IT/Network Outsourcing  
Defense & Intelligence  
Federal, State / Local & Commercial  
ISR, Homeland Security & Health

TECHNICAL SERVICES



\$2.1B

Systems Support  
Training and Simulations  
Life Cycle Optimization

ELECTRONIC SYSTEMS



\$6.7B

Radar Systems  
C4ISR  
Electronic Warfare  
Navigation & Guidance  
Military Space  
Homeland Defense  
Government Systems

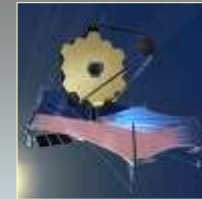
INTEGRATED SYSTEMS



\$5.1B

Large Scale Systems Integration  
C4ISR  
**Unmanned Systems**  
Airborne Ground Surveillance / C2  
Naval BMC2  
Global / Theater Strike Systems  
Electronic Combat Operations

SPACE TECHNOLOGY



\$3.1B

ISR Satellite Systems  
Missile Defense Satellite Systems  
MILSATCOM Systems  
Environmental & Space Science Satellite Systems  
Software Defined Radios  
Directed Energy Systems  
Strategic Space Systems

SHIPBUILDING



\$5.8B

Naval Systems Integrator  
Nuclear Aircraft Carriers  
Nuclear Submarines  
Surface Combatants  
Expeditionary Warfare Ships  
Auxiliary Ships  
Fleet Maintenance  
Marine Composite Technology  
Coast Guard Cutters  
Commercial Ships

*Information & Services*

*Electronics*

*Aerospace*

*Shipbuilding*

*A Portfolio Positioned for the Future*

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\* Includes Intersegment Eliminations

† Realigned Results

Approved for Public Release – Corp. 2008

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# Capability Developments for the Future are Built Upon a Legacy of Unmanned Aerial Systems



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BQM-74



RQ-4 Block 20/30/40  
Global Hawk



X-47A UCAS



Euro Hawk



RQ-8A Fire Scout



MQ-8B Fire Scout



X-47B UCAS



BQM-34



Compass Cope



Combat Dawn



Compass Arrow



AQM-34 SPA



Firebolt



M324



RQ-4 ACTD/Block 10  
Global Hawk



BQM-145A



BQM-74E



MQ-5B Hunter



BQM-74F



E-Hunter



RQ-5A Hunter

1940

1950

1960

1970

1980

1990

2000

CURRENT

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DEFINING THE FUTURE™

# Unmanned Systems Integrated Capabilities and Support



**Beale AFB**

- Global Hawk CONUS Flight Ops



**Edwards AFB**

- Global Hawk Flight Test



**Hollywood, MD**

- UMS Support Center
- NAS Pax River**



- VTUAV Flight Test
- GHMD Flight Test



**Pt. Mugu**

- Targets Operations



**Rancho Bernardo**

- Global Hawk Engineering
- X-47B UCAS Engineering
- Fire Scout Engineering
- Targets Development
- Rapid Prototyping



**El Segundo**

- X-47B UCAS Engineering



**Palmdale**

- Global Hawk Production
- Targets Production
- X-47B UCAS Production



**Moss Point**



- Fire Scout Production
- Global Hawk Production

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# Unmanned Systems are Required Globally



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# Key Capability Developments for the Future

## Creating an Autonomous Environment

*Aerial Refueling*

*Virtual Warfare  
Environment*

*Networked ISR*

*Cooperative Control  
and Mission Management*

*Command and  
Control Flexibility*

*Ship Integration*

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# Product Development Investments



1D01-AS-4618

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# End to End System Integration...



**Global Hawk  
System Center**



**X-47B UCAS  
System Center**



**VMS Lab**



**Fire Scout  
System Center**












*...Key to Success to Date*

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# Unmanned Systems Current Contracts

	<b>Global Hawk</b> <i>Customer: US Air Force</i> A combat proven high altitude, long endurance UAS with extraordinary ISR capabilities. Can provide near real time high resolution imagery of large geographical areas all day/all night in all types of weather.		<b>UCAS-D</b> <i>Customer: US Navy</i> Navy UCAS Carrier Demonstration will show that an operational class, tailless, LO-representative air vehicle can operate from a carrier at sea.
	<b>GHMD</b> <i>Customer: US Navy</i> Maritime version of the high altitude, long endurance Global Hawk UAS with application for broad area maritime surveillance mission.		<b>Hunter</b> <i>Customer: US Army</i> Army Reconnaissance, Surveillance and Target Acquisition (RSTA) system currently in service. Combat proven in multiple theaters and deployed in Iraq.
	<b>Euro Hawk</b> <i>Customer: German MoD</i> First International version of high altitude, long endurance Global Hawk UAS with German ELINT/COMINT sensor on board.		<b>Targets</b> <i>Customer: Multiple</i> Low cost UAS for simulation of threat aircraft and missiles for combat training and weapons evaluations.
	<b>VTUAV Fire Scout</b> <i>Customer: US Navy</i> Navy multi-mission system. Operates autonomously from any aviation-capable warship, or unprepared landing zones in battle area.		<b>Model 324</b> <i>Customer: Egyptian Air Force</i> Autonomous, long range reconnaissance UAS providing EO and IR imagery.
	<b>FCS Class IV UAV</b> <i>Customer: US Army</i> Army Future Combat Systems multi-mission Class IV UAV for the Brigade Combat Team can provide RSTA, countermine, chemical detection, TUGS deployment, and logistics re-supply.		

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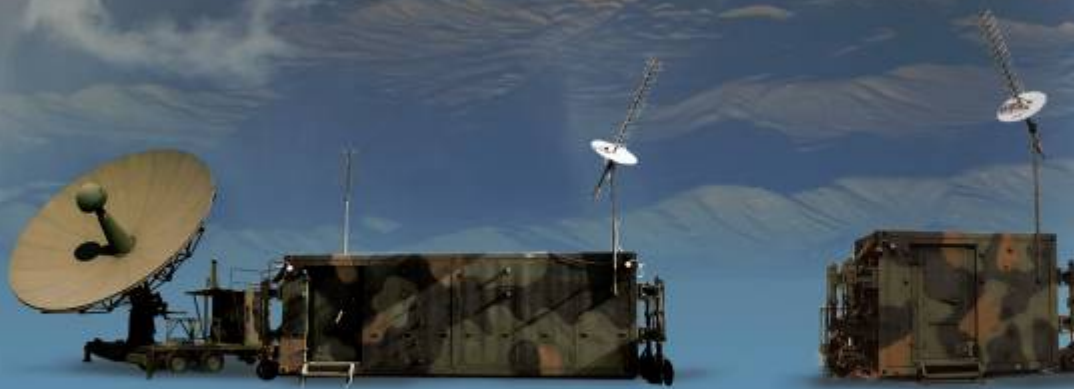
***Dynamic Program  
Updates***

# Global Hawk



***Combat proven high altitude, long endurance UAS with extraordinary Intelligence, Surveillance, Reconnaissance (ISR) capabilities.***

***Provides near real time high resolution imagery of large geographical areas all day / all night in all types of weather.***



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# Global Hawk Maritime Demonstration



*Maritime version of  
the high altitude,  
long endurance  
Global Hawk UAS  
with application to  
the broad area  
maritime surveillance  
Concept of  
Operations  
(CONOPS)  
development.*

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# Euro Hawk

*Contracted in January 2007 with the German Ministry of Defence, Euro Hawk represents the first international development program for Global Hawk.*

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# Ship-Based Fire Scout VTUAV System



VTUAV Control Station  
Integrated Into the  
Ship's Combat  
Information Center



LPD-17

FFG-7

CG-47

DDG-51

GD LCS

LM LCS

# X-47B UCAS



***X-47B is the Navy Unmanned Combat Aerial System Carrier Demonstration (UCAS-D) program – demonstrating the ability of an unmanned, low observable platform to conduct operations from a carrier at sea to include: launch, recovery, deck handling and full integration into Carrier Air Traffic Control Center.***

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# X-47B UCAS-D Progress





# X-47B UCAS-D Progress



# New Unmanned Systems Pursuits



## Navy UCAS

Customer: *US Navy*

Completion of the UCAS-D program in 2013 is the first step toward an operational Navy UCAS strike / ISR platform.



## BAMS

Customer: *US Navy*

Maritime, high altitude, long endurance Intelligence Surveillance Reconnaissance and Targeting (ISR&T) system based on combat-proven Global Hawk.



## Fire Scout International

Customer: *Multiple*

Multi-mission system which has been source of many international requests to USN. High degree of interest in Europe and Asia.



## VUAS

Customer: *USMC*

Potential Fire Scout application for Marines. Autonomous system that can land in battlefield areas and act as communications relay.



## AGS

Customer: *NATO*

NATO System consisting of a combination of manned and unmanned systems to provide ISR capabilities. Unmanned component is a Global Hawk UAS.



## Targets International

Customer: *Multiple*

Low cost UAS for simulation of threat aircraft/missiles for combat training and weapons evaluations. Currently sold to various nations.



## USCG FS

Customer: *USCG*

Potential Fire Scout application for U.S. Coast Guard. Autonomous system that can land on any air capable ship.



## ACIS Projects

Customer: *Multiple*

The Advanced Capabilities and Integrated Solutions Projects Team leads the way for the developmental and implementation of new technologies that will enhance the capabilities of unmanned systems.

1D01-AS-5281 Pursuits

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# Continuing to Support the Warfighter...





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