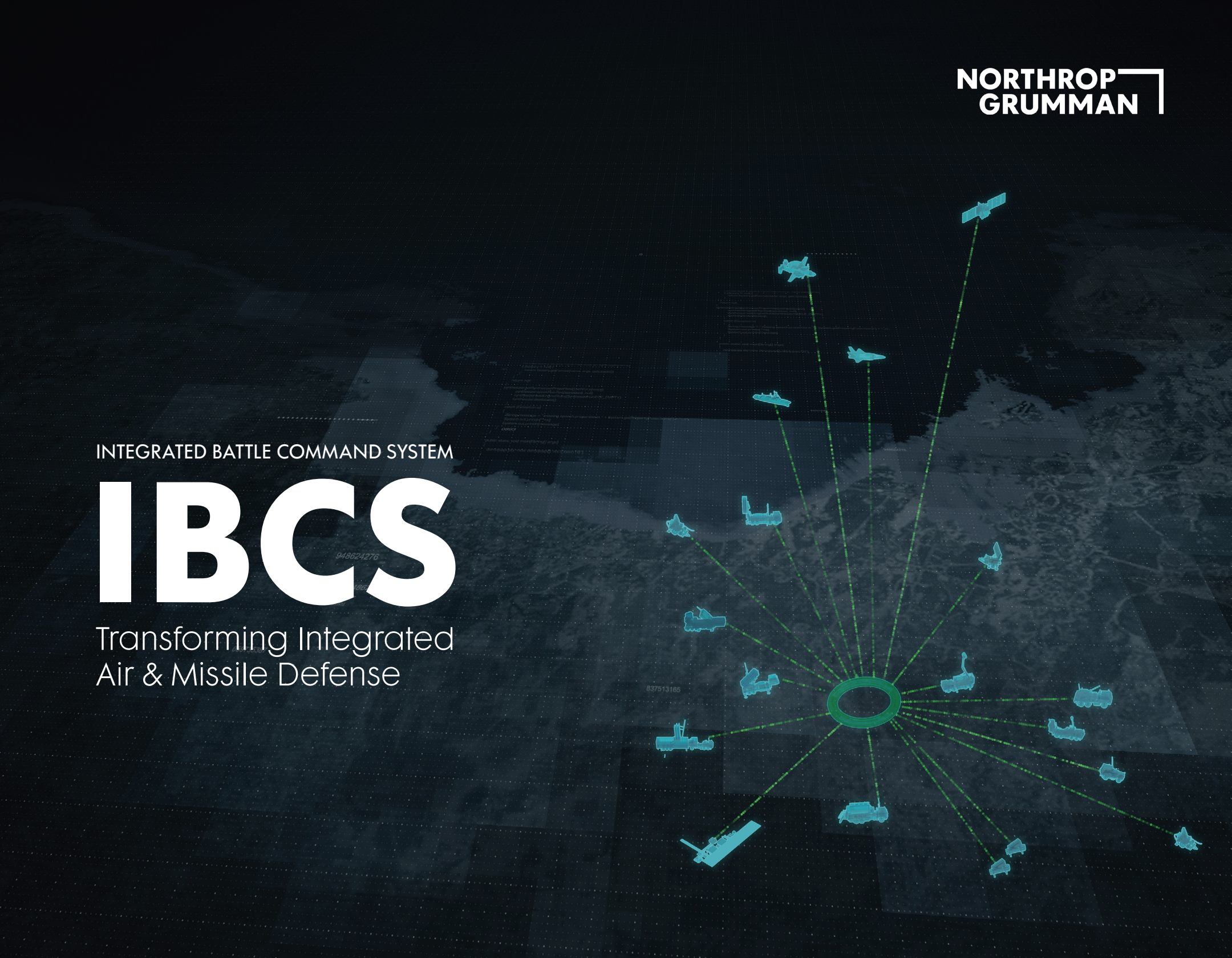
NORTHROP GRUMMAN

INTEGRATED BATTLE COMMAND SYSTEM

IBCS

Transforming Integrated Air & Missile Defense



THE INTEGRATED BATTLE COMMAND SYSTEM

The Integrated Battle Command System (IBCS) developed by Northrop Grumman is a ground-breaking, ready-now command and control (C2) system with unprecedented battle management and network integration capabilities. IBCS connects available sensors, effectors and C2 systems across multiple domains.

As the United States (U.S.) Army program of record for air and missile defense modernization, IBCS will replace legacy C2 systems such as Patriot and become the single fire-control C2 system for all Army Air and Missile Defense. IBCS provides a ready-now path for modernizing air and missile defense (AMD) for countries that have acquired the legacy Patriot system.

IBCS is designed to scale and connect with any system and offers a cost-efficient way to improve performance today and expand to include new capabilities that address the threats of tomorrow. This approach provides flexibility for future growth while reducing cost, risk, and deployment time.

IBCS is a transformational C2 capability for IAMD and an enabler for multi-domain integration for the U.S. and strategic allies. With IBCS, allied countries and coalition forces have interoperability with U.S. AMD forces, which increases efficiency, resilience, and performance across the battlespace.

IBCS will replace all current Army IAMD C2 systems (Patriot, THAAD, FAAD) over the next decade.

In April 2023, IBCS achieved Initial Operational Capability (IOC*) and authorized for Full Rate Production.

*The IOC milestone marks the completion of Patriot integration.

IBCS PROVEN & READY

THE THREAT

Today's battlespace is asymmetrical, highly contested and congested. Evolving threats utilize simultaneous, multi-axis attacks to overwhelm current defenses making the old paradigm of one sensor per shooter ineffective.

Addressing this complex threat environment requires an unprecedented degree of multi-domain integration that leverages all sensors, weapons, and C2 systems.

THE SOLUTION

IBCS is a revolutionary, proven system that fuses sensor data for a single, integrated air picture across the battlespace and enables rapid, informed decisions that optimize the ability to defeat identified threats.

IBCS' game-changing "plug-and-fight" technology scales to adapt and integrate multi-domain sensors and weapons onto an Integrated Fire Control Network (IFCN). This allows advanced battle management, planning and decision aids to achieve "any sensor, best shooter" effects.

Truly integrated air and missile defense is realized through IBCS' application of distributed sensor fusion and modern networking technologies to connect sensors, weapons and C2 nodes. Fusion of data from the networked sensors creates fire control quality tracks that enable rapid combat identification, weapon optimization and defense in depth using a variety of networked weapons.

IBCS TIMELINE

FLIGHT TESTS 1 - 3
MAY 2015 - 2016
Engagement on composite track and successful simultaneous intercepts of ballistic and cruise missiles

SUCCESSFUL TESTING
JAN - JULY 2018
Successful networking, multi-node and live-air tests

EOC FIRST DELIVERY
MARCH 2019
Delivered first production representative of the IBCS Engagement Operations Center (EOC)

FLIGHT TEST 5
DEC 2019
Simultaneous intercept of two cruise missiles and interoperability with USMC TPS-59 radar and F-35 sensors

ACHIEVED MILESTONE C
JAN 2021
Received U.S. DoD approval for Low Rate Initial Production of IBCS Major End Items

LRIP AWARD
DEC 2021
U.S. Army awarded Northrop Grumman LRIP contract based on competitive source selection

SOLDIER CHECKOUT EVENTS
AUG - OCT 2017
Soldiers conducted multiple successful IBCS hands-on events

ACQUIRED BY POLAND
MARCH 2018
Poland becomes the first international partner country to purchase IBCS

FLIGHT TEST 4
AUG 2019
Intercepted cruise missile at long range with Patriot, Sentinel, and PAC-3 interceptor

LIMITED USER TEST
JULY - SEP 2020
Successful independent operational test incorporating HWIL, live-air, and flight tests in a realistic, simulated wartime environment

FLIGHT TEST 6
JULY 2021
Successfully integrated the widest variety of joint sensors to date including F-35 and AN/TPY-80 G/ATOR

COMPLETED IOT & E
JAN - OCT 2022
Underwent Initial Operational Test and Evaluation (IOT&E)

VALIANT SHIELD 2022
JUNE 2022
Fused data from multiple services to create fire control quality composite track

IOC ACHIEVED & FRP AUTHORIZED
APRIL 2023
Achieved U.S. Initial Operational Capability (IOC) and Full Rate Production (FRP)

POLAND BOC
SEP 2023
Poland declared Basic Operational Capability (BOC) for IBCS and WISŁA medium range air defense program

INTEGRATED COLLABORATIVE ENVIRONMENT MAJOR END ITEM
DEC 2023
Delivered first production Integrated Collaborative Environment (ICE) to U.S. Army

MEI DELIVERY
JUNE 2024
Northrop Grumman delivered the first full set of IBCS major end items to the U.S. Army.

FRP AWARD
DEC 2024
U.S. Army awarded Northrop Grumman Full Rate Production award supporting Poland's IBCS enabled medium and short-range air defense programs.

SUCCESSFUL FLIGHT TEST WITH LTAMDS
DEC 2024
With LTAMDS and PAC-3, IBCS detected and defeated Black Dagger target configuration surrogate ballistic missiles.

PROJECT CONVERGENCE 2022
OCT 2022
Successfully integrated with U.S. Army's AFATDS to provide data for offensive fires in support of long-range precision fires

IFCN RELAYS DELIVERED
MAY 2023
Integrated Fire Control Network (IFCN) relays delivered to Poland for WISŁA program

LTAMDS INTEGRATION
NOV - DEC 2023
Successfully demonstrated integration with new LTAMDS sensor

POLAND LOA
FEB 2024
The USG and Polish governments signed letter of offer and acceptance for IBCS for Poland's NAREW short range air defense program and phase two of the WISŁA medium range air defense program.

SUCCESSFUL FLIGHT TEST WITH IFPC
AUG 2024
Integrated with Indirect Fire Protection Capability (IFPC) to defeat surrogate UAS and missile.

POLAND IOC
DEC 2024
Poland declared Initial Operational Capability for first IBCS-enabled battery of Poland's WISŁA medium range air defense program.

POLAND PHASE II AWARDED
DEC 2024
Achieves Initial Operational Capability (IOC) in Poland enhancing air and missile defense.

DIFFERENTIATORS

ENABLING JOINT AND MULTI-DOMAIN INTEGRATION

- IBCS is a software-defined solution built from a modular open systems approach (MOSA) architecture that enables constant, rapid upgradability to meet complex and evolving threats.
- For systems with built-in dependencies across various platforms, IBCS distinguishes each sensor and effector and adapts them to an integrated fire control network. This distinctive action is a force multiplier by leveraging existing systems. Increasing the survivability of sensors, weapons and supporting platforms enables individual deployment over a larger area.
- IBCS enables network integration and interoperability across services and coalition allies and moves away from isolated and stand-alone systems to a modular approach.
- IBCS has proven capability to connect and fuse multi-service sensor data to multi-service weapons through numerous successful developmental and operational tests and demonstrations.
- IBCS has demonstrated ability to integrate with a wide range of sensors and effectors including Patriot, Sentinel, PAC-2 (GEM-T), PAC-3, PAC-3 MSE, PAC 2 (GEM-T), PAC 3, and prototyped systems such as F-35, Common Anti-Air Modular Missile (CAMM), Giraffe, and other sovereign capabilities. IBCS continues to add capabilities like integration with the Lower Tier Air and Missile Defense Sensor (LTAMDS) and Indirect Fire Protection Capability (IFPC) launcher/interceptor. Notably, IBCS has demonstrated C2 to C2 integration.

IBCS PROVEN & READY

CONFIGURATION

IBCS comprises three major end items: the Engagement Operations Center (EOC) S-280 Shelter (Figure 1), Integrated Collaborative Environment (ICE) (Figure 2), and the Integrated Fire Control Network (IFCN) Relay (Figure 3). The delivery approach for IBCS is key to the flexibility offered. Offering a tailorable, componentized approach encourages industrial participation and adaptation to meet a country's unique air defense needs.

- The IBCS EOC is a mobile command and control center which hosts the battle management software, communications, and computing power that enables IBCS operators to plan and fight the battle.
- The ICE is a modular, electromagnetic interference-protected shelter hosting battle management workstations which enable warfighters to perform air and missile defense planning and defensive operations.
- The IFCN Relay forms the IBCS communications network and serves as the interface for sensors and weapons integrated into IBCS.
- The IFCN Relay is unmanned and serves two purposes. First, it forms the IFCN that runs over terrestrial (radio, fiber) and satellite bearers to carry both data and voice traffic. Second, the IFCN Relay contains the "plug-and-fight" kit that adapts sensors and weapons to the IFCN. The IFCN transports fire control quality data between sensors, weapons and the EOCs to support execution of engagement operations by the IBCS operators.

HARDWARE

1.1 – Engagement Operations Center (EOC) S-280 Shelter

1.2 – Integrated Collaborative Environment (ICE)

1.3 – Integrated Fire Control Network (IFCN) Relay

IBCS UNIFYING SENSORS & SHOOTERS

ENGAGE EFFICIENTLY

Optimize the **best effector** for each unique threat

Engage sooner to expand battlespace and defended area

SEE BETTER

See the **same air picture** for warfighters at all levels

Use **composite sensor tracks** to improve interceptor performance

DEFEND MORE

Expand coverage from existing systems

Gain **economies of force,** greater magazine depth, and higher performance-per-dollar

BE RESILIENT

Eliminate **single point of failure** with robust C2

Keep systems **mission-capable,** even after strikes

INTEGRATE ALLIES

Create a **shared, actionable picture** across Allies

Enhance ability to do **multi-national planning and operations**

ENABLE FUTURE

Keep pace with threat with a scalable modular open systems architecture (MOSA)

Have option to build towards **multi-domain** C2 solution

IBCS PROVEN & READY

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