

# F-35 MULTI DOMAIN OPERATIONS



**GARY NORTH**  
**VICE PRESIDENT CUSTOMER RELATIONS**  
**LOCKHEED MARTIN AERONAUTICS**

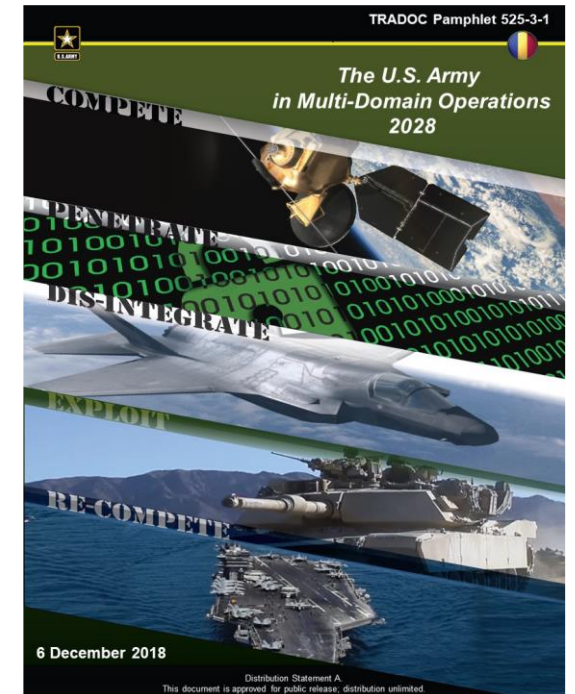


# NET CENTRIC WARFARE & MULTI-DOMAIN OPERATIONS

*“The rapid and continuous integration of all domains of warfare to deter and prevail [against an adversary]”*

~The U.S. Army in Multi-Domain Operations 2028

- Net Centric Warfare (NCW) and Multi-Domain Operations (MDO) are not new
- Increasing the level of complexity while decreasing the time to transfer meaningful intelligence is the focus



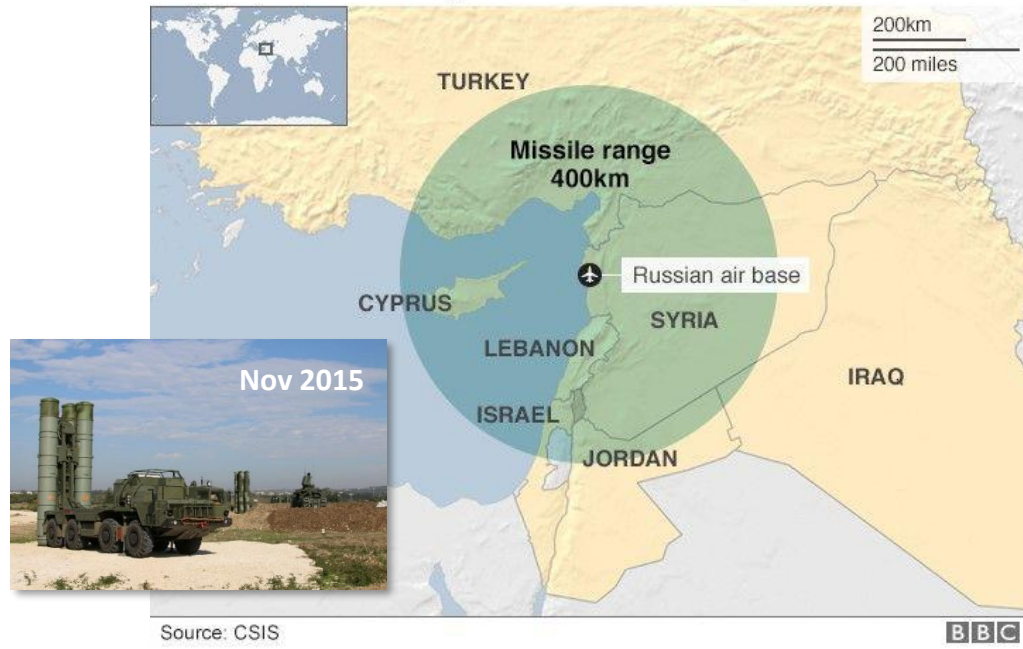
***The Speed of Information Matters***



# CONTESTED AIRSPACE

## "Permissive" to Contested Overnight

### Russian S-400 "Triumph" missile defence system



### Pentagon: Iran has deployed the S-300 system

Pentagon's Defense Intelligence Agency says Iran has tested and deployed Russian-made anti-aircraft system.

Eliad Benari, 08/03/18 06:13

Aug 2018

## Recent Losses in "Permissive" Airspace

Yemeni forces target Jordanian F-16 fighter jet over Saudi Arabia: Report

Feb 2017

Home / Middle East / Yemen

Fri Feb 24, 2017 08:10PM

Yemen's Houthi rebels shoot down Saudi-led coalition Typhoon jet

Oct 2017

IANS | Sanaa

Last Updated at October 28, 2017 08:22 IST

### THE WARZONE

Houthi Rebels Release FLIR Video Showing Shoot Down of Saudi F-15S Over Yemen (Updated)

Militants repurposed an American made infrared sensor turret to track and shoot down a Saudi Arabian fighter jet.

Jan 2018

NEWS / SYRIA'S CIVIL WAR

Israeli F-16 jet shot down by Syria fire, says military

The Israeli military says one of its F-16 planes was shot down during their Syria operation targeting 'Iranian sites'.

10 Feb 2018



Feb 2018

PRESSTV News Iran US UK Videos Programs Docs

Russian Su-25 aircraft shot down in Syria, pilot killed: Defense ministry

Feb 2018

### THE WARZONE

Aircraft Attacked Over Yemen With R-27 Air-to-Air Missile Modified Into A SAM

Mar 2018

**No Environment is 'Permissive' or 'Low Threat' or 'Safe'**





# OPERATING ENVIRONMENT



***Drives 5th Gen Capability & Capacity as the Minimum Entry to Theater***



# F-35 OVERVIEW

## STEALTH

F-35 possesses unmatched ability to evade detection by radar, infrared sensors or emission interception.

## ADVANCED SENSOR SUITE

AESA radar, Distributed Aperture System, EOTS and Helmet Mounted Display System make up the most robust sensor suite of any fighter aircraft.

## ELECTRONIC ATTACK

Advanced EW capabilities to locate/track enemy forces, jam radars and disrupt attacks. An F-35 can get physically closer to a target vs 4th Gen thus increasing the relative jammer power exponentially.

## SUPERSONIC SPEED

At Mach 1.6, the F-35 is a supersonic fighter— with a full complement of weapons loaded.

## SENSOR FUSION

F-35's advanced sensor fusion creates a single integrated picture of the battlefield that greatly enhances awareness, survivability and lethality.

## MISSION FLEXIBILITY

Missions performed by specialized aircraft — air-to-air combat, air-to-surface strikes, close air support, electronic attack, ISR— can now all be executed by the F-35.

## WEAPONS CAPACITY

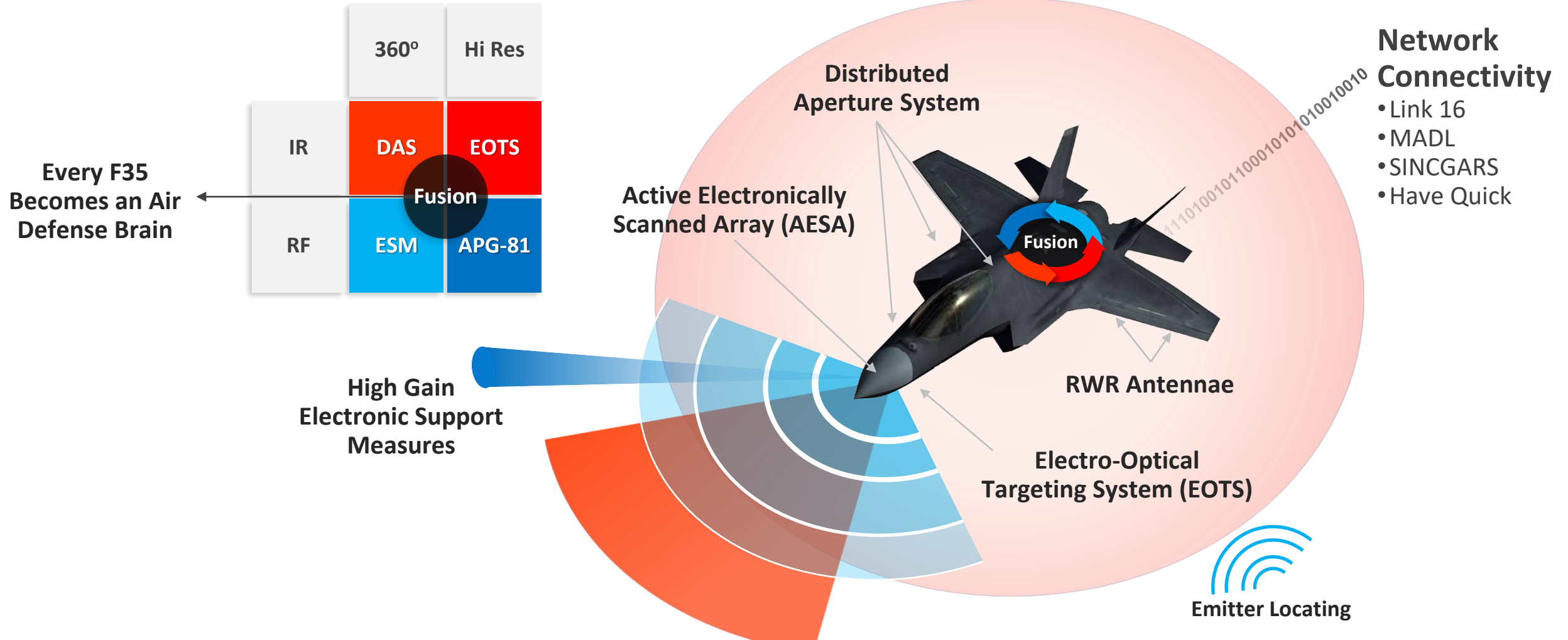
The F-35 carries weapons internally in stealth configuration, or externally in permissible environments.

## NETWORK ENABLED OPS

The F-35 will serve as a communications gateway for numerous other platforms, sharing its operational picture with ground, sea and air assets.



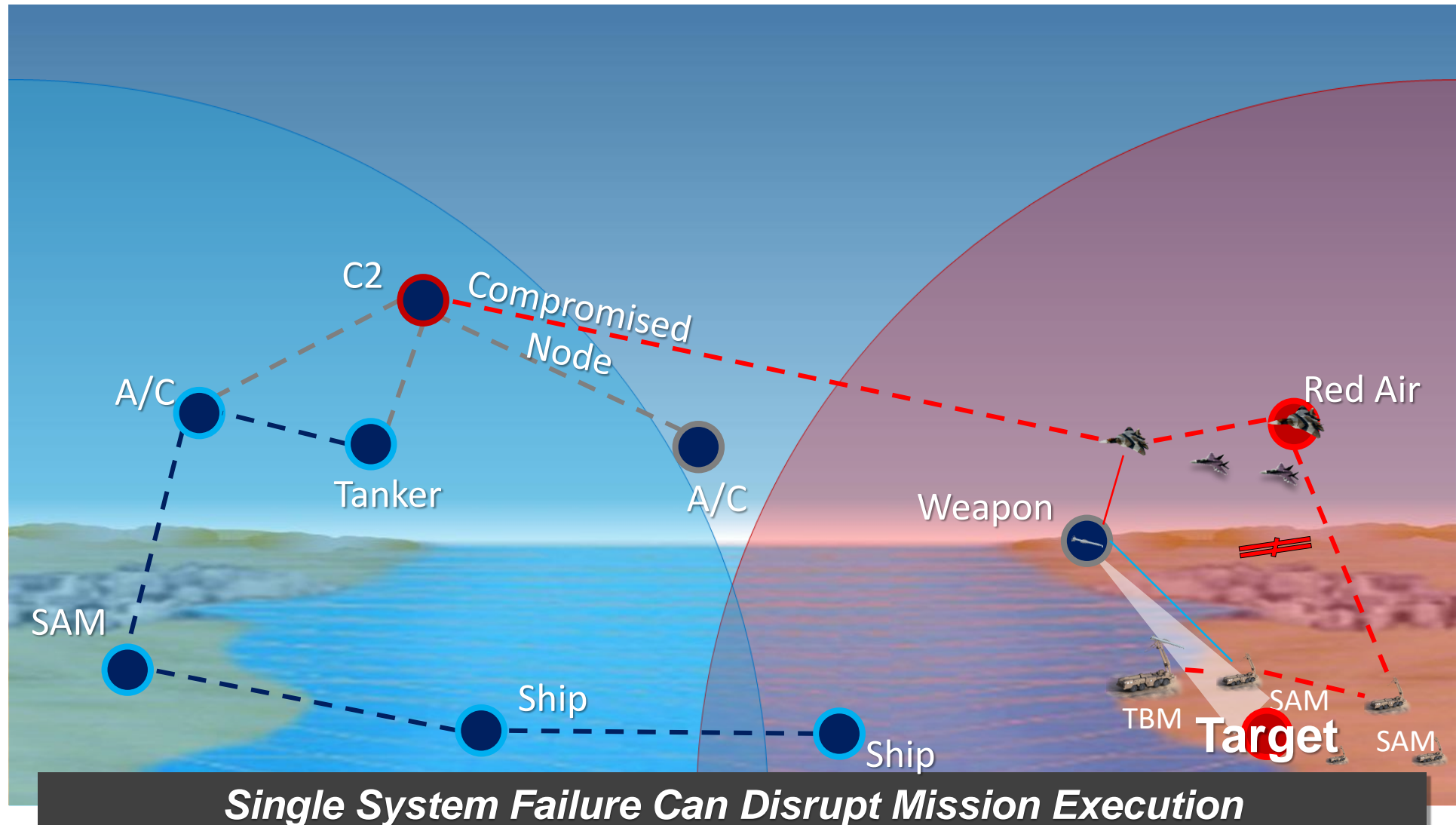
# F-35 MISSION SYSTEMS



**Multi-Spectral Closed Loop Fusion Provides Unprecedented Situational Awareness**

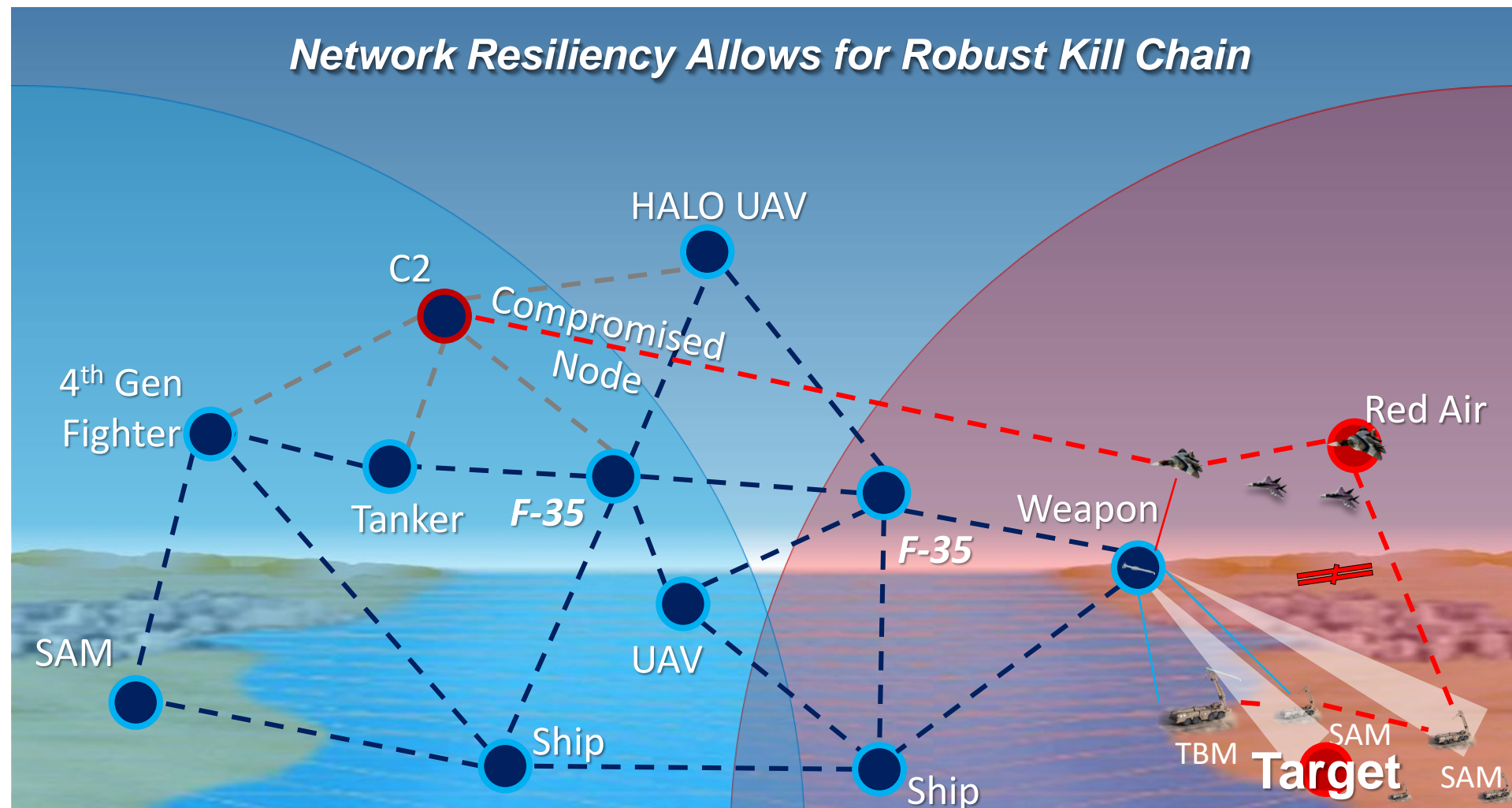


# NET CENTRIC WARFARE – LEGACY





# NET CENTRIC WARFARE – FUTURE



**Only F-35 Can Organically Operate Where Needed and Provide the Right Networked Capability to Enable Robust MDO**





# INTEGRATED FIRE CONTROL-COUNTER AIR

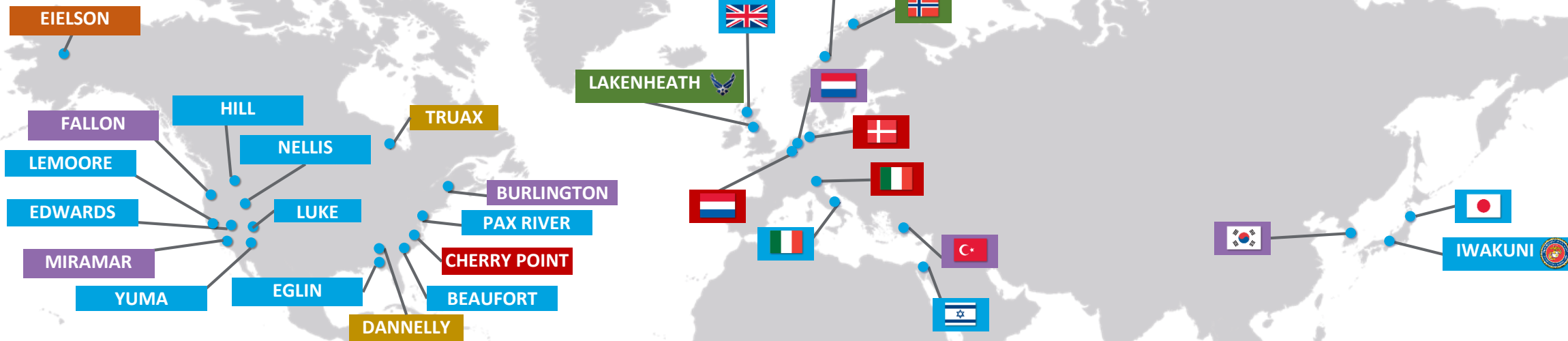


## White Sands Missile Range Live Fire Demo – Sept 12, 2016

*An unmodified U.S. Marine Corps F-35B from the Marine Operational Test and Evaluation Squadron 1 acted as an elevated sensor and detected an over-the-horizon threat. The F-35B sent data through the aircraft's Multi-Function Advanced Data Link (MADL) to a ground station connected to the Aegis Weapon System on the USS Desert Ship (LLS-1), a land-based ship. The target was subsequently engaged and intercepted by a Standard Missile 6.*



# F-35 WORLDWIDE



Today: 455+ F-35s, 20 Bases & 2 Ships  
 2023: 1,087 F-35s, 32 Bases & 11 Ships

Year	AC	Bases	Ships
Activated	336	16	2
2019	468	24	4
2020	616	24	8
2021	768	27	9
2022	921	30	11
2023	1087	32	11

USS ESSEX	USS America	HMS Queen Elizabeth	USS Bonhomme Richard
USS WASP	USS Makin Island	USS Carl Vinson	USS Boxer
		ITS Cavour	USS Abe Lincoln
			USS G Washington



# LOT 12-14 ANNOUNCEMENT – 28 OCTOBER 2019

**<\$80M**  
F-35A by ~~2020~~  
**2019**

**12.8%**  
Price Reduction  
from Lot 11-14

**5<sup>th</sup> Gen  
Capability**  
@Less Than  
4th Gen Cost

## Unit Costs

### Lot 12

F-35A  
Price  
**\$82.4M**

F-35B  
Price  
**\$108.0M**

F-35C  
Price  
**\$103.1M**

### Lot 13

F-35A  
Price  
**\$79.2M**

F-35B  
Price  
**\$104.8M**

F-35C  
Price  
**\$98.1M**

### Lot 14

F-35A  
**\$77.9M**  
Price reduction  
**12.8%**  
From Lot 11

F-35B  
**\$101.3M**  
Price reduction  
**12.3%**  
From Lot 11

F-35C  
**\$94.4M**  
Price reduction  
**13.2%**  
From Lot 11

## Quantities by Variant *Includes lot quantities 12-14*

**A 351**

**B 86**

**C 41**

## Quantities by Operator *Includes lot quantities 12-14*



# SUMMARY

The Future of Net-Centric Warfare Focuses on the “Three Rs”

- *Resiliency*
- *Redundancy*
- *Rapid Information Sharing*

5<sup>th</sup> Gen Capability is the Minimum Entry to the Future Battlespace

F-35 Organically Improves Both Situational Awareness and Networked Interoperability within Multi-Domain System-of-Systems

Leverage F-35 Economy of Scale and Relevancy into the Future

***Operate in the Right Place at the Right Time with the Right Organic and Networked Capability to Enable Robust Multi-Domain Operations***







# QUESTIONS



