

# ***Headquarters U.S. Air Force***

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*Integrity - Service - Excellence*

## ***The Future Fight: Technology in the Battlespace***



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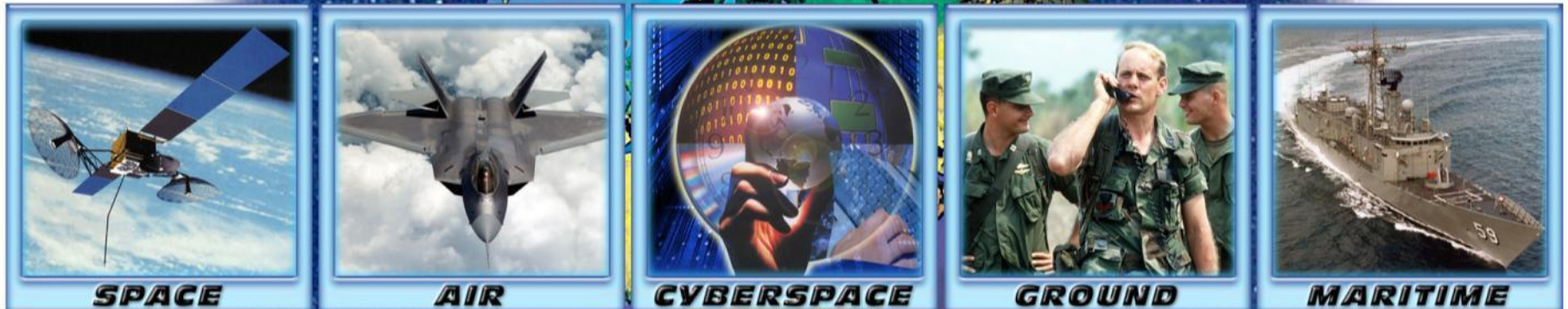
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**Lt Gen Dave Deptula  
Deputy Chief of Staff, Intelligence,  
Surveillance and Reconnaissance**



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# ***Domains & Environments***



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# *What's at Risk*

**Air, Space &  
Cyberspace  
Superiority**

**Nuclear  
Deterrence**

**Global  
Precision  
Attack**



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# What's at Risk

Global  
Integrated ISR



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# *What's at Risk*

**Rapid Global  
Mobility**



**Agile Combat  
Support**



**Special  
Operations**



**Personnel  
Recovery**

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# What's at Risk

Command  
&  
Control



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# Threats to Air and Space Operations

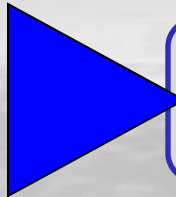
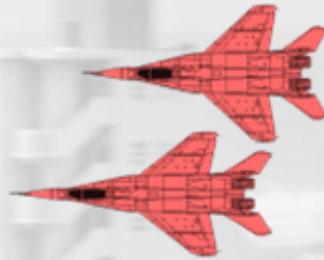


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# Legacy Threats



**Avoid**      **Engage**      **Engage**      **Destroy**  
**Detection**   **Fighters**   **SAMS**      **Target**







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# Emerging Threats

Expanded Challenges

Exploiting Technology

Learning from US Ops

Information Operations

Mission Phases

Plan Mission

Mission Prep

Avoid Detection

Engage Fighters

Engage SAMS

Destroy Target

Engage DS

Destroy Target



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# Ongoing Challenges: Exploiting Technology



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# Emerging Threats

Expanded Challenges

Exploiting Technology

**Learning from US Ops**

Information Operations

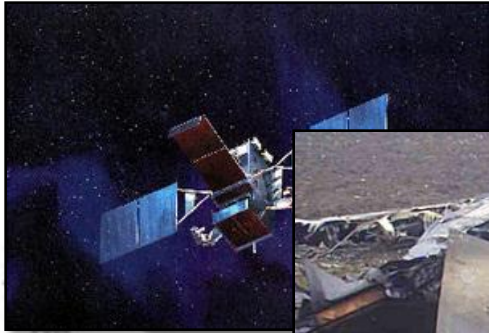


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# Ongoing Challenges: Learning from US Operations



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# Emerging Threats

Expanded Challenges

Exploiting Technology

Learning from US Ops

Information Operations



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# Adversary Information Operations

## Adversary Information Operations:

- Media savvy adversary ...
- Camera as the Weapon ...
- Creating the visuals to reinforce an orchestrated desired effect ...

## Able to “oscillate” reality:

- Information to shape our operations
- Deny us use of ways & means ...
- Secure, assure, & reinforce the population without presence ...





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# Ongoing Challenges: Plan Mission

Expanded Challenges

Exploiting Technology

Learning from US Ops

Information Operations

Mission Phases

**Plan Mission**

Mission Prep

Launch

Transit

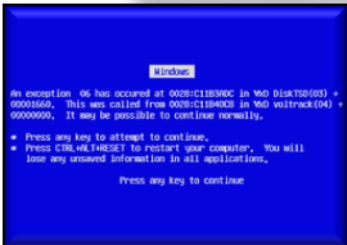
Avoid Detection

Engage Fighters

Engage IADs

Destroy Target

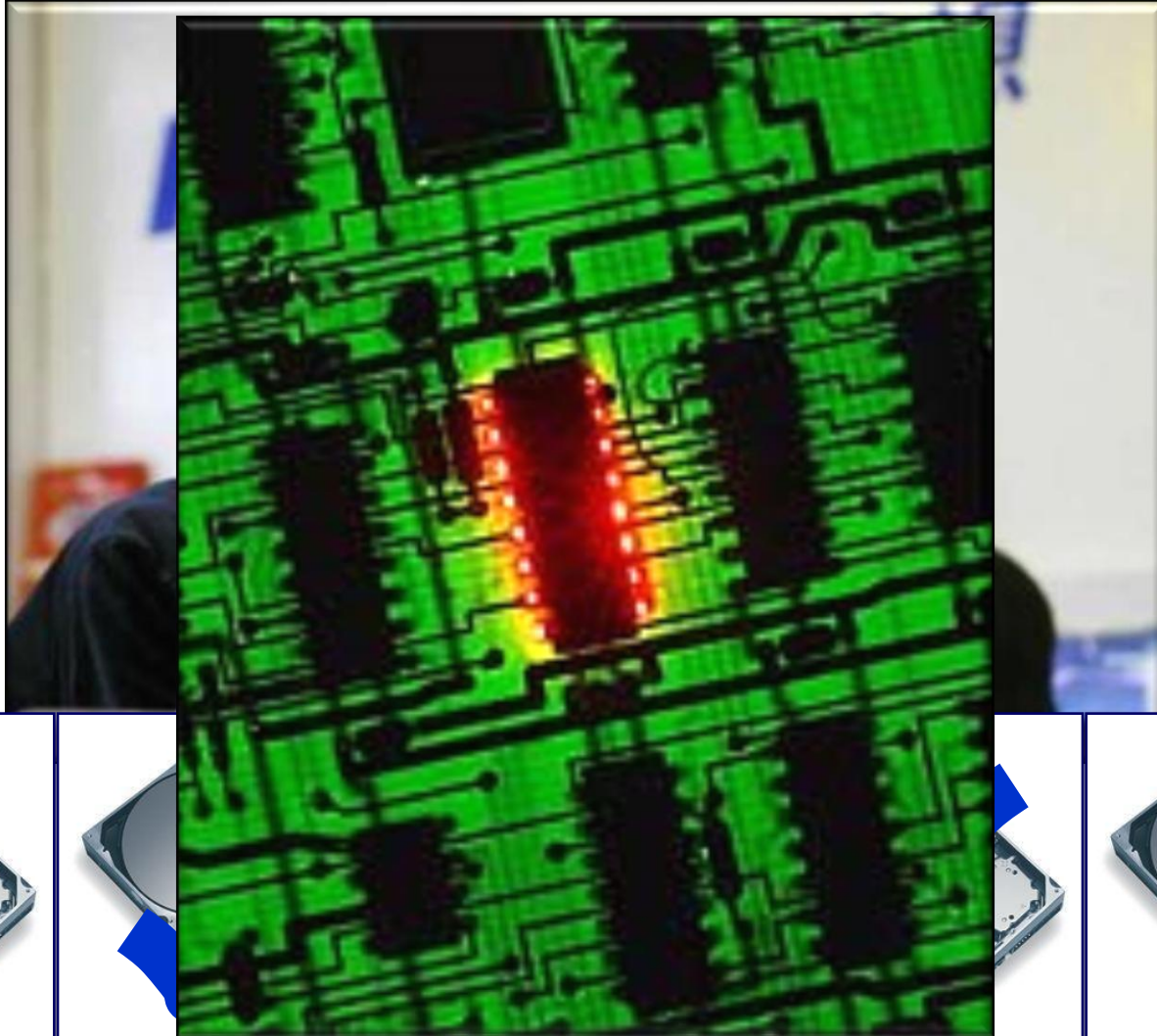
**Cyber Warfare**





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# Ongoing Challenges: Cyber Supply Chain



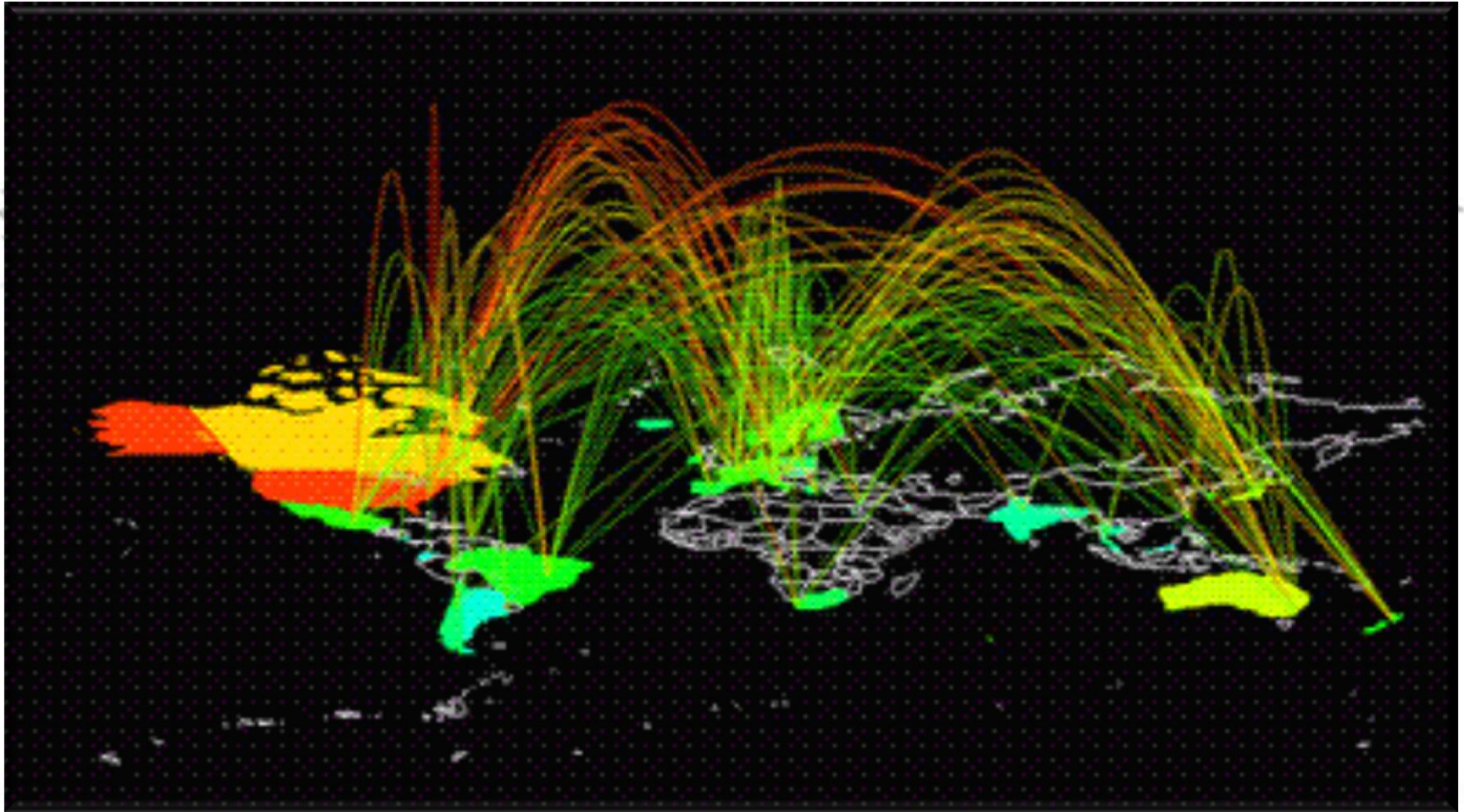
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# Ongoing Challenges: Cyber Warfare



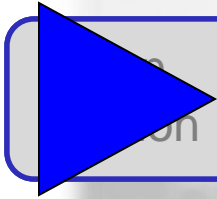
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# Ongoing Challenges: Mission Prep

Foreign ISR



**Mission  
Prep**

Launch

Transit

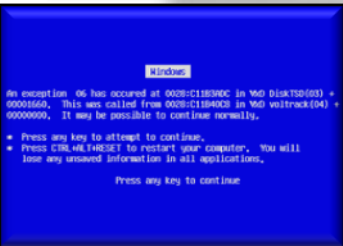
Avoid  
Detection

Engage  
Fighters

Engage  
IADS

Destroy  
Target

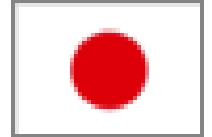
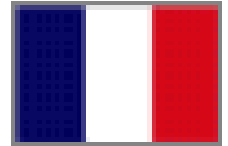
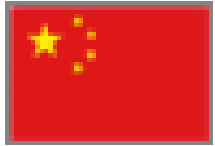
Cyber  
Warfare





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# Ongoing Challenges: Foreign ISR



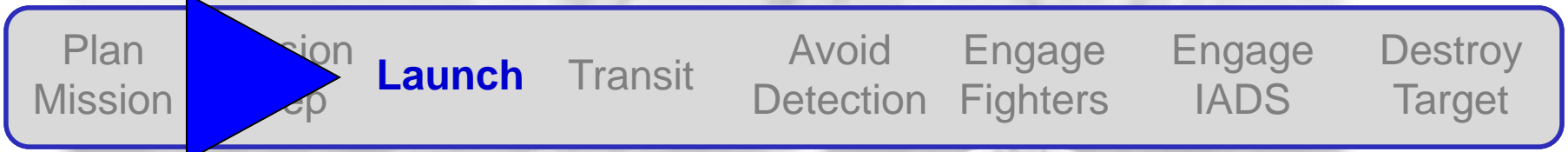
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# Ongoing Challenges: Launch

Foreign ISR



Cyber Warfare

Attack Basing





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# Ongoing Challenges: Ground Threat



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# Ongoing Challenges: Air Attack



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# Ongoing Challenges: Surface-to-Surface Missiles

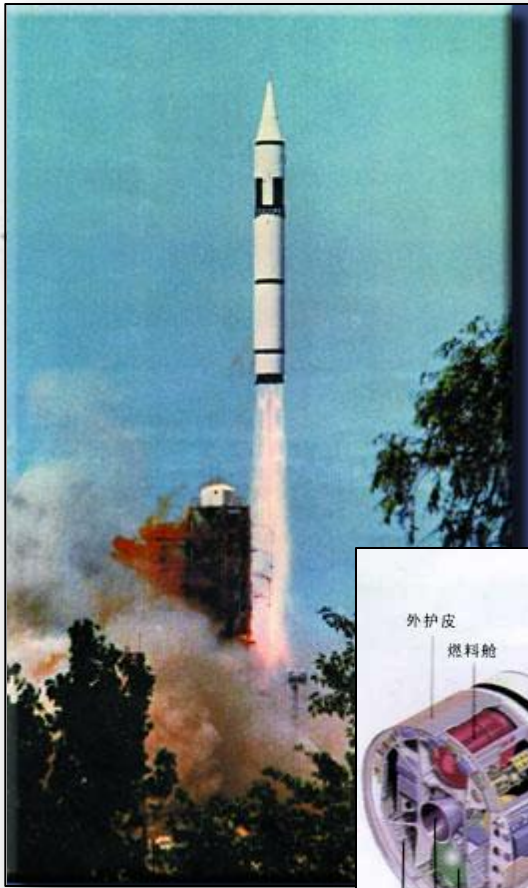


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# Ongoing Challenges: Surface-to-Surface Missiles

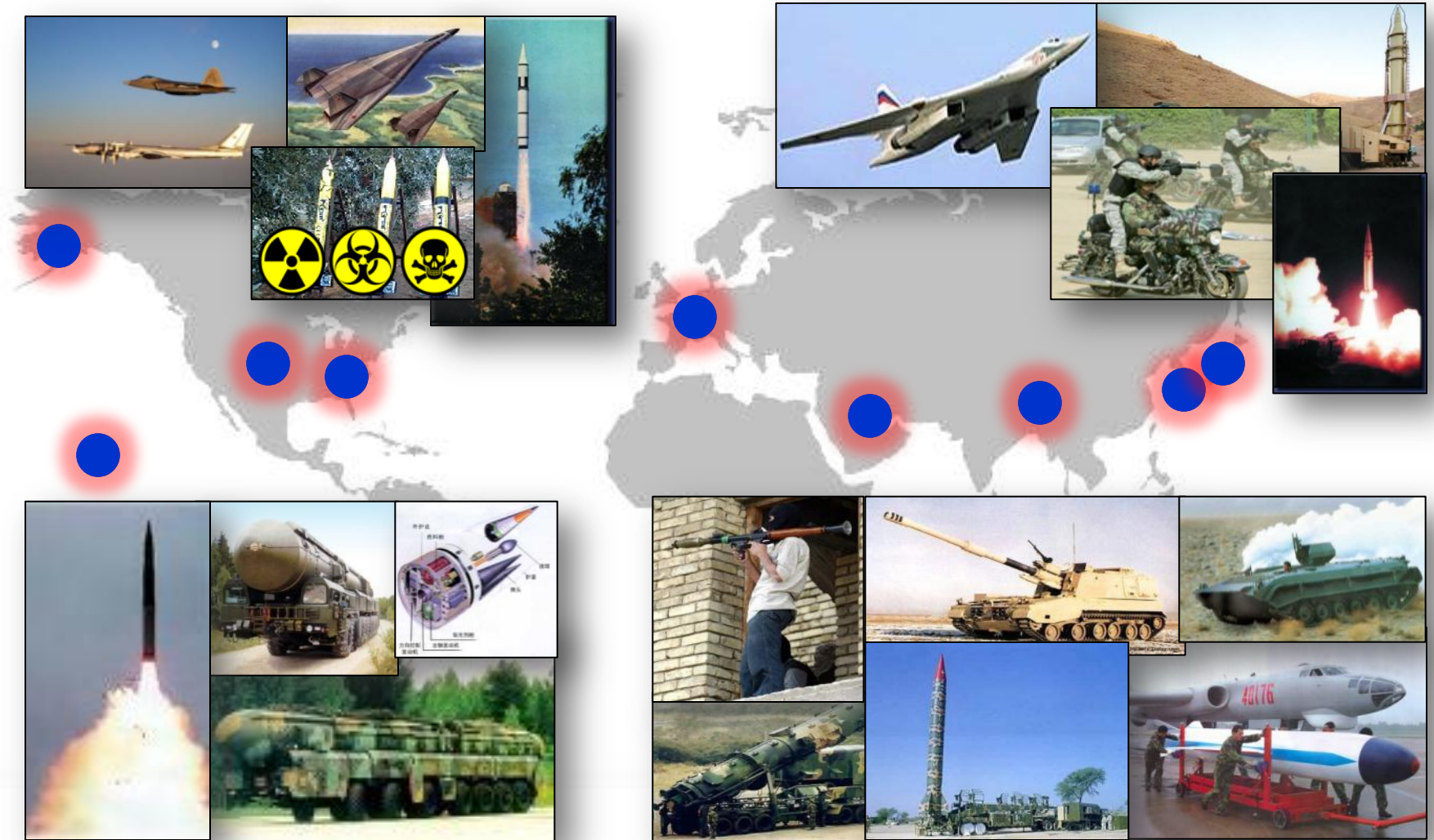






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# Ongoing Challenges: Threats to Ground Domain



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# Ongoing Challenges: Transit

Foreign ISR

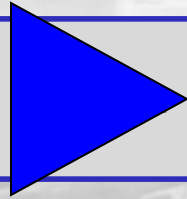


Attack Space Assets



Plan Mission

Prep Asset



**Transit**

Avoid Detection

Engage Fighters

Engage IADS

Destroy Target

Cyber Warfare

Attack Basing





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# Ongoing Challenges: Attack Space Assets



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# Ongoing Challenges: Attack Space Assets



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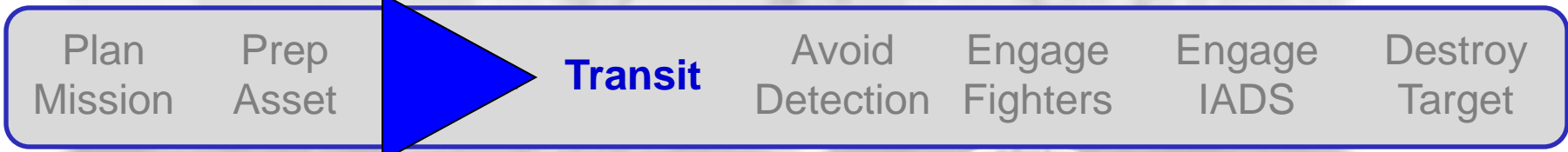
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# Ongoing Challenges: Transit

Foreign ISR



Attack Space Assets



Cyber Warfare



Attack Basing



Deny Combat Support





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# Ongoing Challenges: Deny Combat Support



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# Ongoing Challenges: Avoid Detection

Foreign ISR



Attack Space Assets



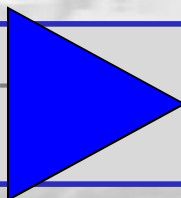
Advanced Sensors



Plan Mission

Prep Asset

Launch



**Avoid Detection**

Engage Fighters

Engage IADS

Destroy Target

Cyber Warfare

Attack Basing

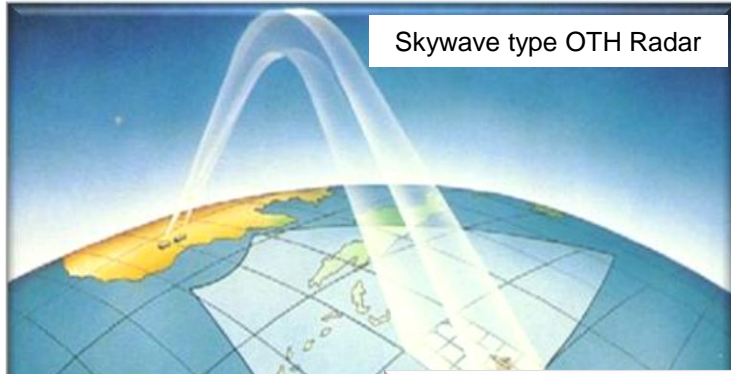
Deny Combat Support



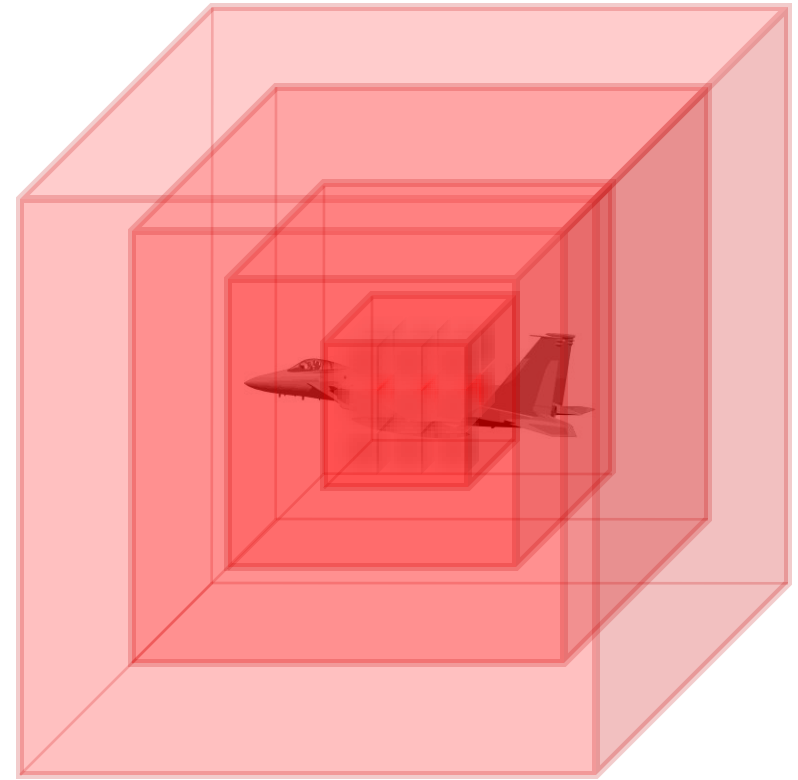


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# Ongoing Challenges: Advanced Sensors



Skywave type OTH Radar



PRC PCL Prototype



Zhuk-AE

NEBO-SVU



***Sensor Cueing Speeds Detection... And Engagement***

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# Ongoing Challenges: Engage Enemy Fighters

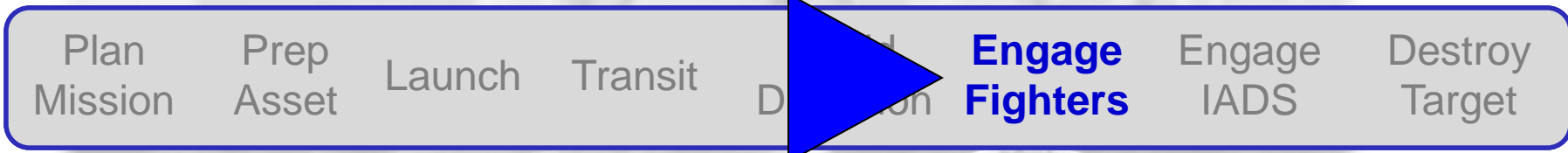
Foreign ISR



Attack Space Assets



Advanced Sensors



Cyber Warfare



Attack Basing



Deny Combat Support



Air-To-Air Threat





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# Ongoing Challenges: Enemy Fighters



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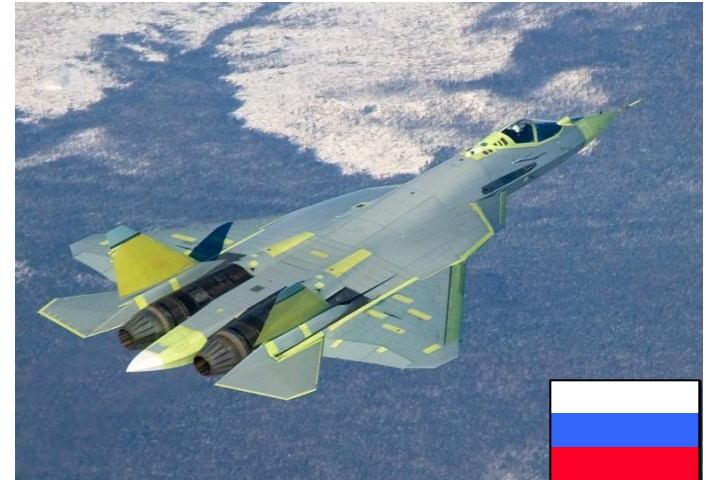


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# Adversary 5th Generation Fighters

## *Russian PAK-FA*

- Jointly developed by Russia and India  
—work begun on first prototype
- Most advanced foreign fighter in the world



## *Chinese XXJ*

- F-22-like configuration, capabilities
- Developing radar technology with goal of F-35/F-22-like capability

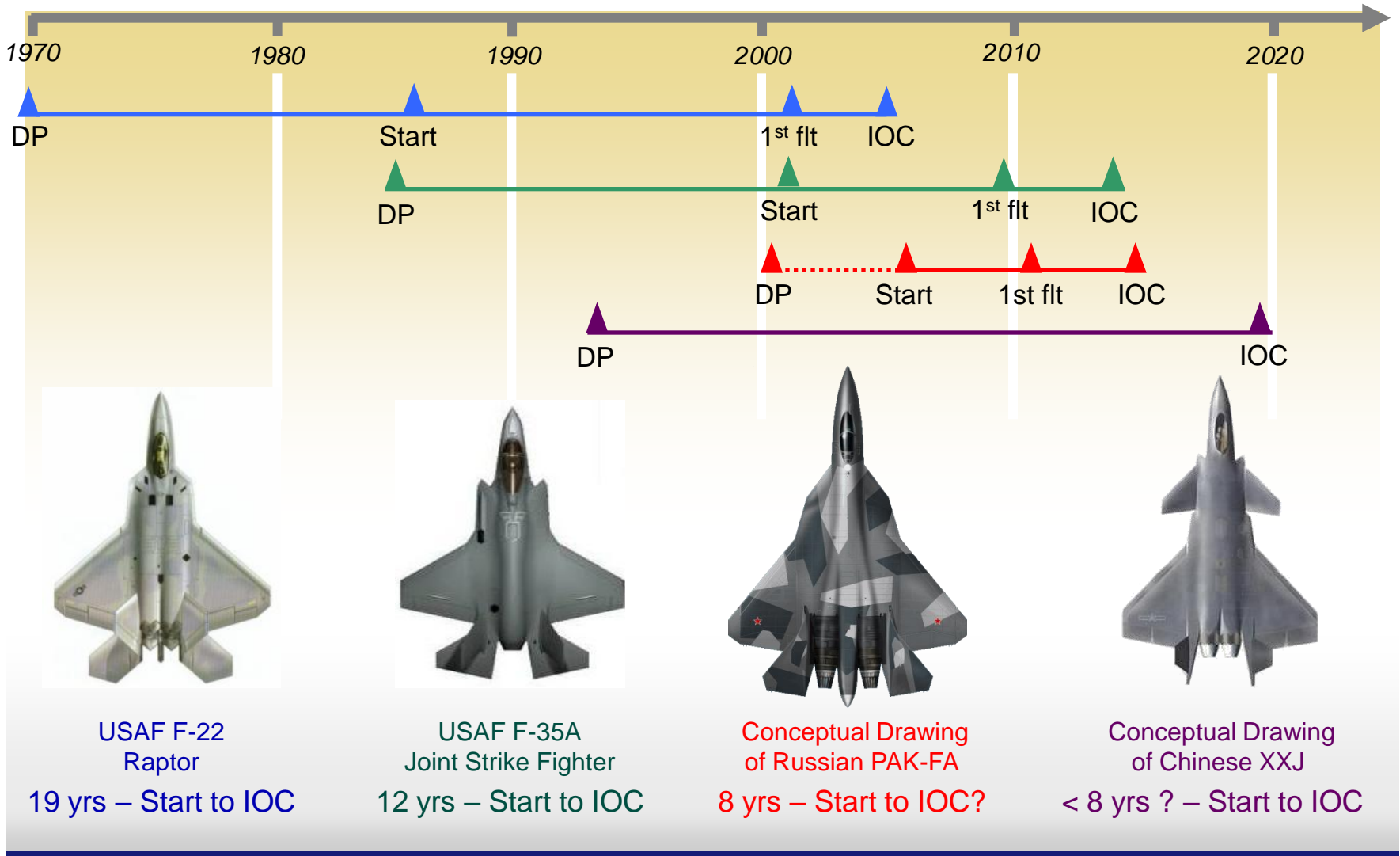


*Aspiring to F-22 Performance While Proliferating to F-35 Quantities*



# Fighter Comparison

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USAF F-22  
Raptor  
19 yrs – Start to IOC

USAF F-35A  
Joint Strike Fighter  
12 yrs – Start to IOC

Conceptual Drawing  
of Russian PAK-FA  
8 yrs – Start to IOC?

Conceptual Drawing  
of Chinese XXJ  
< 8 yrs ? – Start to IOC



# How They Match Up

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	F-15	Su-35	F-35	F-22	PAK-FA	XXJ*
Reduced RCS		✓				
Stealth			✓	✓	✓	✓
Internal Weapons Bay			✓	✓	✓	✓
Supercruise		✓		✓	✓	✓
Supermaneuverability		✓		✓	✓	✓
AESA Radar	✓		✓	✓	✓	✓
Adv Electronic Attack		✓	✓	✓	✓	✓
Sensor Fusion	✓	✓	✓	✓	✓	✓
Ultra-Long Range AAM		✓			✓	✓
In Service	1974	2010	2013	2005	2015	2020

\*Assessed

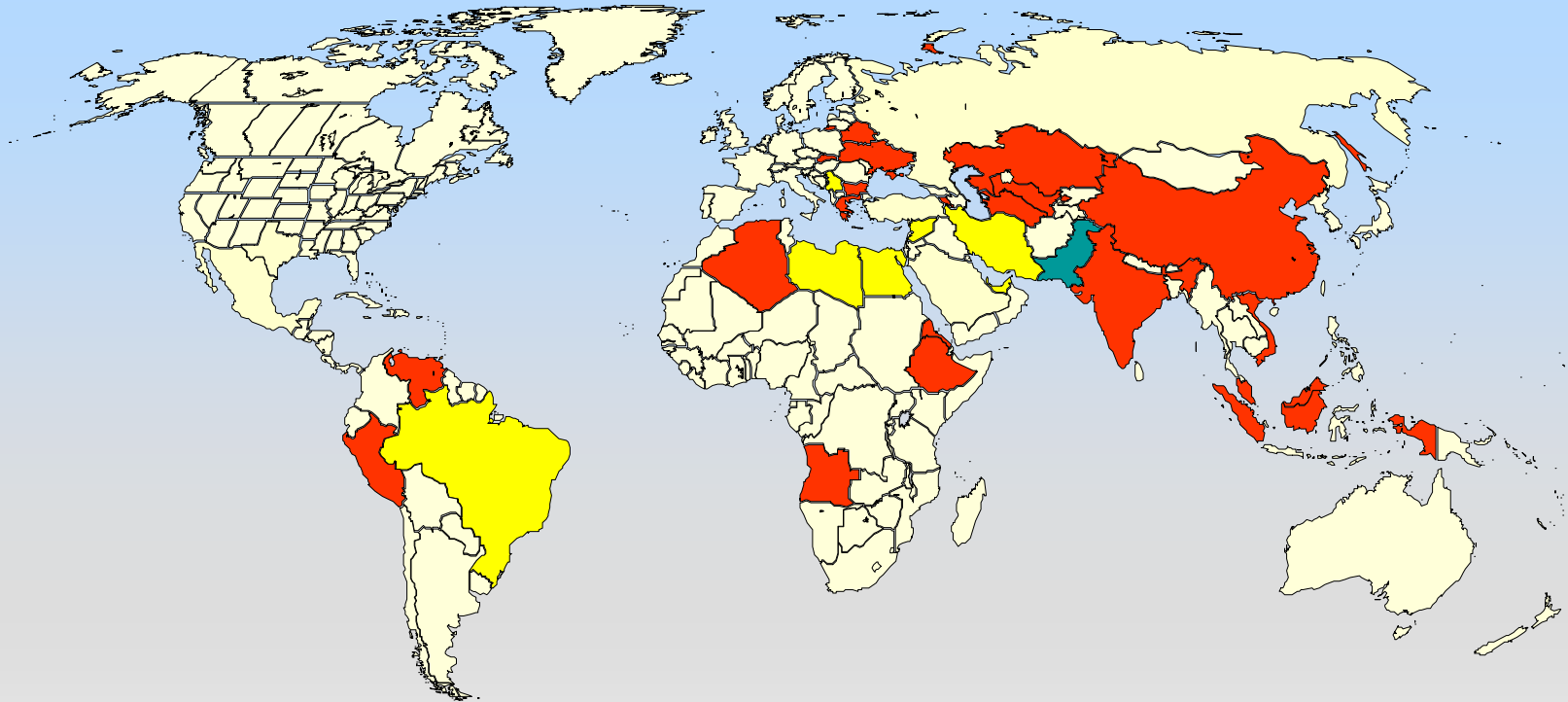
*Russia and China Developing Fighters Aimed at Challenging F-22 Dominance*

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# Expanded Challenges: Proliferation – Fighters



Country	Aircraft
Russia	Su-30/FLANKER MiG-29/FULCRUM
China	F-10 & FJ-17

- Russian aircraft sold or awaiting delivery
- Chinese aircraft sold or awaiting delivery
- RS/CH aircraft sales talks ongoing



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# Ongoing Challenges: Engage Enemy IADS

Foreign ISR



Attack Space Assets



Advanced Sensors



Ground-Based Threat



Cyber Warfare



Attack Basing



Deny Combat Support



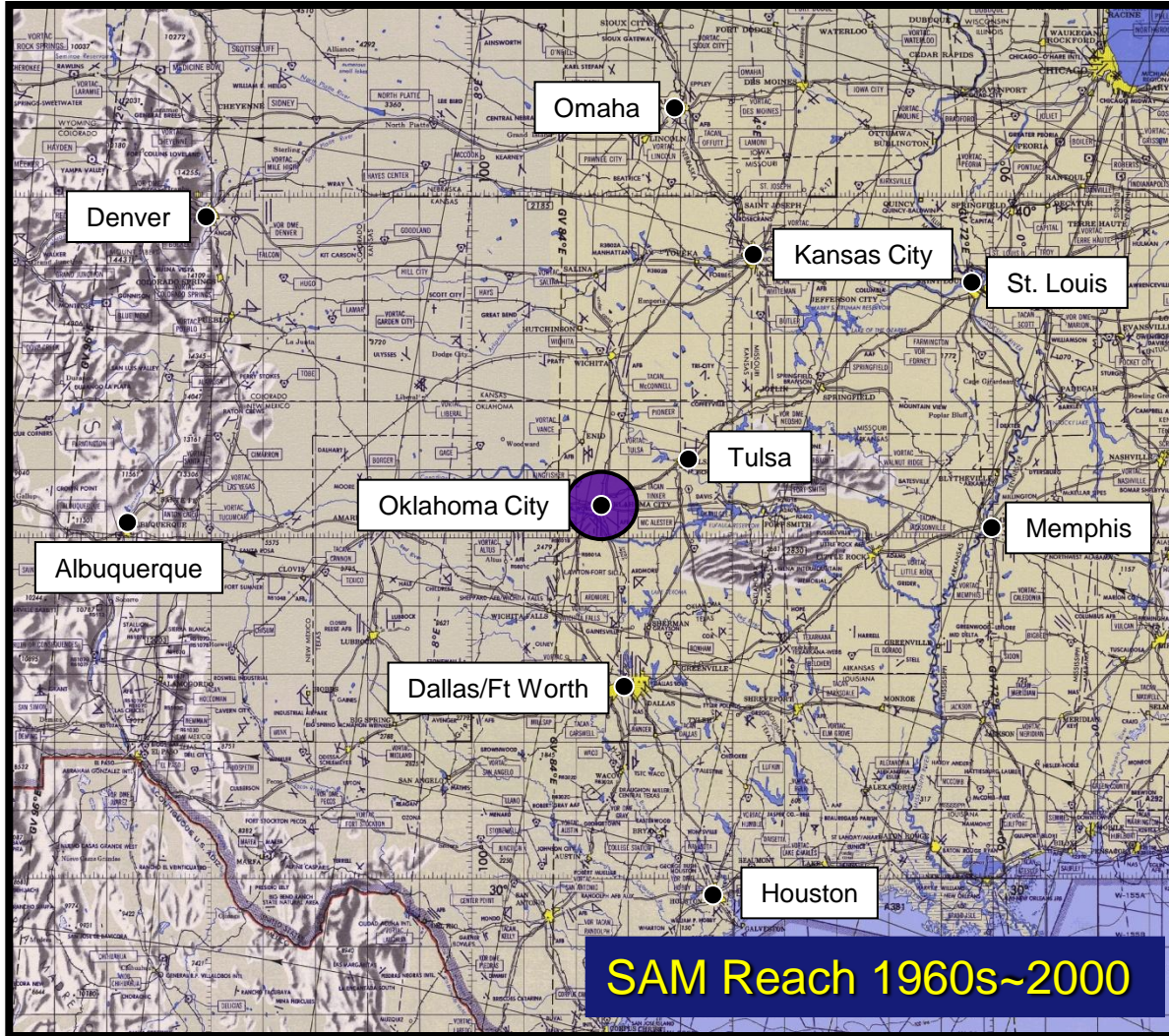
Air-To-Air Threat





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# Expanded Challenges: Engage Enemy IADS

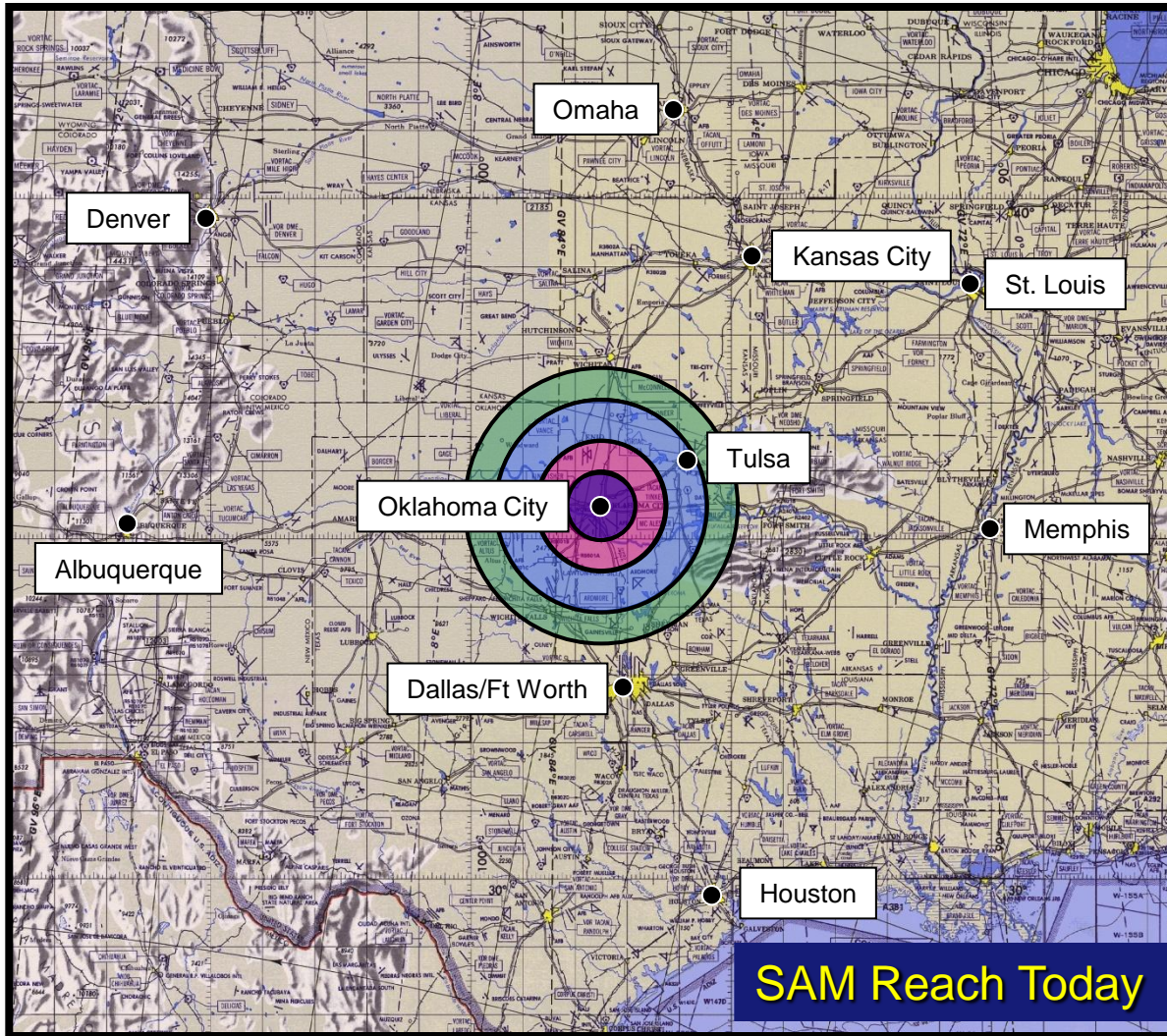






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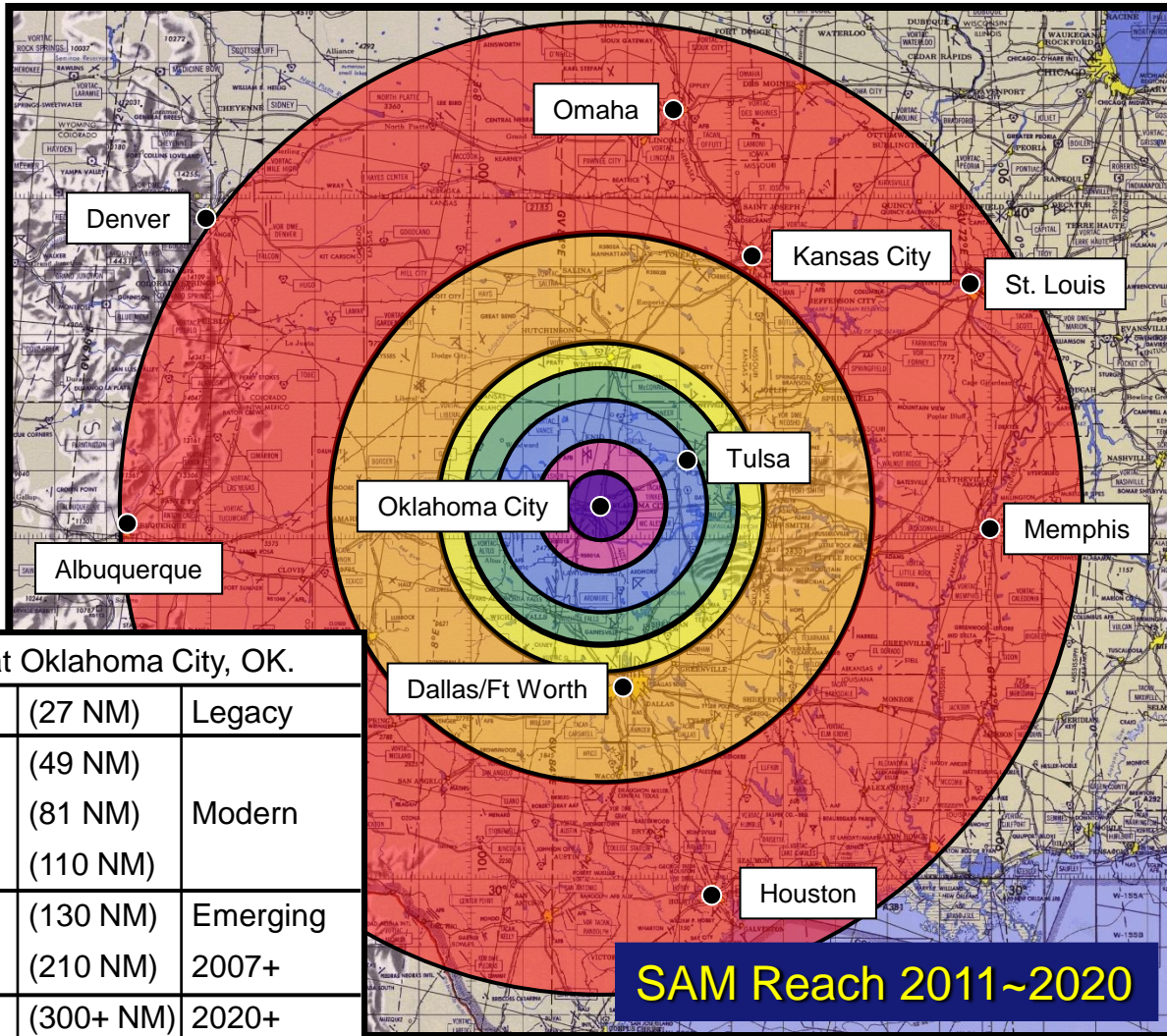
# Expanded Challenges: Engage Enemy IADS





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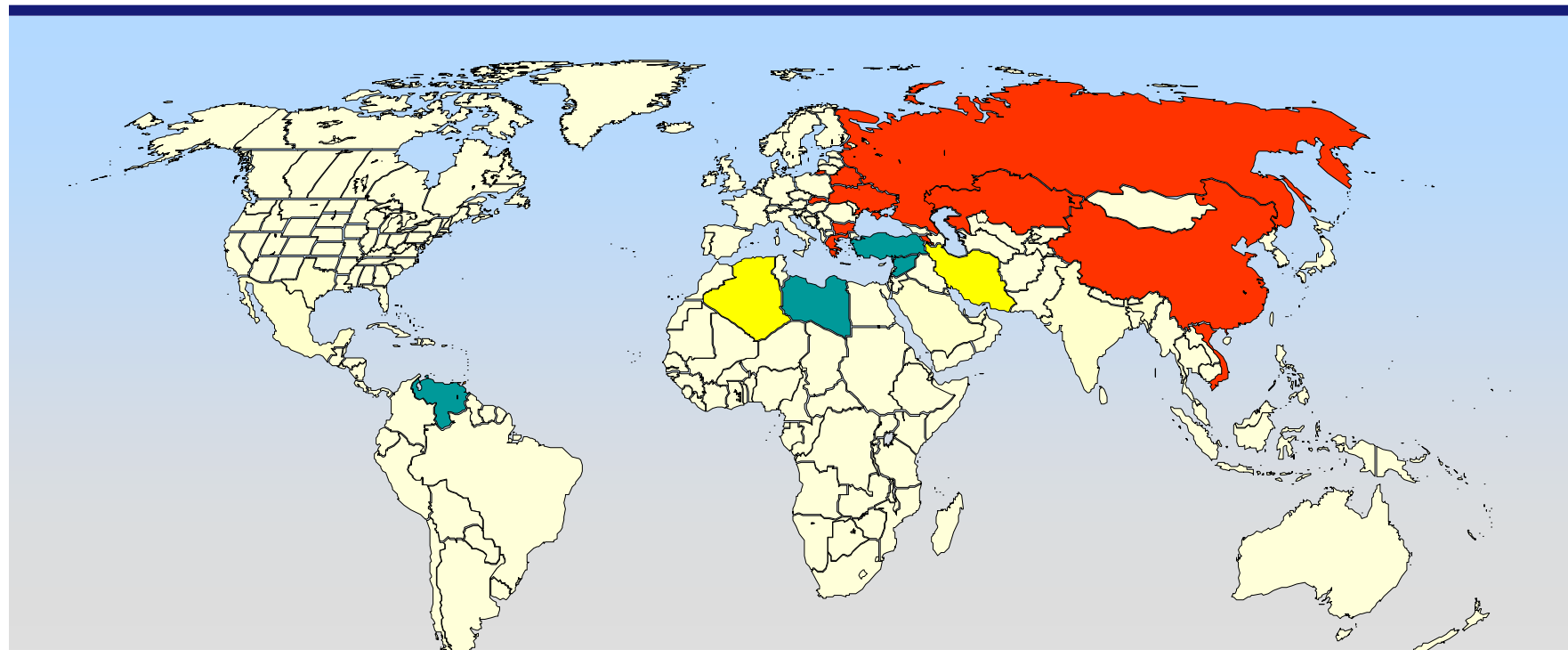
# Expanded Challenges: Engage Enemy IADS





# Advanced SAM Proliferation

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## *Deployed Advanced SAMs*

SA-10	Russia, Armenia, Belarus, Bulgaria, China, Kazakhstan, Slovakia, Ukraine
SA-20	Russia, China, Greece, Vietnam
SA-21	Russia
SA-12	Russia, Belarus, Ukraine
HQ-9	China

	<i>Deployed Advanced SAM Capability</i>
	<i>Contract Signed, Awaiting Delivery</i>
	<i>Interest in Advanced SAM</i>



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# Conflict Challenges: Destroy Target

Foreign ISR



Attack Space Assets



Advanced Sensors



Ground-Based Threat



Plan Mission

Prep Asset

Launch

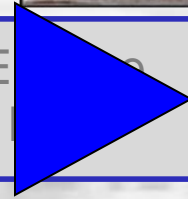
Transit

Avoid Detection

Engage Fighters

E

Destroy Target



Cyber Warfare



Attack Basing



Deny Combat Support



Air-To-Air Threat



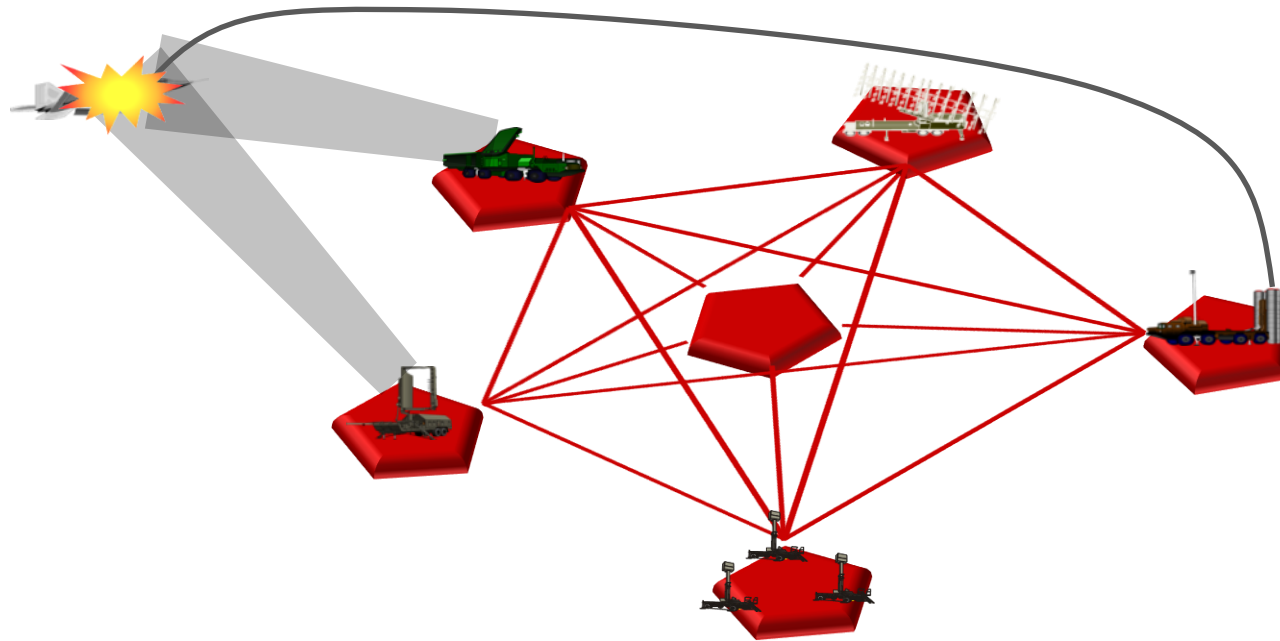
Target





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# Conflict Challenges: Target - C4 Trends



**What One Can See, All Can See**

**What Any Can See, Any Can Shoot**

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# Emerging Threats

Foreign ISR



Attack Space Assets



Advanced Sensors



Ground-Based Threat



Plan Mission

Prep Asset

Launch

Transit

Avoid Detection

Engage Fighters

Engage GBAD

Destroy Target

Cyber Warfare



Attack Basing



Deny Combat Support



Air-To-Air Threat



Target



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# ***Conclusion***

**Threats to US Air Force capabilities are rapidly growing as a result of advanced technology and learning from US operational successes**

**...Will attack us in every domain, at every phase**



***... future threat environment will not be like that we have seen in the past...***

# ***Headquarters U.S. Air Force***

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## ***The Future Fight: Technology in the Battlespace***



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Deputy Chief of Staff, Intelligence,  
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