

# **Air Superiority**

# **2030 Flight Plan**

**Enterprise Capability Collaboration Team**



***May 2016***

# AIR SUPERIORITY



## BACKGROUND

The Chief of Staff of the Air Force chartered the Air Superiority 2030 (AS 2030) Enterprise Capability Collaboration Team (ECCT) to develop capability options to enable joint force Air Superiority in the highly contested environment of 2030 and beyond. CSAF-chartered ECCTs bring users and operators from all Air Force domains and core functions together with the requirements, acquisition, and Science & Technology (S&T) communities. These experts collaboratively examine, comprehend and quantify operational needs, including current and emerging capability gaps that span the Air Force enterprise. As part of the Air Force capability development process, ECCTs formulate and explore innovative multi-domain options for materiel and non-materiel solutions that may wholly or partially mitigate capability gaps or provide opportunities for greater effectiveness and efficiency. Optimizing investments requires a full and integrated understanding of Air Force capabilities and missions in order to ensure the Air Force fulfills joint warfighting requirements.

## AIR SUPERIORITY

Counterair operations are designed to gain control of the air and wrest such control away from an adversary. Air superiority is a condition on the spectrum of air control, which ranges from adversary air supremacy, to air parity, to friendly air supremacy. The air superiority condition is achieved when friendly operations are able to proceed without prohibitive interference from opposing forces.

In modern military operations, achieving this level of control of the air is a critical precondition for success. Air superiority provides freedom from attack, freedom to attack, freedom of action, freedom of access, and freedom of awareness. Importantly, it also precludes adversaries from exploiting similar advantages. As such, air superiority underwrites the full spectrum of joint military operations and provides an asymmetric advantage to friendly forces. A lack of air superiority significantly increases the risk of joint force mission failure as well as the cost to achieve victory both in terms of resources and loss of life.

In common discourse, air superiority is often envisioned as a theater-wide condition. In highly contested environments, such a conception may be unrealistic and unnecessary. Air superiority is only needed for the time and over the geographic area required to enable joint operations. The specific amount of time and space required varies significantly across scenarios, mission objectives, and phases of conflict. Accordingly, capability development for air superiority must provide options for commanders to array their forces across a range of durations and geographies.

# THE 2030 OPERATIONAL ENVIRONMENT

Emerging integrated and networked air-to-air, surface-to-air, space and cyberspace threats, as well as aging and shrinking fleets of US weapon systems, threaten the Air Force's ability to provide air superiority at the times and places required in the highly contested operational environments of 2030 and beyond.

Threat capabilities are likely to advance along two major vectors over the next 15 years. First, traditional threat systems will continue to evolve and proliferate. Along this threat vector are advanced fighter aircraft, sensors, and weapons. While near-peers have most of these capabilities today, advanced air and surface threats are spreading to other countries around the world. Air superiority forces will face growing numbers of these threats across a wide range of locations and scenarios in 2030.

The second threat vector is a series of comprehensive capabilities with a less predictable impact on warfare. These include increased threat capabilities to negate our advantages in the space domain, increased quantity and sophistication of cyberspace threats, and air threats including hypersonic weapons, low observable cruise missiles, and sophisticated conventional ballistic missile systems. How, when and where these capabilities emerge is less clear, but it is certain air superiority forces will face many of these threats by 2030.

The Air Force's projected force structure in 2030 is not capable of fighting and winning against this array of potential adversary capabilities. Developing and delivering air superiority for the highly contested environment in 2030 requires a multi-domain focus on capabilities and capacity. Importantly, the rapidly changing operational environment means the Air Force can no longer afford to develop weapon systems on the linear acquisition and development timelines using traditional approaches. Air superiority capability development requires adaptable, affordable and agile processes with increasing collaboration between science & technology (S&T), acquisition, requirements and industry professionals. Failure to adopt agile acquisition approaches is not an option. The traditional approach guarantees adversary cycles will outpace U.S. development, resulting in "late-to-need" delivery of critical warfighting capabilities and technologically superior adversary forces.



OPERATIONAL ENVIRONMENT

## PROCESS

The AS 2030 team began its efforts by characterizing the 2030 threat environment. Following problem definition, the ECCT examined friendly and adversary mission effects chains, reviewed capability gaps, conducted a comprehensive review of existing classified and unclassified analysis and reporting, and assessed promising technologies and other opportunities. This led to a concept collection phase with over 1,500 different concepts submitted and evaluated based on technical readiness level, gap mitigation, cost, and level of dependencies. Following concept collection, the ECCT entered the analysis phase. During this phase the team leveraged existing analytical products and conducted independent modeling, simulation, and wargaming. The team used detailed assessment criteria to ascertain effectiveness at the engagement, mission, and campaign levels, and assessed force structure level impacts. The ECCT's analysis phase culminated in the development of strategic level courses of action (COAs) for senior leader consideration. Analysis of the COAs led to a further distillation of recommendations.

## RESULTS

Adversaries are increasingly deploying integrated and networked capabilities as part of the Anti-Access/Area Denial (A2/AD) strategy in highly contested environments. To achieve air superiority against this strategy in support of joint force mission objectives, the Air Force needs to develop a family of capabilities that operate in and across the air, space and cyberspace domains—there is no single capability that provides a “silver bullet” solution. This family must include both stand-off and stand-in forces, integrated and networked to achieve mission effects.

The speed of capability development and fielding will be critical to retain the U.S. advantage in the air. As the pace of technological advancements continue to increase the Air Force must leverage experimentation and prototyping to more rapidly infuse advanced technologies into the force. Additionally, the Air Force must reject thinking focused on “next generation” platforms. Such focus often creates a desire to push technology limits within the confines of a formal program. Such efforts should be accomplished within the S&T portfolio and proven through effective prototyping, harvesting when mature to a sufficient level for transition. Pushing those limits in a formal program increases risk to unacceptable levels, resulting in cost growth and schedule slips. This put such programs at risk of cancellation due to their nearly inevitable underperformance, and results in delivery of capabilities “late to need” by years or even decades.

The AS 2030 Flight Plan--including the classified versions--integrates multiple



upcoming Analyses of Alternatives (AoAs) across the air superiority family of capabilities. Follow-on Development Planning will continue to refine and appropriately scope these capability development efforts. Additionally, Air Force Core Function Leads (CFLs) will develop and bring forward options for resourcing these capability development efforts through the Air Force's Strategic Planning and Programming Process to be included in the long range plan for eventual inclusion in the President's Budget. AS 2030 capability development will need to be balanced against other Air Force mission areas and operational environments.

There are five major Capability Development Areas directed in this Flight Plan. These include Basing and Logistics; Find, Fix, Track and Assess; Target and Engage; Command and Control; and Non-Materiel (Doctrine, Organization, Training, Materiel, Logistics, Personnel, Facilities, and Policy [DOTMLPF-P]). Each is discussed below in more detail.



## BASING AND LOGISTICS

The ability to deploy and operate forces in non-permissive environments is essential to air superiority. The Air Force must pursue appropriate capability development efforts in concert with the joint force in order to project, defend, and sustain forces that are able to generate the combat power needed to conduct operations in non-permissive environments. Adaptive basing, forward air base operations, untethered operations, full spectrum resilient networked logistics, collaborative logistics and shared resources, performance-optimized logistics teams, and other related concepts enable these capability development efforts. Additionally, basing and logistical considerations must be up front requirements for all capability developments in the AS 2030 Flight Plan. The Basing and Logistics Capability Area Development Plan includes the following items:

1. *Set the Theater.* Capability development for setting the theater will focus on providing commanders those key items needed to prepare for combat operations. Many of these capability development efforts will involve non-materiel contributions and leverage interagency cooperation.
2. *Mitigate Attack.* Capability development for mitigating attacks will include development of active and passive defensive capabilities against ballistic missiles, cruise missiles, and hypersonic weapons, and will leverage partnerships with other services, agencies, and allies.
3. *Recover and Reconstitute.* Capability development for recovery and reconstitution will focus on rapid recovery and regeneration of combat power following attacks.
4. *Support and Sustain.* Capability development for supporting and sustaining the force will focus on globally integrated agile logistics, including materiel options and new logistics tactics, techniques and procedures.
5. *Advanced Air Refueling.* Capability development for advanced air refueling will focus on enabling the operations of AS 2030's mix of stand-off and stand-in forces operating from range.



## Find, Fix, Track, and Assess

Gathering data from sources in all domains, rapidly analyzing data to extract operationally important information, and reliably distributing information on the timeline needed to enable critical decisions creates an asymmetric advantage. The Air Force must pursue capability development in several areas to achieve this advantage and gain information age dominance. Stand-off ranges imposed by area denial capabilities degrade the effectiveness of long-range sensors in the highly contested environment. To overcome these limitations, the Air Force must build an integrated network of air, space, and cyberspace-based sensors, as well as leverage joint contributions from all domains. This integrated network and architecture will enable more rapid and effective decisions from the tactical to the operational level. Key capability development efforts in this area include:

1. *Data-to-Decision Campaign of Experiments.* This experimentation campaign will examine how to fuse data from cloud-based sensor networks into decision quality information for use from the tactical to the operational levels. The campaign will include machine-to-machine options for turning data into information and knowledge, thus allowing humans to make the required decisions. Furthermore, it will examine options and opportunities for building the appropriate architectures necessary to integrate and network the AS 2030 family of capabilities and leverage big data analytics.
2. *ISR Collect and Persistent ISR.* Capability development efforts for ISR collection and persistent ISR capabilities will focus on multi-domain alternatives for placing the right sensor in the right place at the right time.
3. *Penetrating Counterair (PCA).* Capability development efforts for PCA will focus on maximizing tradeoffs between range, payload, survivability, lethality, affordability, and supportability. While PCA capability will certainly have a role in targeting and engaging, it also has a significant role as a node in the network, providing data from its penetrating sensors to enable employment using either stand-off or stand-in weapons. As part of this effort, the Air Force should proceed with a formal AoA in 2017 for a PCA capability. Consistent with an agile acquisition mindset designed to deliver the right capability on the required timeline, this AoA will include options to leverage rapid development and prototyping in order to keep ahead of the threat.
4. *Agile Communications.* Capability development for agile communications will examine options for increasing the resiliency and adaptability of integrated networks. The focus of this capability development will be on responsive, adaptable network architectures with functionality across multiple platforms, weapons, apertures, and waveforms operating in the highly contested environment.

# Target and Engage

The target and engage capability area development plan focuses on application of effects to generate joint force operational outcomes. A mix of capabilities to penetrate the highly contested environment as well as deliver effects from stand-off ranges offers a balanced approach to counter the A2/AD strategy. There are several key concepts for kinetic and non-kinetic capabilities in this area, including:

1. *Stand Off Arsenal Plane.* For this capability development, the Air Force will continue to partner with the Strategic Capabilities Office (SCO) on concepts utilizing long-range mission effects chains.
2. *PCA.* In addition to F2TA capabilities above, the penetrating capabilities of PCA will allow the stand-in application of kinetic and non-kinetic effects from the air domain.
3. *B-21.* Long-range strike against counterair targets is a critical part of gaining and maintaining air superiority. The penetrating capability of the B-21 will allow survivable and repeatable attack operations.
4. *Electronic Warfare.* This capability development effort will focus on providing the right mix of electronic warfare (electronic attack and electronic protection) capabilities in support of the AS 2030 stand-off and stand-in force structure.
5. *Weapons.* Capability development in this area should focus on leveraging opportunities to create tradespace between platforms, sensors, and weapons. Specific weapons development efforts will be paired with platform development efforts. Both long-range and high capacity weapons will enhance the overall effectiveness of the AS 2030 family of capabilities.
6. *Defeat Agile Intelligent Targets (DAIT) Campaign of Experiments.* The DAIT experimentation campaign will focus on the most challenging targets across multiple domains. Defeating such targets will require new, multi-domain technologies and concepts.



TARGET AND ENGAGE

## Command and Control

The increasing lethality and reach of adversary weapons will significantly increase the risk to large BMC2 platforms like AWACS in 2030. This will limit their ability to see and manage activities in the contested and highly contested environments. To overcome these shortfalls, the Air Force should develop concepts that disaggregate this capability using multiple sensor platforms, including teamed manned and unmanned systems, a robust battlespace information architecture, and dispersed command and control. Key efforts in this capability area are:

1. *Advanced Battle Management System (ABMS)*. As the Air Force moves forward with the ABMS AoA in 2018, it should include options for non-traditional concepts including networking planned and purpose-built sensors into architectures that enable BMC2 functions in the highly contested environment.
2. *Operational level Command and Control*. The focus of this capability development should be on providing new capabilities for the application of operational art across air, space, and cyberspace forces. Both materiel and non-materiel solutions should provide commanders in 2030 with the ability to synchronize forces across domains, with or without direct contact with those forces.



## Non-Materiel Capability Area Development Plan

Each of the capability developments discussed above include DOTMLPF-P actions to bring the capability to fruition. The following non-materiel efforts cut across capability development areas and will be essential for development of the AS 2030 force:

1. *New development and acquisition paradigms*. The Air Force must implement acquisition approaches that enable the maturation, demonstration, and integration of advanced technologies into weapon systems on timelines that match the tempo of key underlying technology development cycles. The Air Force must fund subsystem and component technologies outside of a program of record until technically mature and the challenges of integration are understood. This will allow future capability to be achieved in deliberate increments, speeding delivery to the warfighter. The Air Force should develop systems



# NON-MATERIEL

based on mature component technologies and integration concepts that enable modular upgrades. Future increments of capability should be introduced at regular intervals based on technology development cycles, utilizing recently matured component configurations.

2. *Cyber-based capabilities.* Development of cyber capabilities and Airmen who can operationally employ those capabilities is essential to air superiority in 2030 and beyond. The Air Force should develop cyber forces tailored for air component missions and priorities, including the protection of mission critical systems.
3. *Increased contributions from space-based assets.* The Air Force and the joint force will increasingly rely on advantages provided by on-orbit assets for air superiority. As such, ensuring survivable space assets is essential. Development of the Space Mission Force and implementation of the Space Enterprise Vision are key components of the AS 2030 family of capabilities.
4. *Invest in foundational infrastructure.* Creation of a robust modeling, simulation, and analysis (MS&A) infrastructure that enables accurate evaluation of multi-domain capabilities across all classification levels is critical for force development. The Air Force must invest in MS&A to enable rapid assessment of advanced technologies and concepts developed by government, industry, and academia in consistent operational environments. MS&A infrastructure must support basic research, wargaming, development planning, experimentation campaigns, and operational/strategic analysis.
5. *Continue to pursue "game-changing" technologies.* Directed energy, hypersonic weapons, and autonomy are potential game-changing technologies for air superiority. The Air Force roadmaps for these and similar technologies should include targeted decision points to assess the maturity and readiness to on-ramp these technologies into a variety of systems.
6. *Low Cost Systems.* The focus of this capability development area is to continue development of manufacturing technologies that enable the affordable and rapid fielding of larger quantities of capability. While several concepts utilizing mass show promise, all are predicated on bending the cost curve first. The Air Force should therefore focus low cost efforts on the development of key technological enablers prior to attempting to instantiate any particular capability. This includes development of low cost and additive manufacturing techniques, automated manufacturing, modular component development, streamlined certification, and autonomous operations. Follow-on prototyping and experimentation efforts will demonstrate the maturity of technology concepts and operational employment.

# CONCLUSION



## CONCLUSION

Gaining and maintaining air superiority to enable joint force operations in 2030 and beyond requires a new approach. This approach requires strategic agility through experimentation, prototyping, and agile acquisition strategies. If successful, this strategic agility will provide future commanders with options through fielding of the integrated and networked family of capabilities in the AS 2030 force structure. Stand-off and stand-in forces will work together to provide effects at the desired time and place, enabling the Air Force to fulfill its fundamental responsibility to provide air superiority in 2030 and beyond in support of joint force objectives.



