



Blue Horizons 13: Control, Deny, Project: An Air Force Vision for Global Strategy in 2035

Quick Read Report 14-1

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INTRODUCTION

The Air Force Chief of Staff Norton A. Schwartz tasked the Center for Strategy and Technology (CSAT) to assess two alternate futures from the Air Force Strategic Environmental Assessment as the guiding focus for our 2013 Blue Horizons study. CSAT was asked to identify the unique requirements or capabilities to deal with these potential futures, explore technologies and concepts of operations that would improve Air Force readiness to respond, and assess the degree of risk incurred if these challenges were not met.

Conducted during the Fall and Spring of academic year 2013, this study was done by 16 Air War College and 12 Air Command and Staff College researchers, principally from operational backgrounds. The conclusions of this report were synthesized by the students and faculty at the end of the course.

Consideration of the rapid technological change and presumed financial constraints for a decade or more within the U.S., the researcher's review led to the recognition that **a new global military strategy is required to successfully pursue U.S. National Security interests in 2035.**

THE WORLD OF 2035

Chartered by the Air Force Chief of Staff, the Blue Horizons study provides HAF/A8 with the longest forward look into the implications of geo-strategic and technological change of any Air Force study. Conducted as a full-year elective at Air War College and Air Command and Staff College, it draws on experts from academia, NNSA Laboratories, FFRDCs, NASIC, OSD, DARPA, AFRL, defense industries and think tanks to understand the interaction of strategy and technology 25 years into the future

- The **United States no longer enjoys unquestioned global military dominance.**
 - o The United States is no longer the world's dominant economy. This is not due to failures in the U.S. but the rise of economic capabilities among the rest;
 - o the U.S. technological advantage is shrinking due to rapid proliferation of scientific knowledge and technology;
 - o social security has displaced national security as the principal interest of the body politic;
 - o debt servicing as a portion of the U.S. budget limits resources necessary to sustain technological and numerical overmatch;
 - o pursuit of fewer technological solutions limits strategic choices and carries greater risk.
- The **strategic environment is characterized by continuous competition and conflict** not by periods of peace and war, particularly in cyberspace. Though these occur at varying levels of intensity over time, they occur 24/7/365 across non-military, quasi-military and military means.

- **There is a power projection paradox:**
 - o Regional power projection becomes easier and cheaper for others as long range projection becomes more difficult and expensive for the United States.
 - o The proliferation of precision and ISR capabilities mean that A2AD capabilities are cheaper than the offensive means to overcome them.
- Across all futures, **accelerating technological change will continue.**
 - o The proliferation of precision will bring fixed infrastructure of all kinds under constant threat;
 - o rapid improvement in sensing capabilities will make finding as important to deterrence as striking;
 - o defensive capabilities become more important, and cause a move, counter move competition.
- Due to advanced extraction techniques, **access to the sources of energy supplies are moving west**, decreasing dependence on the Middle East. **Simultaneously financial strength is moving east to Asia.**
- **The Arctic will become more important** as this region is estimated to contain 16% of global oil reserves and 30% of the natural gas reserves.

Given this strategic environment, in 2035 the **U.S. will have advantages, opportunities and liabilities we do not now possess.**

Advantages:

- U.S. military capabilities and our **geo-strategic location** mean we

- can maintain parity with other peer/near peer competitors.
- o An extended “hemispheric defense” into the Pacific and South Atlantic gives it the advantage of **interior lines** through the Western Hemisphere.
 - o The Western Hemisphere will be relatively **resource and energy independent.**
 - o U.S. is geographically positioned to **control access to the Arctic** lines of communication and energy resources.

Opportunities:

- **Investing in creating and sustaining a power projection capability in the Indian Ocean.** This capability creates a balancing space outside the U.S. area of core interests but in a region vitally important to other rising powers for both resources and transit.
- The routine opening of the Arctic polar sea routes for transit and energy production provides an opportunity for the U.S. **to partner with Canada to control entrance and transit of the Arctic.**

Liabilities:

- **U.S. alliances in East Asia** risk US military engagement with China as it seeks to resolve territorial and other disputes with its neighbors in the East China and South China seas.
- The **decline of NATO** places an increasing proportional burden on the U.S. to maintain European collective defense and the global security commons.
- **Instability in West Africa** will draw increased attention from the U.S. and our allies as it becomes even more important as a source of oil and natural gas.

The failure to change U.S. security strategy in response to the identified realities of the 2035 security environment will leave the U.S. more vulnerable to cost imposition by others who have interior lines, significant A2AD capabilities, and a desire to weaken or prevent US military presence. The circumstances of economic, military and technological overmatch no longer prevail. This means:

- **Success will be defined not by winning and losing but by achieving an equilibrium of mutual denial** in certain regions. Achieving a condition of effective deterrence and/or military parity, not overmatch, can be a sustainable condition of mutual advantage in war avoidance.
- **Rapid innovation provides the advantages** necessary to shape and exploit the security environment.
- **Air, space and cyber power from range are uniquely suited capabilities to contend successfully in this environment.**

The U.S. will have to engage in a more nuanced strategy. We should maintain our strategic leverage and comparative advantage wherever and whenever possible. However, we will have to apply a differential set of strategies to do so in order to preserve our essential goals in different regions.

ELEMENTS OF GLOBAL MILITARY STRATEGY FOR 2035

A strategy of **Control, Deny and Project** offers the U.S. a way to lock-in enduring strategic advantages while avoiding the costs others seek to impose. The general requirements of Control, Deny, Project are briefly

summarized below and shown schematically on the attached map (Appendix 1).

- **Extend lines of control to encompass core areas of our geo-strategic interests.** Control means the ability to achieve dominance in a region. This area extends from Perth to Guam, across the Pacific and Arctic, encompasses the Americas, and extends to Europe and West Africa. This region includes the bulk of the U.S.'s major trading partners, alliances, resource areas, and cultural affinities.
- **Establish a zone of mutual denial** at the western edge of this zone of control. By drawing potential adversaries to the edges of their interior lines, the U.S. need not maintain a force required to establish and hold positions of dominance, or absolute superiority. Instead, strategic stability can be achieved through equilibrium of power and influence. Doing so in the area of East Asia and Western Pacific maintains U.S. presence, demonstrates support for allies, and denies control to adversaries.
- At the eastern edge of the zone of control, the **U.S. needs to be ready and willing to project power.** Most significantly, because of its unique importance in global trade, is the capability to project power into the Indian Ocean and the areas that border it; including East Africa, southern Africa, and the Arabian Peninsula. Projection is not permanent presence, but a routine demonstration of the ability to exercise power of all kinds—land, sea and air within the region—if necessary.

In all areas, U.S. capabilities should be supplemented by carefully crafted technology transfer and weapons sales to allies and the preplanned use of air base/port pairs, exercised logistics capabilities, and access to land and maritime chokepoints.

A strategy based on these elements—Control, Deny, Project—provides geo-strategic positional advantage for the U.S., avoids cost imposition by adversaries, and provides options to shape global military competition.

Implementing this strategy will mean reassessing the traditional basing construct in order to protect alliances, trade, and transit. Such a tiered strategy is essentially a defensive military strategy, which maximizes U.S. strengths and minimizes our weaknesses.

In pursuing this strategy, and leveraging these advantages, **U.S. National Security Strategy remains largely unchanged.** We still seek to sustain the global system of norms and regulations; to preserve U.S. interests and global influence; assure key U.S. allies and partners; and deter others from military coercion and aggression. **The differences lie with the National Military Strategy of where and how the U.S. chooses to plan, present, and operate our military forces.**

ELEMENTS OF AN AIR FORCE 2035 STRATEGY

A new era of air ascendancy is required to implement Control, Deny Project. Though joint and combined operations are likely in all future combat operations, and an integrated strategy and procurement policy a requirement of national security, **the projection of power quickly, at range is the central Air Force capability as**

the primary custodian of the third dimension.

Reconsideration of the current Air Force vision for the future is necessary. Positioning to support Control, Deny, Project does not seriously challenge Vision, Reach and Power as an Air Force construct. Rather it seeks to apply these capabilities in different ways, in different places, and for different effects. This is not radically different from previous changes in USAF core emphasis. The USAF has adapted repeatedly throughout our history to adapt to new operating and security environments. (See the chart in Appendix 2).

Supporting a national security strategy of **Control, Deny, and Project** requires the USAF to:

- **renew our capacity for long range power projection**, returning to missions we once performed routinely (long range coastal defense and maritime patrol).
- **move from an emphasis on stealth and precision** supported by continuous overhead ISR to **embrace employment of sensors and weapons from long range.** (See the attached chart at Appendix 3).

These changes will enable the Air Force to train, organize and equip in the right ways for an amended set of roles and missions in the environment of 2035.

Shared Global Transparency from Space

Continued advances in cyberspace, space, vastly improved sensing of all kinds, the increased speed of computer data collection, storage, processing, and dissemination of information will create **more accurate real time information,**

greatly increasing global transparency.

Imagine a world in which the U.S., as we do with GPS, shares a capability for global transparency from space, making it a public good. Governments (mapping, environmental monitoring, human migration), private business of all kinds (real time shipping visibility, weather and traffic monitoring, construction progress), various international non-governmental groups (Arctic Council, International Red Cross, International Maritime Organization), even individuals, would all become rapidly addicted to the benefits such capability would bring.

- A **network of global dependencies** would serve to enhance U.S. interests and promote collective security from space.
- This capability is already under development as a commercial venture, proving it is technically possible to offer global transparency cheaply.
- The first Skybox satellite of a 24 ball constellation was launched last year and will provide a 3 minute stare gap at critical points globally. A possible Iridium follow-on of 66 balls could provide continuous stare at additional-points globally, thus establishing a global “neighborhood watch” from space.

These or similar commercial ventures to provide this capability, if successful, would provide prolific sensors to backup high-end U.S. capabilities and make accomplishing a “space Pearl Harbor” attack much more difficult. The USAF has an opportunity to support these developments in much the same way we assured Iridium’s development

of global satellite telephone capabilities in the 1990s.

- **Shared reliance on global transparency as a public good creates GPS like effects that shape international security.** This would ultimately result in a sort of planetary “**collective security from space**” by advancing U.S. national security strategy objective for transparency in support of human rights, security, and free trade.
- The existence of private, shared, survivable IMINT back-up, with high post-process resolution, would transform global information flows, commerce and security. The system’s survivability would be likely insured due to its global importance to states, non-state actors, and individuals everywhere.

Cyber Deterrence

Networked cyber operations are the industrial web of the 21st century.

They are a requirement for both state and non-state actors. A military targeting strategy holding critical portions of these networks at risk would have high deterrent value vis-a-vis other international actors. Such a strategy is reminiscent of the Cold War Single Integrated Operations Plan (SIOP) for nuclear deterrence developed to hold the industrial webs of our adversaries at risk, thus deterring threats to U.S. national survival and interests.

The U. S. should develop a Cyber SIOP for deterrence if possible, a warfighting capability if necessary.

In an age of cyber competition and conflict, risks against U.S. infrastructure and economic systems could be so severe, that a similar approach may be required for an era of increasing

cyber threats and the significant, rapid effects they are capable of producing.

The SIOP consisted of a set of capabilities that included preplanned responses to be executed during the time limitations of a nuclear conflict; a strategic effects methodology more political than military; an organizational construct with an assured execution focus; an updated plan prepared to execute 24/7/365; all with the purpose of generating increased risk for adversaries and creating leverage for political effect in a crisis. Targeting critical nodes and capabilities—fiber optic junctions, critical server farms, uplink and downlink stations, etc.—would hold critical capabilities at risk.

The USAF should advocate for a more strategic use of cyber in furthering the nation's interests and lead in the development of a more robust cyber deterrent strategy by:

- expanding the definition of cyber (bringing intelligence, ISR, offensive, and defensive capabilities together).
- placing cyber weapons into a political context (as nuclear weapons are today).
- integrating cyber more completely into national security strategy.

Cyber deterrence may become the equivalent of nuclear deterrence in the Cold War. 1) It cannot be physically demonstrated but promises potentially horrific consequences should it be used; 2) has the capability to damage or destroy a nation's economy, military capability and/or infrastructure; 3) is a capability acquired for deterrent purpose in the hopes that it will not be used; 4) poses global consequences beyond the major

antagonists who might use it (Internet blowback could be the equivalent of "nuclear winter").

Basing the Future Long Range Air Force to Support Control, Deny, Project

The essence of airpower and the chief responsibility of the Air Force is to project power from a distance.

We have done so with both aircraft and missiles for over 50 years; we have now added cyber and space capabilities as well. To project power, air assets have relied on a network of forward bases for strike, refueling and logistical support.

By 2035, proliferation of precision weapons and the acquisition of longer range aircraft and missile systems by potential adversaries, **forward bases will no longer be the secure sanctuaries they have been in the past.** Thus, sensors, weapons, and communications must be employed from greater range than today. This implies increased requirements for long range sensors and penetrating weapons and suggests **larger, multi-use platforms from which to employ a new kind of air superiority.**

In the future, air superiority as an absolute condition against a peer or near-peer in a robust A2AD environment may no longer be possible. The relative decline in stealth capability, the number of missiles a near-peer possesses and their range and precision make contested environments much more difficult and costly to penetrate. **Episodic air superiority—at a specific time and place, for a specified duration—will remain a requirement in many circumstances.**

Emerging technologies in long range manned and unmanned systems; the

development of hypersonic flight; more capable UASs; increasingly remote, robotic, cheap, swift and small sensors and munitions used in swarms; and a merger of joint capabilities (sub-sea, surface, space and cyber) may achieve limited wide-area persistence without forward bases.

Supporting a diverse set of long range capabilities required for Control, Deny, Project, the USAF will require a global tanker basing plan. **Operating from locations outside adversary A2AD range**, the USAF would employ multi-role aircraft for refueling, transport, to serve as sensor platforms, and deliver munitions.

Larger aircraft capable of launching swarms of sensors; using electronic warfare capabilities, deploying decoys and projecting power from a distance in a stand-off mode may be as necessary as tankers and penetrating platforms for future air campaigns.

Doctrine and CONOPS for Denial

A strategy of denial could be the most cost-effective counter to an A2AD strategy. A denial strategy would:

- **empower allies to resist adversary power projection** through investment point defenses against missiles and advanced fighters and;
- **focus on targeting specific assets critical to adversary power projection** such as the production and transportation of kerosene fuels.

Denial works by **shaping an adversary's deterrence calculus** by increasing his costs and the risk of failure. It may not require controlling territory. To be effective, denial must impose significant costs on an

adversary and increase the uncertainty in an adversary's defense planning (question his doctrine and capabilities). The increased uncertainty and risk of failure changes the deterrent calculation, preventing military operations.

Employing air, space and cyber power from range delivers denial effects by checking the adversary. The risks for all parties in a crisis are reduced by a **strategy of equilibrium through denial**. This circumstance is an acceptable, if not a preferred, condition of stalemate and stability.

Allied Air Forces in A2AD Environments

It is American allies in the Western Pacific who are threatened and most at risk from growing Chinese military capabilities and territorial desires. Alliances are two way streets. Just as the U.S. is obligated to come to the aid of allies in East Asia, **they are obligated to contribute to their own defense** and to carry out effective joint and combined operations with the U.S. should the need arise.

This circumstance is analogous to the situation in NATO where the U. S. has supplied the majority of certain critical assets and engaged in arms sales, technology transfer and joint operations and training in order to bolster defense of the region. Doing so effectively however, means **a reliance on allies in the region to invest in their own defensive capabilities**.

Allied air forces should contribute to establishing their own effective A2AD capabilities and counter A2AD capabilities to prevent Chinese territorial advances. Doing so gives allies "skin in the game" and a means of

self-protection enabled by high-end networked capabilities.

Allied A2AD capabilities can be supported and guided by technological transfer and through the sale of sensors, and weapons systems from the U.S. Strategic technology transfers will **create shared systems, ensuring combined operations capability** and encourage allied investment in their own defense capabilities.

Having a number of **cheaper, dispersible systems integrated into an overall Allied network** and capable of engaging a variety of targets from disparate locations imposes costs on an adversary's defense, threatens a variety of high-valued targets (both counter force and counter value), and provides strategic complexity.

Being able to operate platforms from highways or short fields or the sea; use connected, **interoperable communications and sensor information via gateways** between different cyber architectures; and using brilliant munitions would all enhance allied defensive capabilities and combined operations.

Allies need relatively cheap, easy to maintain air capabilities. Having an ability to field reasonable numbers of short range fighters, long range patrol or point defense systems would increase defensive capabilities and **call into question an adversary's assessment of military success in major combat operations.**

CONOPS for Maritime Control

At the moment, **the U.S. Air Force has no significant counter-maritime capability.** Yet most of the world's resources, trade in agricultural and

manufactured goods, and significant military capabilities transit the oceans. In order to impact the economic sinews of power, the USAF needs to be able to conduct maritime patrol for ISR and strike.

If it is to assist the U.S. Navy in control of our ocean borders at range (Pacific, Arctic and Atlantic) in our area of core interests, deny adversaries power projection and project power globally in distant areas (Indian Ocean), **the U.S. Air Force must be able to target adversary assets at sea.** At the moment, we have disinvested in a large portion of terrestrial targeting by not having a maritime capability on the oceans--70% of the earth's surface.

The ability to do so gives the U.S. an asymmetric advantage in accessing energy, **controlling trade and transit through maritime choke points** (i. e., the Alaska Straits, Straits of Malacca and Sunda, Panama Canal etc.), and securing internal lines of operation relative to potential adversaries.

Being able to stop, disable, delay, disrupt, deny, and degrade seaborne trade without destroying the ships would be a powerful deterrent to adversaries with export dependent economies or those trying to use naval assets in combat. The ability to project air power to maritime choke points in the Indian Ocean is an essential part of the Control, Deny, Project strategy and imposes costs on would be adversaries.

A full DOTMILPF assessment of potential air and sea based capabilities to interdict maritime activity of all kinds is required and should be a part of **an expanded Air/Sea Battle concept.**

Requirements for the Arctic

The Arctic, as an emerging area vital to U.S. national security interests in trade, transit, resource extraction and military security, presents problems as well as opportunities. **Increased routine access to, and transit of, the region will require U.S. development of the air, space, land and naval assets to monitor, protect and defend the Arctic region.** Developing these capabilities will require significant joint service investments to operate at the ranges and in the conditions the region requires.

Great power confrontation in the Arctic may be likely as Russia occupies a large amount of territory bordering natural resource deposits, and China will become increasingly dependent on Arctic routes for global trade. The opportunity for incidents in the air, on land or at sea and disagreements about resources, transit, responsibilities and rights involving major near peer states are significant.

The Arctic region is the size of the western Pacific, requiring similar range and refueling capabilities. The region is **further complicated by extreme temperatures, difficult logistics, and high latitude GPS and SATCOM issues.** The use of space, cyber and unmanned platforms will be increasingly important to monitor transit and implement operations of all kinds (CSAR, resupply, or strike). As commercial enterprises move to exploit the natural resources on land and offshore, the need for an expanded presence in the region will grow. The U.S. and Canada occupy strategically fortuitous positions, able to **control entrance to and egress from the Arctic** from bases in the Pacific, Alaska, and the Canadian Maritime Provinces. Insuring the capabilities to do so will require a concerted effort to develop joint service

and multinational interoperability in this environment.

Service R&D Priorities

Continuing **analysis, synthesis, discussion and wargaming are required to assess strategies, CONOPS, and technologies to contend successfully in 2035.**

Selecting the critical technological investments is increasingly difficult given rapid technological change and the fact that **the truly innovative technologies—nano, cyber, and bio—are all merging in novel and unpredictable ways.** This will mean accepting larger risks in future competition in order to achieve higher payoffs. USAF needs to:

- 1) **assess the variety of technological capabilities and cost of new systems for deployment and employment;**
- 2) **develop CONOPS** and strategies to employ these technologies;
- 3) **integrate service capabilities** and partner with allies to achieve presence;
- 4) **develop strategies and force mix** for deterrent, offensive, and defensive capabilities, and
- 5) **make R & D investments based on identified capability requirements.**

Given increasing global transparency, wider sharing of scientific knowledge and technological innovations, there is no guarantee that a particular capability will confer unrivalled long term superiority. **The half-life of attempts at military dominance is shrinking.**

There are a number of additional problems to address as we advance

toward the world of 2035. Among these are the nature and limits of autonomy; the survivability of cyber capabilities; the architecture for processing exponentially expanding big data; and the capabilities and impact of quantum computing.

CONCLUSION

Stated bluntly, **by 2035 global dominance is no longer possible.** The era begun in WW II when the U.S. had global economic and military superiority will be over by 2035. A more discriminating strategy of influence and access will be required as the span of absolute control will diminish.

Maintenance of a strategy requiring continuous military superiority around the globe is unaffordable in 2035. U.S. financial circumstances, the rise of the rest, and global proliferation of military technologies in a networked age make any strategy built upon this assumption unrealistic.

The changing security environment provides the U.S. a unique strategic opportunity. **A policy choice to adopt Control, Deny, and Project as a national security construct** provides an affordable option for the future. It maximizes U.S. strengths, minimizes our weaknesses, and empowers allies.

Acknowledging the need to change U.S. strategy, from global dominance to one aligned with strategic, economic, and technological realities is a necessary first step. In doing so, we seek **to impose high costs on potential adversaries, while avoiding the costs they seek to impose upon us.**

In an era of continuous competition and conflict, a “one size fits all” strategy, force structure, and doctrine cannot be successful in supporting

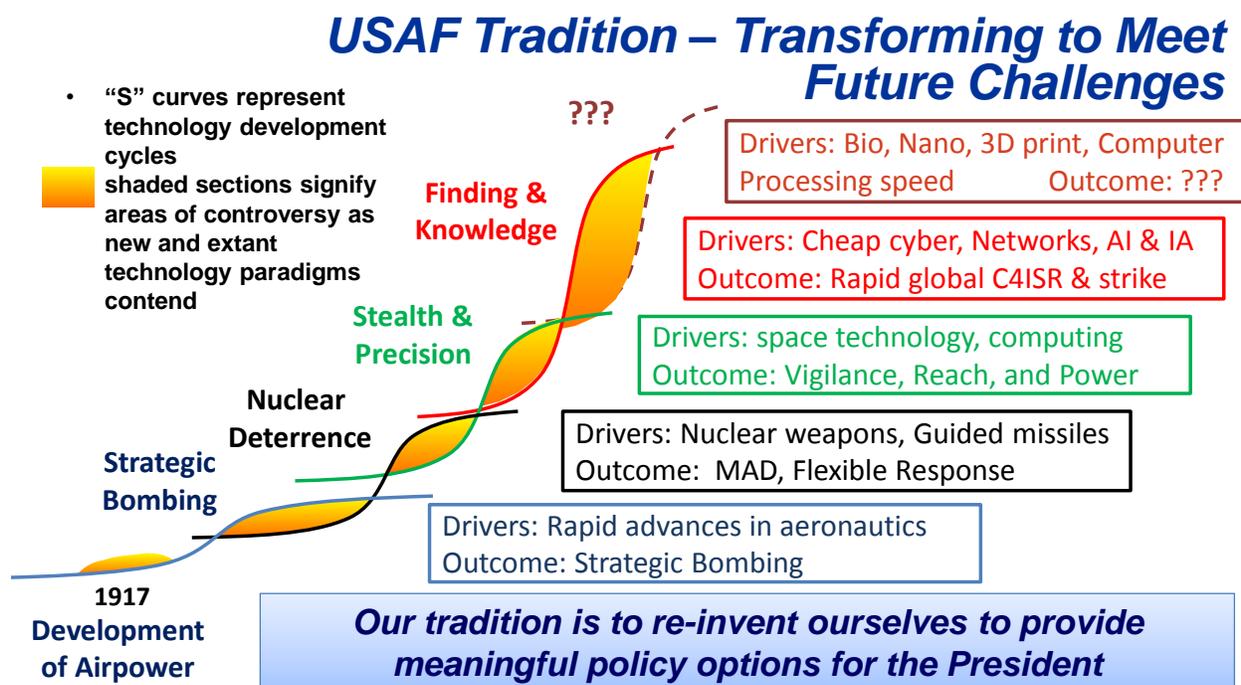
national interests. The U.S. Air Force has an opportunity to develop the vision, capabilities, and opportunities essential to execute this strategy and provide an air minded approach to preserving U.S. power and prestige in the emerging economic/security world of 2035. **An Air Force vision of renewed air ascendancy** is only the latest reinvention of the Air Force in our history.

Appendix 1



Figure 1 Map displaying zones of emphasis in the Control, Deny Project global military strategy

Appendix 2



Appendix 3

Emerging Technological Choices

Command, Control, Integration of Interdependent Capabilities					
Stage Sustain Defend	Reach & Access	Opposed or Permissive?			
		Find & Fix	Track & Target	Engage	Assess
Voice, Data, Timing, Position					

Emphasis
Shifts



UNCLASSIFIED