“...Or Go Down In Flame”?
An Airpower Manifesto for the 21st Century

A Research Paper
Presented To

Air Force ***2025***

by

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Introduction

To lead is to choose. Choosing commits one's group to courses of action and to consequences. In 1995 the leaders of the United States Air Force asserted long-range planning in the Air Force was “broken,” and they would fix it. Doing so requires vision, a sense of the evolving environment, and a process for linking visions to strategies and tasks. Bureaucracy without vision mistakes activity for progress. Vision without the wherewithal for change is called dreaming.

Planning today matters because the Air Force, in our view, is poised between two courses--one is to “live in fame,” the other to “go down in flame,” as the Air Force song goes. Bad choices forebode institutional irrelevance or, worse, disintegration and defeat. Some may find contemplating a future with no Air Force a distraction, waste of time, or logical impossibility, but it is none of those.

Why Change?

By now, it is hardly news that the Department of Defense must come to grips with two fundamental discontinuities.

The first one involves the “why” of military power in the wake of the Berlin Wall's fall. No one knows whether history—the domination of world politics by great power struggles—has ended, simply taken a breather, or is in the process of transformation. Absent knowing, it ill behooves the United States and its armed forces to await history's return recumbent. As nettlesome as today's challenges may be, it is difficult to foresee any circumstances under which the reemergence of a hostile great power would enhance the national security of the United States. In the cold war, the Air Force prescribed bombers and ballistic missiles to help deter any feverish confrontation from getting too hot. Today's environment mandates rethinking the capabilities required to deter tomorrow's great powers from overly hostile posturing.

The second discontinuity involves the “how” of military power in the enveloping onrush of information technology. Simply put, *being digital*, to use Nicholas Negroponte’s meaning of the new ontology, means the high ground is no longer aerospace, in and of itself, but cyberspace. Understood in its broadest sense,

cyberspace is the great confluence of all the various bits and information streams which, together, generate the strategic topsight prerequisite for victory.

By history, predilection, and structure, topsight is the natural (but not automatic) domain of the Air Force. But prior to staking its claim to tomorrow's high ground, the Air Force needs to redefine itself as an infospheric institution rather than an atmospheric one. This is the soul of our manifesto. It is toward envisioning and guiding this transformation that our essay turns.

Understanding the implications of this proposed transformation for the Air Force requires starting from first principles. The mission of the Air Force is not merely what we do (tending toward air and space operations) but what we contribute (determining how to operate for strategic effect). While knowing how to transport mass or energy to targets—plinking tanks or flattening cities—has its time and place, it is but a subset of knowing how to get and use knowledge to confound or terminate the production, distribution, and (increasingly) control of all sources of opposing military strength. Technology permits ends—strategic superiority—to be achieved through many means: space-based, atmospheric, ground-based, and maritime systems, both manned and unmanned. If a separate Air Force exists for strategic purpose, then information, rather than any one attack method, becomes central; hence, a rationale for the Air Force to drop its atmospheric orientation in favor of an infospheric one. Just as the Air Force was born to exploit the technology of flight, it must also evolve to reflect subsequent technologies of equal strategic heft. Our notions of the "high ground" must change as airmen accept the *coup d'oeil* as the peer to and enabling means for the *coup de grâce*.

The Air Force was founded on the principle that mastery of the new technology would allow a nation to leap over World War I's bloody stalemate and strike a strategic blow to the enemy's war-fighting machine. Air—the atmosphere—became the high ground. Taking it made victory everywhere else only a matter of time and will. It so happened that in the first interwar period (we may presently be in another), this technology was reified in manned aircraft, since only the human body had the sensors and computing power needed for airpower's chores. But technology is protean by its very nature and, as Operation Desert Storm was the first to demonstrate, the information realm is becoming tomorrow's high ground. Simply put, if you can see the enemy and the enemy cannot see you, then only modest applications of precisely aimed, correctly

timed force suffice to command the battlespace. This is the ground which, we argue, the Air Force must seek to command.

Before examining the transition from atmospheric to infospheric force, fairness requires noting two alternative visions: the "constabulary" Air Force and one based on information warfare. Both capabilities—one based on peace operations and the other on targeting enemy information systems—are valid new tasks. Neither, however, provides a reasonable heart and soul for tomorrow's Air Force.

The constabulary Air Force, so brilliantly elucidated by Carl Builder, is nevertheless highly problematic. Very little "force" is left; food "bombs" on friends may be necessary but hardly suffice for strategic leverage against enemies. Such a force provides little insurance against the reemergence of serious great power rivalry. A weakened constabulary Air Force might even beckon such fools forward. Once alienated from its core focus, the Air Constables may not be able to recover if history returns.

Adopting the trendy profundity and modernity of "information warfare" as a primary mission is often (wrongly) read into the Air Force statement on information warfare, *Cornerstones*. Yet, warfare is distinguished from brawling not through its inscrutability or novelty but through its discipline and causality in the grinding application of power. Strategic information operations—the unleashing of viruses, worms, Trojan horses, and others of that seemingly magical (or perhaps mythical) menagerie described by Doug Waller for the world in *Time*—tend to reach their highest utility against enemy national infrastructures just prior to conflict. This fact alone should suggest wariness in putting any military in charge (and even more so for strategic information defense). At the operational level, no one really knows how much good—let alone harm—information attacks can do. Such operations are opportunistic, and thus antithetical to an *ethos* built on strategy-to-task generation. Foes with no infrastructure to disrupt leave such a redefined Air Force with nothing to do.

The Air Force as a Joint Force

How does our vision of seizing and controlling the high ground harmonize with the vision of the other services and the Joint Staff? The latter's *Joint Vision 2010* was designed to scan the strategic horizon, promote joint force, and thereby inform the "visions" of the separate services. It seeks virtue in

unchangeable aspects of fighting. Will there be precision strike in the future? Yes. Will one side strive to have greater awareness than the other? Of course. Would it be efficacious if joint forces could envision and engineer the dominating maneuver? Absolutely. Does focused logistics facilitate resupply? Unremarkably so. Alexander, the Great Khan, and Napoleon would applaud these attributes, finding them familiar.

What is left unsaid, though, matters more. Neither legislation nor downsizing makes jointness necessary as much as does the tendency of every service's target acquisition and prosecution systems to overlap. The battlespace is as indivisible as the cyberspace. It can no longer be divided into neat domains and parceled out to each service to fight its own war--the Navy in the littoral, the Army in the fields, and the Air Force high and deep. They just keep getting in each other's way.

A future air force cannot help but envision the totality of the joint and integrated armed forces. At the heart of this joint vision is likely to be a vast, interconnected, interoperable, and ultimately integrated metasystem (a “system of systems” or, farther on, an “organism of organisms”), to which all services contribute and from which they all draw. The metasystem is not the elusive silver bullet or golden BB but the convergent architecture of capabilities nurtured by deliberate planning. It will not be a single machine or even a single network, but its users will not care—as far as they are concerned it will be the common instrument with which all carry to war. Feeding it will be rules of engagement, commanders' intents, strategic intelligence, bitstreams from space, continuous logistics reports, status of forces, weather observations, sensors from everywhere, operator inputs, and even the output of global news networks. It will supply the raw material of nearly total situational awareness, from global overlay to designated targets. If the metasystem is to do serious work, it has to be planned from the start as an integrated system, even though initially composed of legacy devices and codes. It will not do to glue today's increasingly inadequate systems at their edges and be done with it. Such a conceit grossly understates both the requirements for real-time battlespace control and the degree to which technology can empower greater vision. In the end, someone must be in charge of building and maintaining it for whoever is asked to command it. Who better, we argue, than the Air Force? It was Air Force's *SPACECAST 2020* that introduced the notion of “Global View” and the institutional pronouncement of a new and virtual form of engagement in “Global Presence” that followed in hot pursuit.

The Air Force need not populate the entire metasystem—an organic construction of various pieces being built, tested, used, refined, reused, swapped out, and retired in their turn. What the Air Force must do, though, is envision the metasystem's architecture and all that implies: requirements, doctrine, tests, protocols, agents, and objects. Once that is well understood, the Metasystem will grow naturally—with the Air Force vision of topsight as the ghost in the machine. Guardianship over the metasystem, we argue, is the aspect of controlling and exploiting the high ground that differentiates a next-generation infospheric air force from an air force slowly yet inexorably being petrified in the amber of slightly faster, slightly stealthier atmospheric operations. An infospheric Air Force possesses capabilities which lock out all would-be competitors and make their air and surface forces noncompetitive with ours.

An "armed" force with information but no means to convert it into striking power, needless to add, is pointless. The best "OO" does not obviate the need for "DA." The metasystem informs but does not replace command; operators are still in charge, and the air force will get its fair share at the top. As for weapons, an infospheric air force must nevertheless be armed. For tomorrow's evanescent battlefield, faster means of energy delivery may be needed, lest targets disappear before energetic force can engage them. Tomorrow's Air Force can and ought to listen to its visionary operators and scientists and engineers: seek real-time engagement weapons ranging from lasers to neutral particle beams and high-powered, focused microwaves. Indeed, the need for fast sensor-to-shooter coupling, consistent with reifying information, calls for the Air Force to strengthen its command over strategic (not just nuclear) weapons, particularly those closely linked with the metasystem itself.

Tomorrow's Missions

If jointness provides one leg for tomorrow's air force, the emerging mission profile of the US Armed Forces provides the other. The United States took away four enduring missions from the cold war: strategic deterrence, conventional overseas intervention, guarding the lines of communication, and dissuasion (e.g., air strikes against Libya). Students of the "New World Chaos" often add peace operations and support for domestic authorities, but neither may last (one political party does not like performing them, while the other party does not like resourcing them) or carry much relevance for the Air Force.

Technology and today's need to deter and defer major power rivalry suggest three new missions will emerge over the next quarter century: extended information dominance, global transparency, and strategic defense.

Technology both enables and requires that the information dominance sought by the United States be extended to its friends. Apart from "stealth" (rare, expensive, and always incomplete), tomorrow's battlespace will be far more transparent than today's—to both sides. Why? Everything creates a signature of some kind—be it sound, odor, contrail, pressure, movement, or twitches in the geomagnetic environment. Every new bit illuminates the battlespace—whether discovering the tank in the weeds or the aircraft in the clouds—and the number of bits per buck has been doubling every 20 months, a trend with at least a decade of momentum remaining. The more bits, the more illumination; a sufficiently dense covering of bits, so to speak, increases the odds that enough of them land on everything worth identifying. This is not purely a military phenomenon: indeed the most powerful forces for generating and disseminating information include the World Wide Web, cheap and plentiful video cameras, commercial satellites, and do-it-yourself unmanned aerial vehicles (UAV). Exactly which capabilities appear when can always be debated, but the trend lines are laid in (and may yet be accelerated by fortuitous discoveries here or abroad). To be present is to risk being sensed by one phenomenology or another; the attendant revolution in precision guidance means that to be sensed is to be killed. Thus, to linger transparently is to court death. All this may or may not favor defense over offense (movement creates more signature than hiding). It most definitely favors those who can integrate the various information flows into a coherent picture of the battlespace rather than an opportunistic series of isolated appearances.

In this environment, today's platforms simply cannot pass unnoticed en route to or when engaged in tomorrow's major fights. This fact plus current public aversion to casualties suggest sending large numbers of young men and women overseas to war against secondary enemies (those who cannot possibly directly threaten the United States) need no longer be the "signature" *modus operandi* of the armed services. More and more frequently, greater leverage may come from empowering our allies to do it themselves, particularly when aided by over-the-horizon applications of energy. Empowering is the key concept; telling our friends the location of enemy targets to within the blast radius of their ordnance permits them to defend themselves against larger foes tied to ancient parameters of force. The means by which friends are so empowered are

the same bitstreams that feed the metasystem, only this time packaged for delivery rather than ingested organically. Hence, the first mission: extend to friends the information advantage enjoyed by the United States. Should they cease being friends, they cannot drink from this font of information. Without information, they must fight blindly.

The global transparency mission naturally follows. The surest deterrence to any nation aspiring to hostile great power status may be the certain knowledge that it is under continual watch. As the Air Force argued, US power can be "globally present" even when it appears to be physically detached. Let others so much as open factory doors in the desert, pick up the handset to summon their craft, roll a tank out of its shed onto the road, or launch an aircraft out of a runway deep in the forest and somewhere, somehow, some part of the metasystem knows—and can instantly alert whoever can best train their boresights thereon. This knowledge need not always be converted into engagement; its demonstration alone may dissuade. Thus, the second new mission of the armed forces: to endow the instrumented world transparently so that no country can challenge us in the dark. The evil that lurks in the hearts of humans may forever hide but not the means to convert evil thoughts into evil deeds. Add instant wherewithal to denude will of means, and ill will becomes an aggravation instead of a threat.

The third mission, strategic defense, flows from the second. Over 90 percent of trying to stop a ballistic or cruise missile is finding it. To an aircraft, a Mach 25 missile is a blur; to a photon, however, it hangs in space. The same metasystem that can arm an ally with information and make the entire world transparent to US power also can sweep the skies for air and space threats and dispatch their coordinates to whatever means are chosen for their engagement.

It would be hard to imagine three missions which inherently favor the new air force more. This is so not because the Army and Navy are absent—for they do play—but because they reflect the orientation and *mythos* that has always fueled the Air Force. This is truly *cosa nostra*: "our" thing. Their guiding principles—call them dominating medium, topsight, or campaign planning (warfare as a solvable problem of the systemic application of force to a specific end)—follow directly from the inspiration that sent earlier generations to the flight line. Those who recognize a change in the possibilities and employ it in warfare, observed Douhet, have considerable advantages over those who wait until the power of transformational change is used against them. Note that none of these new missions have anything to do with the human

mastery of flight. That was yesterday's problem, and one thoroughly solved. It is time for the Air Force, as America's premier technological agency, to move on.

Implications of an Infospheric Air Force

The test of an organizing principle lies in how well it informs the many decisions an institution as complex and vital as the US Air Force must make. The original theory of airpower did precisely that. It gave the organization its mission, put the mission in the context of the other services, suggested how the mission may be fulfilled, prioritized tasks within the mission, steered acquisition strategy (and so fostered the world's greatest aviation industry), defined the essence of being an airman, and contributed to the creation and sustainment of airpower. Today, the Air Force wrestles with seemingly intractable existential problems. If today's vision is to be more than words, it must be the basis by which today's issues are reexamined in a new light, one so powerful it makes the obscure visible and thereby transforms apparent crisis into authentic opportunity.

A vision not reflecting facts risks becoming an illusion. No better example exists than the current F-22 program. To the atmospheric air force, the F-22 is a must have, the next obvious step in a continuous, logical train of sleek machines. The F-22 remains another souped-up, short-range, manned fighter—even if stealthier and laden with more silicon. Perhaps the F-22 can be justified based on a cold assessment of its costs—which are certainly crowding out many other investments and perhaps opportunities (albeit in a world where everyone else has given up even going against our F-15s). Perhaps an infospheric air force also would buy them. Vision, after all, is the beginning (not be-all) of analysis. But an atmospheric air force cannot help but buy the F-22, as the former head of the Air Combat Command bravely stated, regardless of anything we might know about the threat.

Those who would hold the high ground need to attend to three activities that must become the *raison d'être* of air and space forces: (1) operating militarily in a transparent world, (2) understanding space, and (3) defending the American homeland from aerospace threats. Taken together, these needs are the inescapable facts of the future. They are facts, not problems. A fact is something that cannot be changed.

Problems arise from ignoring or trying to alter facts. Air and space forces must focus on the facts of the future and use them advantageously.

In a transparent battlespace, big things make more kinds of signatures than smaller ones. Encasing a human in the life support systems necessary to operate in the high atmosphere or in space requires plenty of weight and cube and even then may be frustrated by the high-G loads necessary for maximum agility. Remove the human body from the flight deck and combat air vehicles can surge ahead. The bandwidth to put "space-derived data into the cockpit" can be redirected to contribute more effectively to other parts of the metasystem. Data need to go to warheads, not task-saturated humans who also have to worry about staying straight and level, breathing, temperature control, urination, and—more importantly perhaps—capture and exploitation. Once the human is removed, small vehicles can quickly become very, very small and very, very fast and pose new problems to defenders. Once pilots are understood as information-processing components—the natural tendency of an infospheric air force—the rational allocation of these functions between carbon and silicon can proceed apace.

UAV illustrate some of the difficulties an atmospheric Air Force engenders for force planning. Just the names today's models have acquired—Hunter, Raptor, Talon, Predator, Dark Star—are good clues that, even unmanned, the UAV is meant to fight rather than just see. Dreams of air-to-air combat among UAV lie just below the surface. Costing several million dollars each, every individual aircraft must be increasingly well protected (and thus add features, and hence cost, and thus . . .). How strange it will seem when someone decides that a $100,000 UAV not only suffices but costs less than the missile otherwise required to shoot it out of the sky. The concept of a flock of expendable UAV would occur far sooner to an infospheric air force than it would to an atmospheric one.

Second, whither space? Space operators cannot be happy without some way of emulating their air combat cousins. Yet, despite however much real importance space holds for air and ground combat, the chances it can be used as a war-fighting arena, in and of itself, are slight (and were thus even when the Soviets were around). It is bad enough that such urges feed the usual round of institutional fantasies. But they seriously color the spacefaring community's approach to "everyone else's" space assets. The belated discovery that our forces could be imperiled with spacecraft-derived information—Saddam Hussein could

have seen the left hook coming with overhead imagery—gives birth to a task of shooting such craft from the heavens.

Such a task is problematic. First, it allows others to deny the inevitability of space-mediated transparency on the battlespace under the ill-considered argument that we can eliminate it—all of it—when the time comes. Second, despite the cowboy appeal inherent in "shooting the desperadoes out of the sky," it pushes the armed forces very close to operational doctrine which would, in practice, target everyone else's spacecraft--perhaps appropriate for a third world war but for no lesser contingency. The "black hull-gray hull" challenge that navies have long faced rarely resolved itself in the injunction to sink all hulls. With satellites so cheap (a simple three-meter capability can soon be purchased for $50 million, no questions asked), and third-party sources so ubiquitous, it will be nigh impossible to find out where the bits are being picked up, how they are being sluiced from satellite to satellite, or even which portal or switch in the self-healing global phone or internet system takes them to their destination.

Instead of preening for pointless battle, the Air Force Space Command ought to pick up its mantle as the premier information force in the world. Virtually everything it owns exists to foster battlespace awareness, connectivity, and strategic intelligence. That understood, the Space Command of the Air Force would be pushing its data as the firmament that makes sense of all other sensors' attempts to paint the battlespace. Working under an infospheric air force, it would not have to be asked twice. Conversely, an atmospheric space command, by short shrifting its information role, risks losing topsight to an emerging ground-based cacophony of small remotely piloted vehicles, high-altitude "pseudolites," and ground sensors. These should all be interactive elements in the metasystem, rather than expedient acquisitions because a metasystem vision and architecture does not exist.

Similarly for space acquisition issues. Should the Air Force pursue a trans-atmospheric vehicle (TAV)? If it seeks to put a pilot in charge, the quest may prove quixotic; there is no medium up there from which to execute the Han Solo flights of fancy that air permits. Yet, if the TAV is understood as a radically cheap way to get a pound into orbit, it opens up a wide variety of vistas, not the least which are for the proliferation of information and command.

Third, the Air Force must become the planet's foremost expert on coping with delivered weapons of mass destruction. These weapons used to separate the professionals in the geostrategic big league from the

amateurs in the farm clubs. With proliferation, weapons of mass destruction and disruption become strategic equalizers potentially available to any flyspeck nation, as retired Air Force Gen Larry D. Welch has pointed out. The cheapest and most insidious are weapons of mass information destruction. Close behind are biological weapons capable of being delivered by very small, sensor-evading vehicles. Overseas, they render ports and staging bases unusable for deployment. But they also could hold the American homeland at risk. The threat might come from a ballistic missile—a benign space launch vehicle modified by hostile will—or from a cruise missile launched from a ship-borne container. The capability to touch the American homeland may be such a strategic equalizer that the risks of blackmail and checkmate rise as weapons and delivery means proliferate. Who better to defend the homeland than those who build the metasystem that alerts us to hostile will in actuation?

Some form of active strategic defense must become a competency air and space forces pursue. The former Strategic Defense Initiative Office gave every service a piece; with the Soviets gone, the tough issue of “who's really in charge?” can and must be revisited. Nuclear weapons are no less awesome under a different paint scheme. To argue that a temporary absence of hostile wills lets us ignore hostile means is to forget the value of long-range planning over threat-of-the-moment programming. The dismal prospect of a "peer competitor," while not yet true, may (unless we contemplate it) become a 2015 or 2025 fact. Ignoring facts, as we have said, is a problem. Thus, tomorrow's Air Force must posture itself to command the “high ground” in a real sense. The high ground is the “infosphere,” not the atmosphere or the aerospace. To the high ground's metasystem of knowledge must be added the joint force wherewithal to engage everything an enemy values below.

Tomorrow's Airman Redefined

Central to a redefinition of the Air Force is what it means to be an airman. In World War II, a high percentage of airmen were subject to risk as air crewmen. Today's aircraft are far fewer and more efficiently manned; no more than 1 percent of today's Air Force can be in the air at any one time. Upon how thin a base of pilots at risk can the Air Force rest? Yet, what would substitute as self-definition in an infospheric Air Force?

How have other Services coped with similar requirements for change? The Army, heavy and difficult to move, has no choice but to stay with the "getting ready to get ready" template for combat consistent with the traditional cycle of initial response, build-up, counterattack, and consolidation. Perhaps the digitized Army converts tanks into interactive simulators for "virtual mission rehearsal" during the long, slow ride to "build-up"—or perhaps the short work transparency makes of tanks may be too frightening to contemplate. Either way, armor constitutes the skin rather than soul of the Army. At its heart is its self-definition as the will of the American people made manifest in force; this force, in turn, is expressed by being on scene—today in a real context, but over time also in a virtual one. The Marines have gone further than the Army in shedding weight: tanks are a burden that light, lethal, agile forces may aim to shun. They will ride into the future on a self-definition that draws on the chaotic and complex context in which they ply their trade. A Marine is a human transformed into the transcendent rifleman. A Marine strives to be nothing more nor less than a Marine. Similarly, the Navy will understand what transparency can do for the surface fleet. Yet, the Navy was, and is, wedded to the sea before it is wedded to any instrumentality of mastering it. To command the seas and engage adversaries "from the sea" is not necessarily to exert power with mass but to exert discrimination with energy--the medium remains the message for the Navy.

What then of the Air Force? Habituated to being the willful, rebellious little sibling of the Army, the Air Force found it difficult to change without clinging to the instrument that won it independence. Then came ballistic missiles and the shotgun wedding of aero and space. Will the even greater evolution to cyberspace—it is really nothing more than that—create a fuss, even though it is absolutely faithful to the vision of airpower's founders? Of course. The combat airman is the last and emotional vestige of knighthood, the product of the warriors' quest for one-on-one combat. We breed cranky individualism because we believe, when all is said and done, that warfare really is about LeMay being superior to Khrushchev, or Horner being superior to Saddam. An atmospheric air force that seeks a personalized "right stuff" but limits its attainment to rated officers risks an exploitable schism among its various communities—especially as those of "us" in Nomex are surrounded by those of "them" in BDUs, or hospital whites, or office uniforms. All the while the key strokers and technowizards greatly outnumber what some of our leaders seem to believe are the few elite "real" warriors. An infospheric air force is inherently based on the teamwork inherent in the construction of the metasystem. Fortunately, the Air Force chief of staff has set a

new course: cooperation, teamwork, and an understanding of the Air Force as a system of teams within teams. There is a base upon which to build.

The Air Force apex always will be defined as the masters of the medium, but in an infospheric Air Force, the medium of air can yield a bit to the various space media. The notion of the cyber-jock grappling with the dynamic exigencies of the metasystem in real time is not yet here; those who stare into the screen rarely have to react in real time with "TekWar" tempo. Yet, as the metasystem becomes increasing integrated with sensors and weapons, such real-time control will become increasingly possible, and no one who has spent any time with any masters of the game can doubt their acuity.

And if it is risk that defines the apex, consider that as processing power grows and the spectrum remains fixed, the ability to illuminate, command, and control the battlespace may reintroduce the essentiality of physical presence. Tomorrow's cyber-warrior, strapped to the console, armed with topsight, dedicated to the continuity of illumination, running into the tangible battlespace to build, maintain, or enhance the filigrees of the Metasystem will be the definition of grace under pressure.

Implications for Roles and Missions

Such a transition, however necessary and overdue, cannot be made overnight. It must be carefully planned and delicately engineered. In the interim, someone must remain responsible for selecting the technical solutions necessary to mind the atmospheric store. That used to be the service; now it is the Joint Requirements Oversight Council. Within the Air Force, beneficial bureaucratic inertia and persistent affection for the manned air superiority fighter will provide sufficient checks and balances against dizzying change. Moreover, an independent air force is not an autonomous one. Congress, the Joint Staff, many agencies, and the other services must agree to any new self-definition the Air Force advances. Metasystem architects and builders must be funded by the American national security corporation; a corporation that cannot lose its share in commanding the atmospheric market as one of its product divisions comes to a new understanding of the business in which it ought to be engaged. The change we propose is more easily debated than implemented—a frequent characteristic of revolutionary change (witness the airplane and the intercontinental ballistic missile). So, how should we proceed?

If the Air Force understood itself to be organized around not the aging technology of flight but the nascent technology of topsight, it might be able to play the continuous roles and missions debate in a far more constructive manner. Like any shrewd firm, it would cast off low-information missions in favor of high-information ones, strengthen its core competence, and position itself for vigorous institutional life well into the next century, all the while contributing to fostering jointness without risking its own identity.

The current division of services by media is problematic for the Air Force. Take any given mission. Step one in roles and missions is to assign each service responsibility for weapons emerging from their particular medium: ground, sea, or air. Step two, which breeds hairballs, argues that systems emerging from one medium are of course superior to systems from another. Service prestige is put on the line in defense of technical characteristics that play randomly across the face of combat. This is the way to build a litigious bureaucracy, not an institution. The Air Force, by virtue of its need for theory rather than sentiment as its organizing principle, inevitably puts its coherence (rather than end-strength) on the line every time such issues arise.

What should theory say about the Air Force's strategy for missions allocation? Start with the oft-revisited struggled over the “four air forces” in general and close air support in particular. Declaring there is but one Air Force and three other services also possessing air arms is to deny the facts and fuel continuing debate whenever the embers of fact are fanned. Even so, “one” atmospheric Air Force disdains every other service's use of aircraft in general, and—when it feels like it—jealously guards the close-air- support mission in particular. So the institutional Air Force does it, but with little enthusiasm—using the wrong aircraft, under the wrong command philosophy, and not nearly as quickly or responsively as it could, in spite of the valor of its warriors. Meanwhile, the Army makes do with never-satisfactory coordination mechanisms and then puts all the capabilities it needs in yet another platform for the mission the helicopter since the Air Force allows it no other choice. The answer for the Air Force is obvious: let this mission and its associated equipment go. The Marines prove a ground force can supply its own jet-propelled airpower organically. Close air support is a necessary but low-yield and low-information component of warfare, one which contributes little to topsight, and rarely—if ever—has strategic effect. As long as armies fight armies, close air support will be necessary. But it is nowhere written in stone that Air Forces must fulfill this responsibility.

A similar debate entails long-range missiles, notably for air defense. It is an Army bailiwick in the US, oft-contested by the Air Force as unwarranted intrusion into the deep battle. Here, the Air Force strategy should be obvious: seek the radars and the fire-control internetting and leave the missiles to whoever wants to drag them around. It keeps the topsight over the increasingly nonlinear battlespace and yields the trigger. True, this split is notional as long as fire control and guidance are intimately connected to specific missiles, but such coupling is precisely the wrong way to establish missile guidance in the future. Why could not a Pave Paws radar or an Aegis radar guide a Patriot missile as well as a Patriot radar can? Ultimately, it is the Metasystem which informs the firing control mechanism, and the Air Force, if it is smart, will put first claims on the Metasystem as the core of the military's information machine.

Today's roles and missions debates seem to look back to the last few days of February 1991. Let others win by that criteria. Instead, look ahead and make claims based on what 2015 or 2025 portends—a global battlespace reapportioned by the micro-second. It is a short hop to extend the Air Force's acknowledged claim to tactical missile defense battle management to overall cognizance of the entire complex information flow required to shoot down another missile. No longer should the Army, Navy, and Air Force take three poorly coordinated approaches—each firing from its own medium. Again, an atmospheric Air Force jealously guards its claim to the right firing platform; an infospheric Air Forces goes for the jewels.

If the Air Force wishes to contend with other services over platforms, the way to do it is not to waste time arguing over one or another medium but to lay claim to the information-rich components: the Longbow, the Guardrail, the Hawkeye, and (why not?) some day the Aegis battle system (and yes, it matters little who actually drives the vehicles compared to who works the OPCONs and architectures).

An infospheric air force also can take the lead in maturing our understanding of information operations. An infospheric air force realizes that A2 (intelligence) and A6 (computers and communications) no longer can reside in their own little stovepipes separated from A3 (operations). The transition from an atmospheric to an infospheric Air Force also will give long-term planners in a newly created A5 at least five years of work, examining every aspect of the force and seeing where it fits into the new structure.

A related issue entails what the Air Force should keep organic rather than slough off to the private sector. An atmospheric air force retains its air base orientation, and the result, plain to see, is the retention of so much ancillary functionality that it has far more nurses than operators, with nearly 20 percent of the total

Air Force in the health professions. The military's ability to command large forces in single-minded pursuit of worthy aims must be retained. Yet, an infospheric air force would ask which elements need to be military to ensure continuity of information and command operations under stress. It would carefully review the current practice of outsourcing technical wizardry, lest it be forced to go without in-theater as metasystems are racked with battlefield stress compounded by new forms of information warfare.

Conclusions

We fully expect change will be tortuous and torturous. We also know that "without vision, the people perish." The Air Force stands not before a crossroads but at the edge of a precipice. To affix its affections, theory, and force structures exclusively to aircraft transporting mass to targets is to slide forward into the abyss. Only by braving the chasm can the Air Force ascend to the other side. The lure of descent is familiar to the aviators struggling to retain control of the force, but so were horse and sail to other services in their day.

Will the Air Force fly across like Daedalus or drop like Icarus? If folly is chosen, count on it being proclaimed wisdom. Yet, the inexorable march of contingency leads to one of two outcomes. The better outcome is for splinter groups to arise, chipping off Air Force missions piecemeal and leaving the institution a withering core. The worse outcome is for the ideology of the atmosphere to withstand all challenge—alienating those who see the future with the clarity it presents—until it wakes up to find the revolution grasped firmly abroad by those with few tears left for the Air Force. Either way, if the Air Force fails—fails to do our nation and our allies the favor of succeeding—we leave it to historians of the next century to discover the answer to our final question: why did the Air Force—given the choice of living in fame or going down in flame posed in its own song—choose descent and demise?

The leap from atmospheric to infospheric air force is the next logical step, as paradoxical as it may seem. Air forces have capitalized on the speed, range, freedom of maneuver, and vantage their medium provides. Yet, nothing travels faster than information. Nothing impedes the distance knowledge can travel. Nothing makes movement more intelligent, economical, and fruitful than information. And nothing else would provide the vantage of a metasystem. Atmospheric solutions sufficed until technology permitted multiple

solutions from any medium. The Metasystem, however, demands an integration of exoatmospheric components with those provided from air and surface. This is not the vision or role the Army, Navy, or Marine Corps are in a natural position to advance on, although they may lay claim to bits and pieces, thereby frustrating the larger aim. This is the Air Force's game to win or lose. This essay argues that the hangar door leading to the open skies of the infosphere is ajar, but that the Air Force—if it is to retain its right to be—must roll out and take off without delay.