Andrew Johnson

Subject: FW: SAC = STRATCOM = SPACE COMMAND

From: Ed
Sent: 25 January 2014 21:29
To: Ed
Subject: SAC = STRATCOM = SPACE COMMAND

As you know I started off as the SAC Liaison to the Defense industry.

Later my role was expanded to the DoD Liaison to the Defense industry

SAC (Strategic Air Command) evolved into STRATCOM or Strategic Command which brought Space Command and Cyber Command under their control
and remains so today. The NSA is also under the DoD and is deeply involved with STRATCOM/Space Command.

More on that later. The links below and my comments give you a roadmap.

Ed

Google: SAC STRATCOM

U.S. Strategic Command is one of nine unified commands under the Department of Defense (DoD). Headquartered at Offutt Air Force Base, Nebraska, USSTRATCOM is responsible for strategic deterrence, global strike, and operating the Defense Department's Global Information Grid. It also provides a host of capabilities to support the other combatant commands, including strategic warning; integrated missile defense; global command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR); and measures to combat weapons of mass destruction.

Established Oct. 1, 2002, USSTRATCOM has made many contributions to the national defense in its nine years of existence. For example, it has provided intelligence, planning and cyber support to coalition forces in Afghanistan and Iraq. It monitors orbiting satellites and space debris, allowing high-value spacecraft like the International Space Station to maneuver and avoid collision. It has fielded systems to provide limited protection against ballistic missile attack. In February 2008, it destroyed a satellite that was about to re-enter the earth's atmosphere. In 2011, it supported U.S. Africa Command's operations against Libya in a variety of ways, including long-range conventional strikes and ISR. Today's USSTRATCOM is the product of an evolution from a nuclear command to a strategic one in the broadest sense—from an organization prepared to employ thermonuclear weapons in a general war (which it existed to prevent) to a command that creates a variety of global strategic effects day to day in support of national objectives. Its rich history draws on important contributions from many different organizations stretching back to World War II.
http://www.stratcom.mil/history/

SAC - STRATCOM - Cybercommand - Space Command
http://www.stratcom.mil/

Day-to-day planning and execution for U.S. Strategic Command's mission areas is done by a sub-unified command and the following USSTRATCOM components:

U.S. Cyber Command Fort Meade, MD – Plans, coordinates, integrates, synchronizes, and conducts activities to: direct the operations and defense of specified Department of Defense information networks and; prepare to, and when directed, conduct full-spectrum military cyberspace operations in order to enable actions in all domains, ensure US/Allied freedom of action in cyberspace and deny the same to our adversaries. (more)

JFCC-Global Strike (JFCC-GS) Offutt AFB, NE – Conducts kinetic (nuclear and conventional) and non-kinetic effects planning. GS manages global force activities to assure allies and to deter and dissuade actions detrimental to the United States and its global interests; should deterrence fail, employs global strike forces in support of combatant commander. (more)

JFCC - Space (JFCC-Space) Vandenberg AFB, CA – Continuously coordinates, plans, integrates, commands and controls space operations to provide tailored, responsive, local and global effects, and on order, denies the enemy the same, in support of national, USSTRATCOM, and combatant commander objectives. (more)

JFCC - Integrated Missile Defense (JFCC-IMD) Schriever AFB, CO – Is constantly monitoring for any missile activity or threat against the United States and its allies. In the event of an attack, IMD plans and coordinates the necessary actions to counter the threat. (more)

JFCC - Intelligence, Surveillance and Reconnaissance (JFCC-ISR) Bolling AFB, Washington, D.C. – Identifies and recommends appropriate resources to meet high priority intelligence requirements. Essentially, ISR helps ensure the best use of resources to provide decision makers and troops with crucial information when and where they need. (more)

USSTRATCOM Center for Combating Weapons of Mass Destruction (SCC-WMD) Fort Belvoir, VA – Provides the Defense Department with expertise in contingency and crisis planning to interdict and eliminate the proliferation or use of Weapons of Mass Destruction. (more)

Standing Joint Force Headquarters for Elimination (SJFHQ-E) Fort Belvoir, VA – Plans and trains to enable the command and control of weapons of mass destruction elimination (WMD-E) operations in support of Geographic Combatant Commands (GCCs); on order, deploys to augment an existing HQ or to provide the core of a Joint Task Force that executes WMD-E operations.

Joint Warfare Analysis Center (JWAC) Dahlgren, VA – JWAC is a premier science and engineering institution tasked with solving complex challenges for our nation's warfighters. JWAC uses social and physical science techniques and engineering expertise to assist warfighters in support of our national security. JWAC coordinates directly with the staffs of all Unified Commands, Combatant Commands, Department of Defense (DoD) elements, military services, and other government departments and agencies in order to protect our country and help our nation's armed forces accomplish their missions. (more)

http://www.stratcom.mil/functional_components/

General Kehler:

I think you all know that Air Force Space Command is one of the service components to Strategic (formally SAC) command.

This being a space symposium it wouldn't surprise you, though, that I planned to provide my

perspectives regarding United States Strategic Command's space responsibilities. Now you're obviously, take a look at me, you're going to get a military perspective on some things this evening. That's not the 'only' perspective that there is about space. And I think everybody in this room knows that.

Our own United States government decided some years ago, in fact all the way back to the Eisenhower administration, to separate civil space from national security space. We did that for a reason. And I think that has proven to be a pretty good arrangement over the years. It allows us to interact in all the appropriate places where we share things because among the other things we share between civil space and national security space, *we share the industrial base. We share some facilities. We share astronauts, for example, and people*. But we've made a distinction in our country between civil space and national security space and I think for good reason. You're going to hear a national security space perspective from me this evening, and that shouldn't surprise you.

It was 11 years ago that Strategic command assumed the responsibilities of United States Space Command when those two commands merged. Much has happened since then, and I thought you might appreciate my assessment this evening on where we stand a decade into this old new command because as Strategic Command and *its predecessor Strategic Air Command*, my command has been around since 1946. It predates the establishment of the United States Air Force, as a matter of fact. People say well, but that was an Air Force thing, it was only an Air Force thing. Let me remind you that SAC was two things. It was a specific combatant command and it was an Air Force major command, *so the combatant command lineage does in fact extend to Strategic Command today*.

Uncertainty and complexity continue to dominate our national security landscape. **Today's operating environment is increasingly characterized for the potential for *a wide variety of conflict and probably across all domains*. It is an *operating environment unlike any we've ever seen before*. State and non-state actors alike can employ highly adaptive combinations of strategies and tactics and capabilities to simultaneously and quickly exploit and transit political, geographic and domain boundaries. Things are different today than they were ten years ago.**

The operating environment of space is STRATCOM aka Space Command. The term domains deals with intelligence threats in space, i.e., ETs. "Operating environment, UNLIKE ANY WE'VE EVER SEEN BEFORE! This is very telling. There are no new threats from 'political or geographic boundaries since WWII. (Ed's comments)

These hybrid threats are challenging all of our earlier assumptions. They are stressing our plans, our practices and our organizational structures. They are compounding unity of effort and they are demanding flexible and innovative approaches to create effects that are tailored to the unique actors, circumstances, and scenarios that we face. In short, technologies that allow us to move freely about the globe will likely make yesterday's battlefield tomorrow's global battle space.

Above paragraph: hybrid threat = alien technology and their command and control. *Google: command and control.* THEY are stressing because our technology is BEHIND... STILL! *"Create effects to unique actors and scenarios*." The SPACE COMMAND and the SPACE WAR explains where all the billions of the Black Budget have gone, even the 'missing money.' *I worked for 7 years for SAC (now STRATCOM).* Put it all together: Communications, electronic counter measures, crypto, satellite communications and telemetry, special schools, many weapons systems, a DoD Liaison to the defense industry, and multiple clearances! (Ed's comments)

What if I said, I believe 9/11 was planned so we could spend untold billions on Homeland Security and increase funding for organizations like the NSA, CIA, DHS, DIA, NRO, and Space Command. (Ed's comments)

The missions and forces assigned to this command allow us to gain a global perspective and also to create synergy from a range of strategic capabilities. Those that can create decisive impact, those that can affect large physical areas. Those that can act across great distances. *Those that persist over long periods of time.* Those that change the status quo in some fundamental way. And *those that provide the President ready military options in extreme circumstances.*

Those capabilities and those abilities are unique among the combatant commands. STRATCOM's nuclear and conventional strikes, *space, cyber, and other capabilities remain foundational to confronting the challenges of the future.* The United States can neither deter adversaries and assure allies nor prevail in conflict without them. Simply put, STRATCOM's responsibilities and capabilities underwrite freedom of action for our nation and generate viable options for our national leaders.

I don't have to remind anyone in this room how important space is to our national security and the security of our allies and partners. It is also important to our economy, to civil activities and scientific discovery. *Make no mistake. Space operations underpin U.S. national military objectives and they enhance the combat capability* of the joint force. *No other armed force relies on space as broadly or deeply as the U.S. military and no other military force derives the same unprecedented operational advantages from its use of space capabilities.*

But times have changed. You heard General Shelton earlier today talk about this is a confluence of events. If times have changed, as he offered and I would offer as well, we have to change. Things have to be different as we go forward and I think we all know that. Today's space environment is characterized by more participants, more activity, and the proliferation of a variety of capabilities that eventually can threaten our access to and freedom of action in space during a conflict.

Potential adversaries have noted the decisive advantages we have gained by using space. The importance of space and the new realities associated with space have led to updated national policies, new strategies, clear responsibilities and updated plans. The new presidential level National Space Policy in 2010 was followed by a new National Security Space Strategy signed by the Secretary of Defense and Director of National Intelligence in 2011. *In 2012 the Chairman of the Joint Chiefs of Staff issued a first-ever classified National Military Strategy for Space Operations. In December of 2012 the Department of Defense issued a new Space Policy Directive.*

These documents also emphasize the free use of space by all for peaceful purposes and stress the importance of partnerships and a strong industrial base. They also charge the Department of Defense with a number of important missions and *acknowledge that we must be prepared to protect our space assets*, ground stations and networks if that ever becomes necessary.

Responsibilities are equally clear and here are some things that maybe you didn't know about Strategic Command, because regarding space, the commander of USSTRATCOM is responsible for the following things. And I would mention that when the document that assigns us the responsibilities assigned by the President, it doesn't say that STRATCOM was responsible for it. It says the commander of STRATCOM is responsible. That puts the who in it. I must say, I read that document very closely, after I was confirmed for this job. I read it pretty closely before I was confirmed for this job. Because it does say the Commander of USSTRATCOM is responsible for planning and conducting a full range of space operational missions. Serving as the DoD manager for human space flight operations. Providing warning and assessment of attack on space assets. Serving as the single point of contact and representative for military space operational matters. Conducting space situational awareness operations for a wide variety of users to include civil and as appropriate, commercial and foreign space entities.

These are tremendous responsibilities and all have grown in importance, especially the *situational awareness* responsibility that now consumes a great deal of our time and effort.

We don't execute most of these responsibilities from my headquarters in Omaha. Lieutenant General Susan Helms and our *Joint Functional Component Command for Space*, of JFCC Space for short, plans and executes most of them from her headquarters at Vandenberg. She also runs the Joint Space Operation Center, the JSPOC as everyone calls it, which is the focal point for space operations and supporting activity for all the combatant commands and agencies. Ensuring that space capabilities will be available whenever and wherever they are needed is one of my top priorities and STRATCOM has spent much of the last year improving our contingency plans and working with our service components to enhance the resilience of our space capabilities.

Space situational awareness or SSA for short, is foundational to freedom of action in all domains. SSA involves not only characterizing the dynamic physical environment and the objects in it, but *also the electromagnetic spectrum through which we transmit and receive spacecraft commands* and mission data. *Protecting our assets from unwanted electromagnetic interference is a growing concern.* [Where are the spacecraft that we are commanding? The space shuttle is gone. Ed] We are in the process of streamlining procedures to detect, identify, characterize, geo-locate and resolve such problems.

To give you some sense of the increased workload, over the last several years STRATCOM has entered into 35 signed commercial SSA sharing agreements. In 2012 we provided orbital data to 90 commercial and foreign and 180 U.S. entities. *We reviewed and received nearly 500,000 satellite observations and screened over 1,000 active satellites on a daily basis. From those screenings we provided over 10,000 conjunction warnings, supported 75 conjunction avoidance maneuvers, and fulfilled over 300 orbital data requests for more than 85 separate entities.* Those numbers will continue to grow every year, lending urgency to SSA improvements and establishment of appropriate rules of the road that will govern orbital behavior and allow us to more easily detect problems as they occur.

We're also working to improve our partnership with key friends and allies through a concept called Combined Space Operations. This concept is built upon the current Joint Space Operation Center at Vandenberg with virtual connections between it and other nation's space operation centers around the world. This new approach is similar to operations on the land, at sea or in the air by enabling partner nations to work together to maintain situational awareness, and to synchronize activities when that's appropriate.

Now while improving situational awareness is a key aspect of preparing for the future, we are taking additional steps as well. First, we continue to pursue the very best and brightest people and are working with our service components to ensure they are well trained with the right balance of technical and tactical skills and experience. *When you're finished with your degree at MIT, I have a paper I'd like for you to sign.*

We're very fortunate to have outstanding military, civilian and contractor professionals with an inspiring level of expertise, pride and patriotism. It's our biggest challenge to ensure we continue that trend even in the face of fiscal uncertainty. Access to orbit remains vital to national security, and the key to achieving it is an industrial base that is capable, responsive and affordable. Diversity in the launch marketplace could prove a positive development, and accordingly we support the efforts of the Air Force to expand the available industrial base of certified and proven launch providers. The success of other companies in addition to ULA is an encouraging step in the right direction, but we must continue to invest in capabilities that assure our access to space.

I mentioned the increased demand on situational awareness. We're going to have to maintain a robust and enduring capability to detect, track and analyze the tens of thousands of orbiting objects. Clearly there is an international demand for continued and ever-improving SSA, but challenges remain. New sensors, better integration of existing sensors, and tools like the JSPOC mission system or JMS are vital to our future.

With better situational awareness we need rules of the road, as I mentioned earlier. Rules that enhance our national security by helping us focus on the places and activities that may pose a threat. Speed limits may not stop speeders, but they show you who the speeders are. WE need these rules to help identify the potential bad actors.

We must also improve the resilience of our space, ground and network components. Here we have to work together to develop new architectures and concepts that take advantage of hosting, ride sharing and other ideas that I know all of you are working on.

We also need better plans, better operating concepts, tactics, techniques and procedures to improve the protection of our space capabilities as they become more and more threatened as time passes.

Finally, we have to work with all of you to ensure we have a solid industrial base with the right people leading and working in it. We must continue to rely on you to give us the tools we need, tools that in the future will be capable of going into harm's way and tools that are lower cost, maybe self-aware and smarter.

We can't ignore the very real financial issues our country is facing today. The Secretary of Defense recently announced that he has directed Deputy Secretary Carter and General Dempsey to look across the department to assess where resource adjustments could be made. None of us knows how that review will unfold, but there is no doubt that our space-based systems are expensive and will be part of that review. Regardless of the outcome, we must find ways to drive costs down as we look to the future.

I focused on space this evening, as I said I would. But I can't really talk about space any more without bringing cyberspace into the conversation. *Space and cyberspace share connection points across both of their domains and no doubt about it, we have just as many challenges in cyberspace as we do in space. Not only are those challenges operational in nature, but they are also intellectual in nature. Maybe the greatest threats to our space capability will come through cyberspace.* And maybe that threat will come as espionage against your intellectual property.

No one does space better than our U.S. industry team. That's why cyber spies are after you.

Cyber security requires a whole of government approach and a number of important steps have been taken recently. We know we need a stronger and real time partnership with industry. Cooperation and collaboration between the government and industry, the military and industry, the war fighters and industry, is going to remain important. I think it's going to get more important as we go forward, whether the subject is space or cyberspace.

We all are in for some very challenging days ahead. Challenging for the military, for the industry that supports us, and even to our allies. I predict a bumpy road. Financially, geopolitically and technologically, the way forward has many paths and has a lot of uncertainty.

Those changes occurring as we speak and those coming tomorrow will challenge us, but I spent the last several years at STRATCOM and before that as the Air Force Space Command commander watching what all of you do together. As a result I stand here tonight very confident in our capabilities to defend the nation and our allies, despite our challenges.
http://www.stratcom.mil/speeches/2013/91/29th_National_Space_Symposium/

DoD Joint Vision 2020 which has already been achieved and surpassed.
http://www.fas.org/spp/military/docops/usspac/visbook.pdf

Transformation

http://www.defense.gov/transformation/documents/

Andrew Johnson

From: Andrew Johnson [ad.johnson@ntlworld.com]
Sent: 15 June 2014 07:57
To: ad.johnson@ntlworld.com
Subject: FW: Space Technoloty - Info

From: Ed
Sent: 26 March 2014 02:15
To: Ed
Subject: Space Technoloty - Info

The F-15 ASAT aircraft launched a missile and killed a satellite in 1985. That was one of my programs.
The F-15 released its missile at 80,000 feet.

A **low Earth orbit** (**LEO**) is an orbit around Earth with an altitude between 160 kilometers **(99 mi) [522,000 feet],** with an orbital period of about 88 minutes, and 2,000 kilometers (1,200 mi), with a period of about 127 minutes. Objects below approximately 160 kilometers (99 mi) will experience very rapid orbital decay and altitude loss.[1][2] With the exception of the manned lunar flights of the Apollo program, all human spaceflights have taken place in LEO (or were suborbital). The altitude record for a human spaceflight in LEO was Gemini 11 with an apogee of 1,374.1 kilometers (853.8 mi). All manned space stations to date, as well as the majority of artificial satellites, have been in LEO.

The X-15 could reach an altitude of 67 (353,000 feet) miles in 1963. That was 50 years ago. Further rocket boosters put it into low earth orbit for a short period of time and were classified.

A magnetic rail system going up a mountain side could easily replace a first stage to orbit and we've had this technology since the 80s. The second stage or aerospace (Space Fleet) plane could easily obtain low or medium earth orbit.

Even without the T. Thompson Brown, or the Benfield-Brown technology or the gravity warping or the elusive anti-gravity technologies we should have easily achieved a low cost two stage to orbit capability by 1990.

Then once the payloads or parts were in orbit, larger inter-solar space fleets could have been and have been built.

The US isn't about to admit we have a Space Fleet with space ships. I'm not talking about satellites, space telescopes, and space based anti satellite and anti missile systems.

If you do enough reading, research and digging, you will know almost as much as I know and can't talk about.

Ed

Comparison of space launch methods
Initial operating condition for new systems

Method[a]	Publication year	Estimated build cost GUS$[b]	Payload mass kg	Estimated cost to LEO US$/kg[b]	Capacity Metric tons per year	Technology readiness level
Conventional rocket[1]	1903[4]		700 – 130,000	4,000 – 20,000	≈ 200	9
Space elevator	1895[5]					2
Non-rotating Skyhook	1990	< 1				2
Hypersonic Skyhook[6]	1993	< 1[c]	1,500[d]		30[e]	2
Rotovator[7]	1977					2
HASTOL[8][9]	2000		15,000[f]			2
Orbital ring[10]	1980	15		< 0.05		2
Launch loop[11] (small)	1985	10	5,000	300	40,000	2+
Launch loop[11] (large)	1985	30	5,000	3	6,000,000	2+
KITE Launcher[12]	2005					2
StarTram[13]	2001	20[g]	35,000	43	150,000	2
Ram accelerator[*citation needed*]	2004			< 500		6
Space gun[14][*dead link*]	1865[h]	0.5	450	500		6
Slingatron[15][16]			100			2 to 4
Laser propulsion[17]		2	100	550	3000	Up to 4
Microwave propulsion[18]		1	< 100	600		
Orbital Airship						

http://en.wikipedia.org/wiki/Non-rocket_spacelaunch

http://en.wikipedia.org/wiki/Comparison_of_orbital_launch_systems

1953	May 4	63,668 ft	19,406 m	Walter Frame Gibb	English Electric Canberra B.2	Turbojet	fitted with two Rolls-Royce Olympus engines.[30]
1953	August 21	83,235 ft	25,370 m	Lt. Col. Marion Carl	Douglas D-558-2 Skyrocket	Payload Deployed Rocket Plane	Unofficial record. Powered by the XLR-11 liquid fuel rocket engine (designated as XLR8-RM-5).
1954	May 28	90,440 ft	27,570 m	Arthur W. Murray	Bell X-1A	Payload Deployed	Unofficial record. Powered by the XLR-11 liquid fuel rocket engine.[31]

						Rocket Plane	
1955	August 29	65,876 ft	20,079 m	Walter Frame Gibb	English Electric Canberra B.2	Turbojet	Olympus powered.[32]
1956	September 7	126,283 ft	38,491 m	Iven Kincheloe	Bell X-2	Payload Deployed Rocket Plane	[33]
1957	August 28	70,310 ft	21,430 m	Mike Randrup	English Electric Canberra B.2	Turbojet/rocket	With Scorpion Rocket Motor
1958	April 18	76,939 ft	23,451 m	Lieutenant CommanderGeorge C. Watkins	F11F-1F Tiger	Turbojet	[34]
1958	May 2	79,452 ft	24,217 m	Roger Carpentier	SNCASO Trident II	Turbojet + rocket	
1958	May 7	91,243 ft	27,811 m	Major Howard C. Johnson	Lockheed F-104 Starfighter	Turbojet	The F-104 became the first aircraft to simultaneously hold the world speed and altitude records when on 16 May 1958, U.S. Air Force Capt Walter W. Irwin set a world speed record of 1,404.19 mph
1959	September 4	94,658 ft	28,852 m	Vladimir Ilyushin	Sukhoi Su-9	Turbojet	
1959	December 6	98,557 ft	30,040 m	Commander Lawrence E. Flint, Jr.	McDonnell Douglas F-4 Phantom II	Turbojet	
1959	December 14	103,389 ft	31,513 m	Capt "Joe" B. Jordan	Lockheed F-104 Starfighter	J79 Turbojet	
1961	April 28	113,891 ft	34,714 m	Giorgii Mosolov	Ye-66A Mig-21	R-11 Turbojet	
1962	July 17	59.6 mi	95.9 km	Robert Michael White	X-15	Payload Deployed Rocket Plane	Not a C-1 FAI record
1963	July 19	65.8 mi	105.9 km	Joseph Albert Walker	X-15	Payload Deployed Rocket Plane	Not a C-1 FAI record.
1963	**August 22**	**66.9 mi**	**107.7 km**	**Joseph Albert Walker**	**X-15**	Payload Deployed Rocket Plane	Not a C-1 FAI record
1963	November 15	118,860 ft	36,230 m	Major Robert W. Smith	Lockheed NF-104A	Turbojet + rocket	Unofficial altitude record for aircraft with self powered take off.
1963	December 6	120,800 ft	36,800 m	Major Robert W. Smith	Lockheed NF-104A	Turbojet + rocket	Unofficial altitude record for aircraft with self powered take off.
1973	July 25	118,898 ft	36,240 m	A. Fedotov	Soviet Ye-266	Jet plane record	Under Federation Aeronautique Internationale (FAI) classification the Ye-155 type
1977	August 31	123,520 ft	37,650 m	A. Fedotov	Soviet Ye-266	Jet plane record	Under Federation Aeronautique Internationale (FAI) classification the Ye-155 type
1995	August 4	60,897 ft	18,561 m		Grob Strato 2C	manned propeller monoplane record to date	
2001	August 14	96,863 ft	29,524 m	Unmanned	NASA Helios HP01	propeller	Set altitude records for propeller driven aircraft, solar-electric aircraft, and highest altitude in horizontal flight by a winged aircraft.
2004	October 4	69.6 mi	112.0 km	Brian Binnie	SpaceShipOne	Payload Deployed rocket plane	

Jet aircraft[edit]

The highest **current world absolute general aviation altitude record** -General Aviation World Records- achieved by a manned air-breathing jet propelled aircraft is **37,650 metres (123,520 ft)** set by Alexandr Fedotov, in a Mikoyan Gurevitch E-266M (MiG-25M), on 31 August 1977.

Rocket plane[edit]

The highest altitude obtained by a manned aeroplane (launched from another aircraft) is 111,996 m (367,441 ft) by Brian Binnie in the Scaled Composites SpaceShipOne (powered by a Scaled Composite SD-010 engine with 18,000 pounds (8,200 kg) of thrust) on 4 October 2004 at Mojave, CA. The previous (unofficial) record was 107,960 m (354,199 ft) set by Joseph A. Walker in an X-15 on August 22, 1963.

Electrically powered aircraft[edit]

The highest altitude obtained by an electrically powered aircraft is 96,863 feet (29,524 m) on August 14, 2001 by the NASA Helios, and is the highest altitude in horizontal flight by a winged aircraft. This is also the altitude record for propeller driven aircraft, FAI class U (Experimental / New Technologies), and FAI class U-1.d (Remotly controlled UAV : Weight 500 kg to less than 2'500 kg).[37]

Check out these cool pictures.

https://www.google.com/search?q=single+stage+to+orbit+ksp&rlz=1C1OPRB_enUS561US573&espv=210&es_sm=122&tbm=isch&tbo=u&source=univ&sa=X&ei=cyoyU5TIHJLW2wWfhIGICA&ved=0CEwQsAQ&biw=19

2012 Annual Report: Opportunities to Reduce Duplication, Overlap, and Fragmentation, Achieve Savings, and Enhance Revenue.

GAO-12-342SP. (Washington, D.C.: February 28, 2012).

Space Research: Content and Coordination of Space Science and Technology Strategy Need to Be More Robust. GAO-11-722. (Washington, D.C.: July 1, 2011).

Space and Missile Defense Acquisitions: Periodic Assessment Needed to Correct Parts Quality Problems in Major Programs. GAO-11-404. (Washington, D.C.: June 24, 2011).

Space Acquisitions: Development and Oversight Challenges in Delivering Improved Space Situational Awareness Capabilities. GAO-11-545. (Washington, D.C.: May 27, 2011).

Space Acquisitions: DOD Delivering New Generations of Satellites, but Space System Acquisition Challenges Remain. GAO-11-590T. (Washington, D.C.: May 11, 2011).

Evolved Expendable Launch Vehicle: DOD Needs to Ensure New Acquisition Strategy Is Based on Sufficient Information. GAO-11-641. (Washington, D.C.: September 15, 2011).

Space Acquisitions: Challenges in Commercializing Technologies Developed under the Small Business Innovation Research Program. GAO-11-21. (Washington, D.C.: November 10, 2010).

Global Positioning System: Challenges in Sustaining and Upgrading Capabilities Persist. GAO-10-636. (Washington, D.C.: September 15, 2010).

Briefing on Commercial and Department of Defense Space System Requirements and Acquisition Practices. GAO-10-315R. (Washington, D.C.: January 14, 2010).

Defense Acquisitions: Challenges in Aligning Space System Components. GAO-10-55. (Washington, D.C.: October 29, 2009).

Space Acquisitions: Uncertainties in the Evolved Expendable Launch Vehicle Program Pose Management and Oversight Challenges. GAO-08-1039. (Washington, D.C.: September 26, 2008).

. Space Acquisitions: DOD Needs to Take More Action to Address Unrealistic Initial Cost Estimates of Space Systems.
GAO-07-96. .
. (Washington, D.C.: November 17, 2006
http://www.gao.gov/assets/670/661567.pdf

Notice the years. Notice the Triangle. Notice "Through Space and Time.

Andrew Johnson

Subject: FW: Estimate of Space Command Fleet ships

From: Andrew Johnson [mailto:outgoing@checktheevidence.co.uk]
Sent: 25 March 2014 07:29
Subject: FW: Estimate of Space Command Fleet ships

Interesting E-mail from Edgar Fouche - not sure about the Neil Armstrong quote, which if he made it, was not from within an Apollo LEM etc....

From: Ed
Sent: 24 March 2014 22:06
To: Ed
Subject: Estimate of Space Command Fleet ships

Estimate of Space Command Fleet ships

I believe my information is accurate within +/-10%

The US operates with the UK, Japanese, and the Canadians.

I have conflicting information about whether the Russians are involved with the US or the Chinese, or just playing both sides?

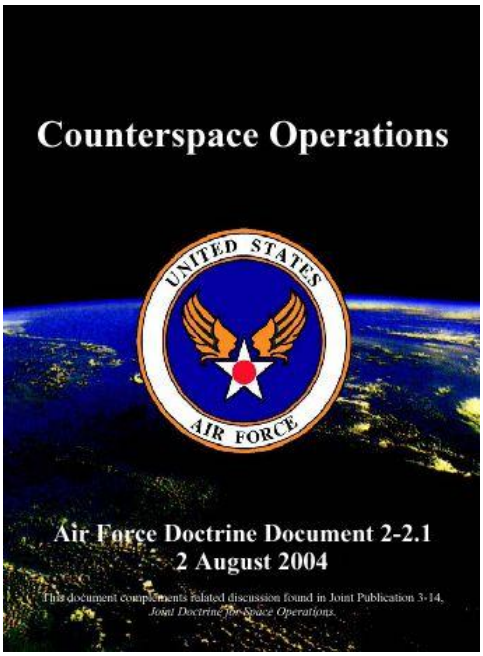
Other SpaceCraft denotes they are NOT satellites, have maneuvering capabilities, and are Military/Government funded/controlled programs.

Good night. Ed

LEO = Low Earth Orbit, MEO = Medium Earth Orbit, Geosynchronous Earth Orbit,

	Country Organization	Spacecraft Deployed	LEO SpaceCraft	MEO SpaceCraft	GEO SpaceCraft	Other SpaceCraft
	World	**7416**	**5641**	**359**	**799**	**617**
	Russia/USSR	4035	3610	187	148	90
	UNITED STATES	2040	1275	136	186	**443**
	CHINA	221	156	6	53	6
	JAPAN	178	97	4	52	25

http://satellitedebris.net/Database/UCSDB.php?page=3



Washington said his company's invention, the Advanced Plastics Engineered for the Extreme (APEX) material, could play a role in the development of advanced vehicles such as the XS-1.
He also flagged the promise of nano-diamond special coatings "and other things that are not yet ready to be talked about."

I believe the proprietary materials are quasicrystals I've spoken of since the early 90s. Ed

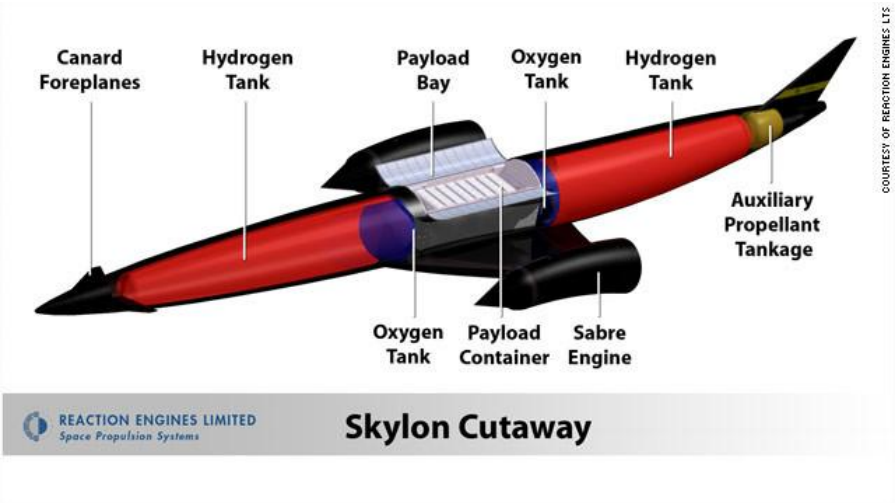
The focus is on revolutionizing the responsiveness and flexibility of space systems by introducing "aircraft-like" space access.

DARPA's Tactical Technology Office is also interested in space vehicle technologies that allow access to a wide range of altitudes and inclinations and also enable highly efficient on-orbit maneuvers.

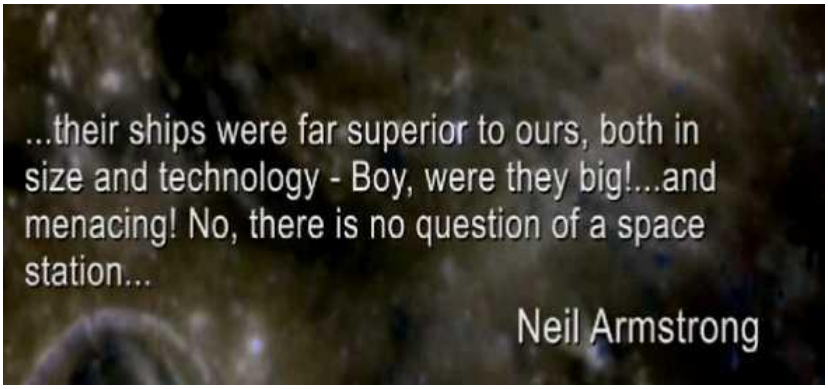
"What I think is important is that it take off the same way that it lands, if they want to get the kind of launch tempo they're aiming at. Having to change the orientation of a vehicle — landing on a runway, then having to erect it to take off vertically — can be a killer on ground turnaround time."

http://www.dailymail.co.uk/sciencetech/article-2154405/Secret-mission-accomplished-Americas-secret-space-plane-land-YEAR-orbit–knows-did-there.html

http://www.space.com/22836-military-experimental-space-plane-darpa.html



http://www.cnn.com/2012/06/08/us/space-shuttle-overheard-on-cnn/index.html



On the enlisted side, the Air Force maintains a cadre of **Space Systems Operators**that support both military and national goals beyond the clouds.

Military Requirements

Space Systems Operators need to meet medical qualifications for space operations, which include normal color vision, hearing, and equilibrium; absence of chronic migraines, epilepsy, or psychological conditions such as claustrophobia; and preclude those with regularly prescribed medications that "affect alertness, judgment, cognition, special sensory function, mood or coordination," according to the Air Force Instruction on Medical Examinations and Standards (PDF).

http://militarycareers.about.com/od/Career-Profiles/p/Usaf-Space-Systems-Operator.htm

AIR FORCE AIR AND SPACE EXPEDITIONARY FORCE CONCEPT

The Air Force has created 10 deployable AEFs either trained to task, or training, exercising, and preparing for the full spectrum of operations.