

Thank you ladies and gentlemen for your time and attention today.

And thank you, Devrie, for organizing this panel discussion on alternative approaches to funding Space Weather Acquisition as currently provided by NASA's ACE satellite.

I'd also like to thank our hosts at NASA, NOAA/SEC and the NSF for their continued support of Space Weather Week in these most challenging of times.



Not so long ago, The America's Cup was a clubby affair held every few years in the mild breezes off Newport, Rhode Island.

It's gotten a lot more crowded since the days of Commodore Vanderbilt.

Today, the America's Cup is defended by a group from a landlocked mountainous country in the middle of Europe. And before that, she was defended by New Zealanders and Australians who famously wrested the Cup from Americans way back in the nineteen eighties. She hasn't been home in quite some time.

But in the early stages of the contest for sport's oldest trophy this summer, talent, technology and teamwork plus a bit of luck, perseverance and commitment will determine who has the right to challenge the Swiss defender.

In this closely fought contest, none of the competing teams has a monopoly on any of the necessary conditions for dominance, least of all luck.

For the first time in the 156-year history of the America's Cup, yachts have come from China, Germany and South Africa as well as the US, Italy, Sweden, Spain and Switzerland.

Like businesses, the different teams - and, let's face it, they are businesses in their own right - have developed characteristic cultures and strategies. And this is so whether the team budget is \$16 million like China's or \$100 million like that of America's BMW Oracle team.

But regardless of the budget, from this hard fought contest, only one will emerge the winner of the America's Cup.

As the skipper of Britain's GBR Challenge team in 2003 said, "You can't just turn up at the America's Cup and expect to win. You have to put in the hard yards as nobody gives an inch."

Времена меняются ...



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It's no different in any other competitive endeavor.

Hard as it is to believe, but it's been almost 45 years since Yuri Gagarin orbited this warm wet ball known as Earth. American's last walked on the surface of the moon over thirty years ago.

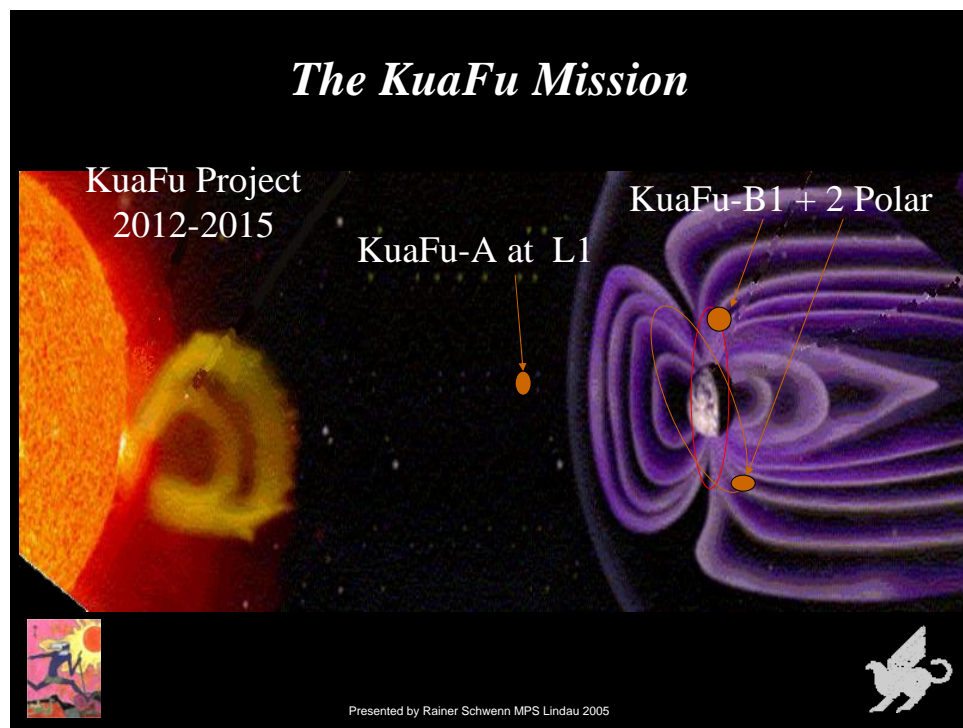
Things change. Today, no nation or global enterprise has an indefensible monopoly on talent, technology or teamwork when it comes to space. And those on top mustn't give an inch if they want to stay there.

India has long produced and launched satellites and ballistic missiles.

Its rival and neighbor, Pakistan, is no slouch in the technology realm, as the world learned to its surprise a few years ago.

And while its people endure famine, North Korea has built and launched missiles over the Sea of Japan.

Two years ago, China put astronauts in space. Later that year, her leaders engaged the Kremlin in joint military exercises, after decades earlier threatening a border war in Russia's Far East.



... and early this January, newspapers declared “China sets off a new round of Star Wars” as China provided a startling demonstration of her national commitment to excel in space by shooting down a dormant weather satellite using a ground based missile.

These events impact, reflect and are manifestations of, an evolving system of systems affecting our daily lives around the globe.

The most widely known such system is the GPS satellite network at the heart of America’s Navigation, Positioning and Timing infrastructure.

And for all of us in the audience today concerned about Space Weather acquisition, the January target shoot clearly anticipates the launch of China’s KuaFu mission for the acquisition of Space Weather Data. The KuaFu project is currently a collaboration between CNSA, ESA and the Canadian Ravens project.

If deployed at L1, KuaFu-A will further undermine America’s assertion of dominance in the space weather arena.

Public Private Finance of NPT Systems

- *What is Public Private Finance?*
- *Who Uses It?*
- *How Does It Work?*
- *Case Study: IRIS 14/ DoD & Intelsat*
- *Common Misconceptions*
- *Conclusion for Space Weather Acquisition*

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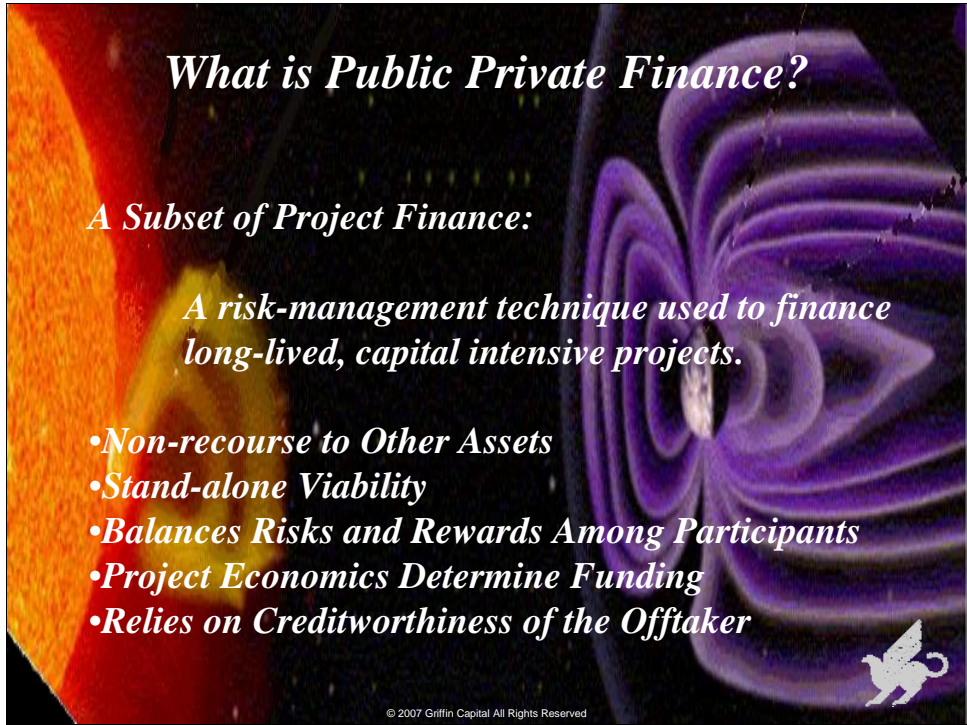


Every mission or program you plan faces agency funding risks.

But in a competitive world, risk come in many other guises.

Governments and companies must identify and manage these risks as effectively as they can, using the tools at their disposal.

Project finance, and related undertakings commonly known as “public private partnerships”, are among the tools and techniques used to finance big ticket projects worldwide.



Public Private Finance is a form of Project Finance

It allows companies and governments to raise finance without recourse to their other assets. The financier looks only to the revenue stream provided by the asset that is being financed. Thus, the UK government has been able to raise borrowings for essentially state enterprises that do not appear as government borrowings. In the US, this technique is used for toll roads and power projects.

For companies, this is traditional off balance sheet financing, similar to a long-term lease of an airplane or building. There are no tricks involved in true project finance because there are no guarantees or recourse whatsoever to the other assets. It is true “stand-alone” financing.

A well-conceived project can attract substantial funding by balancing risks and rewards among various participants. These risks might include cost overruns, delays to completion, changing cost of inputs such as feedstock and variable price of the output or finished product.

Because every project is unique, there are many “Project Finance” structures, but they all have one common element:

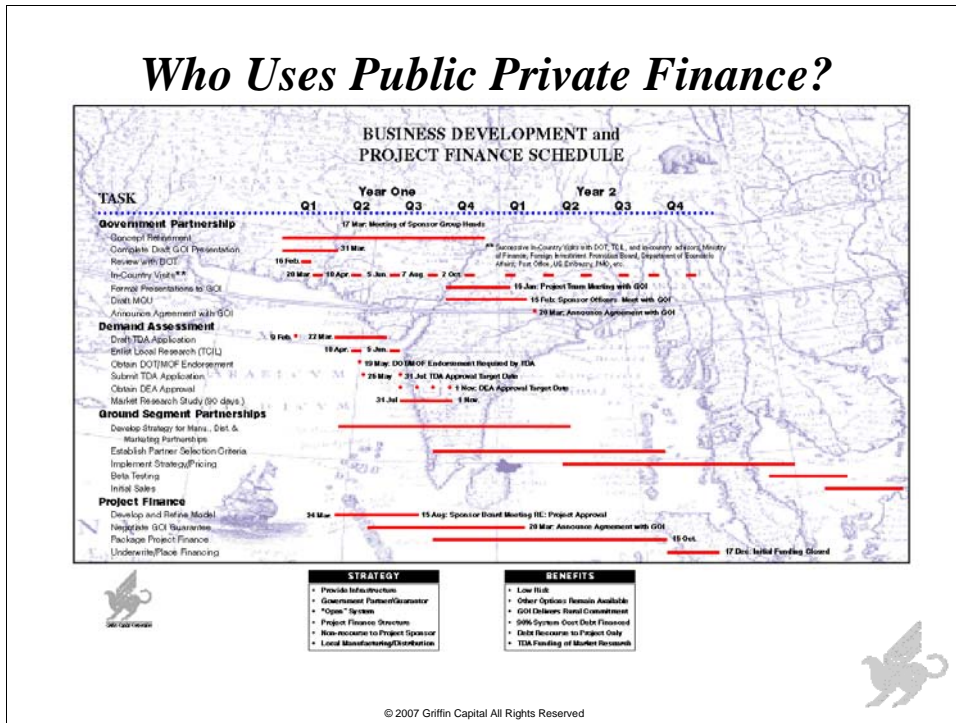
The financing is based on the economics of the project and is not dependent on the credit support of the sponsor or the value of the physical assets involved.

As a practical matter, this means the economic production of the project yields a predictable amount of cash or pre-sold product on a periodic basis. This ultimately depends on the creditworthiness of the offtake party.

This last point is important where projects are developed under government license or concession to develop or utilize a resource.

Such rights or concessions cannot readily be assigned as collateral to third-party lenders. The value of the assets and rights granted by license are thus of limited value to lenders.

Who Uses Public Private Finance?



Infrastructure Projects such as: Power Generation and Distribution, Communication Satellites, Transportation, Resources (mining, steel and petroleum), Property and Government programs like the UK Private Finance Initiative

How Does It Work?



Südeutsche SonnenStrom AG

CONSTRUCTION FINANCING SCHEDULE - SOURCES AND USES OF FUNDS - PROJECT COMPANY (Amounts are expressed in € '000 except per unit amounts)

SOURCES OF FUNDS	Project Month	0	1	2	3	4	5	Total
	Beginning	12-Aug-05	15-Aug-05	15-Sep-05	15-Oct-05	15-Nov-05	15-Dec-05	
Commercial Bank Construction Facility								
Periodic Beginning Balance		0	2,003	4,001	6,185	6,928	7,673	8,601
Drawdowns		2,003	1,991	2,171	721	721	902	8,509
Capitalized Interest Expense		0	7	14	21	24	26	91
Ending Balance		2,003	4,001	6,185	6,928	7,673	8,601	8,601
Owner Participant		836	55	48	19	34	378	1,371
Total Sources of Funds		2,839	4,056	6,234	6,947	7,707	8,979	9,972
% Drawdowns		28.5%	20.6%	22.4%	7.6%	7.8%	13.1%	100.00%

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How does it work?

Every project is unique, but bankable projects have similar elements.

Every successful project financing provides a satisfactory and economic allocation of project risk among the various participants.

The participants in a project financing generally include the project sponsor, lenders, suppliers of equipment and raw materials and a purchaser of the project output. The purchaser is often an affiliate of the project sponsor seeking direct access to a resource or product at a long-term fixed price.

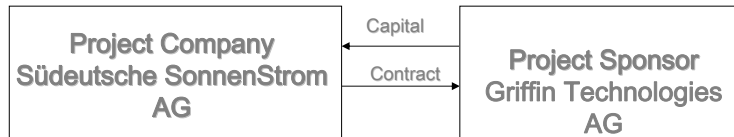
In general, a project sponsor may seek to allocate risks among:

- An EPC (Engineer, Procure and Construct) contractor or manufacturer who will design, build and deliver the project on a fixed-price, turnkey basis;
- A long-term production purchaser who agrees to buy product at a fixed price; this would include data from a satellite;
- An O&M (Operations and Maintenance) contractor who will maintain the satellite on station, manage anomalies and oversee ground stations;
- A monoline or other insurer who will insure the project as required by the lenders.

As an example, let's look at two projects. The first is a solar power project we acquired in Germany. The second is a recently announced satellite project undertaken by DoD, Intelsat and Cisco.

How Does It Work?

Südeutsche SonnenStrom AG



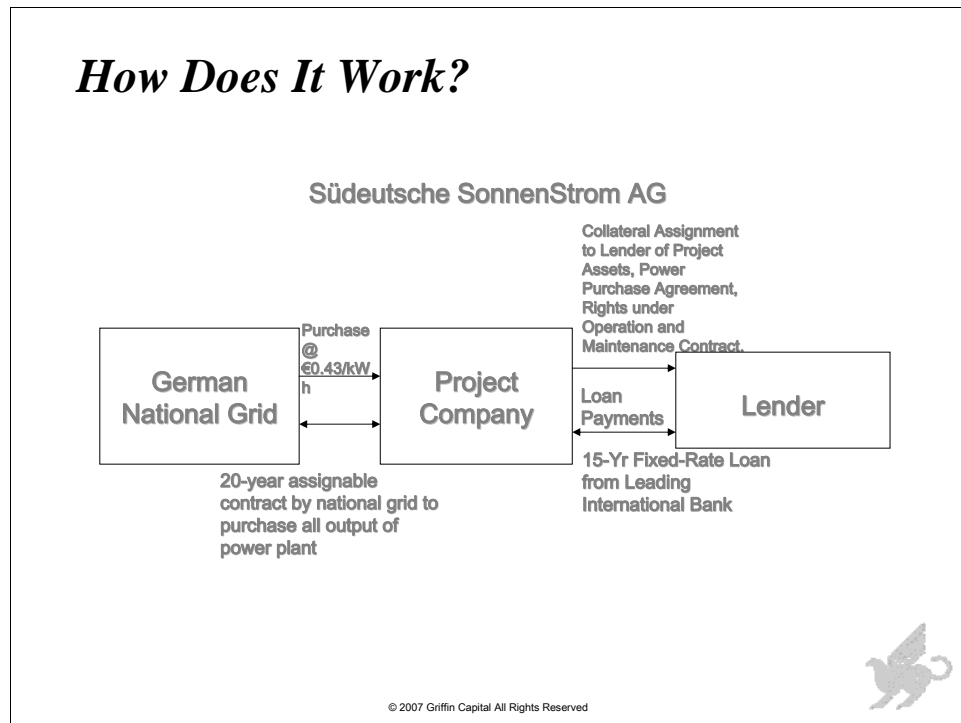
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Like all project sponsors, we want to isolate ourselves from financial liability.

For this reason, most projects are undertaken through a special purpose entity such as a limited liability company established by the sponsor. The sponsor maintains control through ownership or management contracts or a combination of the two.

How Does It Work?



Allocating risks among the project participants is accomplished using written contracts. In the case of the solar power project, the contracts rights are created and assigned as illustrated here ... It's important to recognize that participants rely on contracts. Thus,

The foundation of a successful project financing is ultimately a stable regulatory, tax and judicial regime.

I should emphasize again that transferring risks does not lead to the removal of the causes of the risk. It does result in the assumption of risk by a counter-party, since it is expected that the counter-party will be capable of controlling or bearing the risk.

The more reliable the counter-party, the lower your project's cost of borrowing.

Case Study: IRIS 14 / JCTD Program

Funded in FY 2007, IRIS will launch in Q1 2009 at 45°W and be managed by Intelsat General. The payload will convert to commercial use once testing has been completed.



Intelsat is the first commercial satellite company to be awarded a JCTD Program. The IRIS JCTD is a three-year program that allows the DoD to collaborate with Intelsat General and Cisco to demonstrate and assess the utility of the IRIS capability. A private equity fund has pledged to raise \$200 million.



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The IRIS (Internet Router in Space) program is a recent example of a public private partnership. The funding program's similar to lease financing we've arranged for several satellite fleet operators.

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Cisco, the global networking leader based in San Jose, CA, will provide commercial IP networking software for the on-board router. In addition, SEAKR Engineering Inc. of Denver, CO, will manufacture the space-hardened router and integrate it into the IRIS payload.

Concerto Advisors, a financial advisory firm based in Iowa City, IA, is organizing equity financing for a new company to provide the funds to design, build and operate the equipment used for the demonstration. Following the JCTD testing period, Concerto's affiliate will own the equipment, and Intelsat will operate the equipment on Concerto's behalf to provide services for government and commercial users.

PPP: Common Misconceptions

Lenders require little equity from the sponsor.

Lenders frequently expect the borrower to have substantial capital at risk, particularly during the project's construction phase. Depending on the size of the project, it may be difficult for a single EPC contractor to "wrap" all construction risk in a single EPC turnkey contract. Ultimately, the amount of equity will depend on the reliability of the income from the project. If the quality of the income is robust, little equity may be required. In other cases larger amounts of equity may be required. This equity may be obtained by selling shares in the project company.

The collateral is limited to a claim on project assets.

The value of a non-operating project is often far less than the project cost and may well be zero for a satellite project. The desire of lenders for a mortgage is often defensive – a "belt and braces" approach. This may facilitate a sale rather than any realistic method of ensuring repayment if the project fails on station or otherwise becomes uneconomic.



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Before I conclude, I should describe four common misconceptions about public private partnerships and project finance in general.

The first relates to equity (risk) capital, particularly during the construction, launch, delivery and on-station testing.

The second related to the distinction between cost and value and how lenders seek to secure their loan.

PPP: Common Misconceptions

Technical and economic performance of the project will be measured objectively according to tests by independent engineers.

Lenders will seek to reserve an element of discretion as to the satisfaction of these tests before releasing funds while borrowers will argue for objective tests which automatically release them from liability under the loan terms during the construction, delivery, testing and operating phases of the project.

Lenders and sponsors share the risk of project failure.

Lenders will seldom abandon a project as long as some positive operating cash flow is available to service loans. This is so even if the project returns are uneconomic to the original project sponsors.

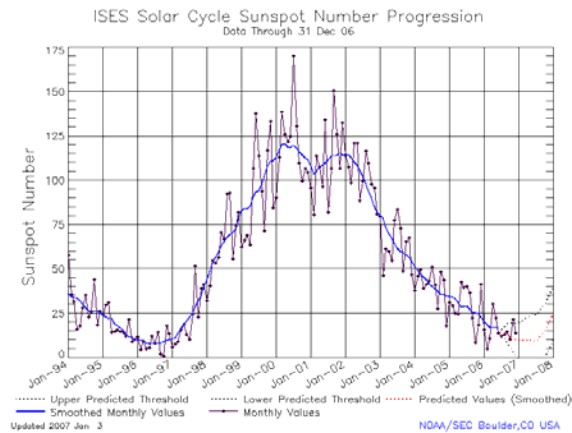


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The third common misconception about public private partnerships and project finance relates to the satisfaction of technical or engineering tests as a prior condition of funding.

The fourth, and perhaps most important misconception, is that lenders are not your partner. They will demand the right to take over a project as long as some positive operating cash flow is available to service their loan.

Conclusion for Space Weather Acquisition and NPT Systems



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China recently provided the world a startling demonstration of it's national commitment to excel in space. We should not be surprised by the spur of competition, just as we were when Sputnik was launched and Yuri Gagarin orbited the Earth.

We increasingly rely on an evolving system of systems affecting our daily lives around the globe. As Fugro Chance will illustrate in their presentation later today, these systems are at the heart of our navigation, positioning and timing infrastructure.

The competitive evolution of such systems naturally alarms Washington due to its dependency on satellites for imaging, surveillance, battlefield communications and missile defense systems.

As we enter the next eleven-year solar cycle, we'll find our use of terrestrial and space-based navigation, positioning and timing systems often interrupted due to increasing solar wind.

This will be inconvenient while watching the latest match play on your videophone. It will be life threatening during periods of conflict as well as during manned flight to Mars. And it will be costly to insurers and will inhibit achievement of minimum field operation standards for a range of activities.

The ability to predict these interruptions depends on a reliable data stream provided by NASA's ACE satellite, now operating beyond its design life. The NSSO/DOT initiative to develop a national NPT infrastructure has at its foundation the continuous acquisition of space weather data.



Conclusion for Space Weather Acquisition

The Availability of Private Funding for Space Weather Acquisition Will Depend on the Creditworthiness of the Offtaker or Guarantor (the Manufacturer or Owner).

Financial Test: PV of the Offtake Contract Must be Less Than Project Cost.

A Regulatory Mandate May Be Essential to Establish Bankable Demand.

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Last year, NOAA/NESDIS proposed funding a follow-on mission to ACE based on established model commonly known as “public-private partnership”. For decades, these financing programs have financed government programs in transportation, communications, energy, health care, and student housing.

Public private partnership funding structures are designed for the direct benefit of a community of users including government and industry. These techniques will become increasingly useful if traditional funding is reprogrammed to other agencies and needs.

A well conceived public private funding program can expedite the continuous and reliable delivery of space weather data.

Such financing will ultimately rely on bankable off take commitments to purchase data and services.

A preliminary assessment of demand for solar weather data is thus the foundation of any bankable project.



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Global consolidation among insurers, electric utilities, airlines, precision drilling operators and satellite constellation owner/operators concentrates buying power among users who regard space weather data as risk mitigation tool. This may be more compelling as we further explore the issue of climate change.

Existing applications tailored to particular user communities are of diminishing value and will atrophy if they cannot be validated by comparison to live solar wind data.

This has been done before successfully ... Britain's MOD has funded billions worth of satellite platforms using its Private Finance Initiative program.

Whether or not space weather data is purchased for terms equal to or exceeding the estimated 11-12 year duration of solar cycle 24 may depend on statutes or regulations mandating such use. Such mandates have been implemented in the aviation industry within the EU. A regulatory mandate supporting Space Weather Data Acquisition may be appropriate in the US as well.

Thanks for your attention ... are there any questions?



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Representative space-based project finance experience is summarized at:
http://www.griffincap.com/english/space_big.html

Thank you for your time.