

[Virtual Library] ホームページ<http://www.space-library.com> ミルスペースのアーカイブ, Virtual 書架 他

[新着] Stars & Stripes(Cover),06.08.14, NorthernLight .06.08.11, AstroNews 06.08.11, SpaceObserver 06.08.10, SatelliteFlyer 06.08.10, Air & Space(Smithsonian): LINK 追加

[独断と偏見] 若田光一宇宙飛行士の Dr. Lisa Randall インタビュー

8/11 夜 NHK BS1「未来への提言」で見せていただきました。九大の平山ニュースのTVプログラム・スケジュールで何度も出ていたので気にはしていたのですが、なかなか見る機会がありませんでした。5次元空間世界とか隠れた次元(Hidden Dimension)とか新しい言葉を聞くことになり刺激的でした。現在少し読み始めた The Elegant Universe(Brian Greene)と近い分野ですね。A Brief History of Time (S. Hawking)の

後半をもう少し詳しく知るには面白い話だと思います。結局、番組で紹介のあった素人向けの著書である Warped Passages(Lisa Randall)を購入し配することになりました。まだ、Parallel Universe, Multi-Universe, Baby Universe とかの言葉は珍奇に聞こえる状況ですが、再放送される時には是非ご覧下さい。

[一部分のサウンド・クリップ] [http://www008.upp.so-net.ne.jp/kimball/lisa\\_0528a.mp3](http://www008.upp.so-net.ne.jp/kimball/lisa_0528a.mp3)

[編注] たくさんのブログにこの話題が出ているのにびっくりしました。おまけに上記のようなサウンドクリップまで記録した人がいたりして。

[講演会開催案内] 「『災害チャーター』について」 無料

日時: 平成18年8月21日(月) 13:30~15:00

講師: ジョアンナ・ガブリノビツ教授 (Prof. Joanne Irene Gabrynowicz)

ミシシッピ大学法科大学院付属国家リモート・センシング宇宙法センター所長  
(the Director of the National Remote Sensing and Space Law Center)

講師略歴: <http://www.spacelaw.olemiss.edu/staff/gabrynowicz/bio.htm>

場所: 慶應義塾大学三田キャンパス東館8階ホール

コーディネータ: 青木 節子

慶應義塾大学総合政策学部教授・グローバルセキュリティ研究所上席研究員

申込み: 参加を希望される方は下記 URL からお申込み下さい。

<http://www.gsec.keio.ac.jp/event/infection.html>

事務局: 慶應義塾大学 G-SEC 研究所 [gsec@info.keio.ac.jp](mailto:gsec@info.keio.ac.jp) TEL:03-5427-1702

0606 Air & Space Power Journal 資料全体は <http://www.space-library.com/> の 5.2 項 米国セキュリティ、軍事関連レポートなど からダウンロード可

**米空軍にとって ORS(運用的に即応宇宙)は宇宙アクセス(打上げロケット)の将来であろうか?**

**Is Operationally Responsive Space the Future of Access to Space for the US Air Force?**

LT COL KENDALL K. BROWN, USAFR, PHD\*

概要

ORS(運用的即応宇宙)コンセプトの鍵は即応打上げ能力である。このようなロケットがなければ、適切な宇宙アセットとインフラを確立するために設計された改善はかなり効率が劣ることが判明しよう。AFSPC は AFRL と DARPA の支援を得て、即応打上げを現実のものとするため、現在、予備的システム取得スタディ、技術開発とコンセプト実証を進めている。  
この記事は ORS の議論に対抗意見を述べる  
(後略)

THE KEYSTONE OF the operationally responsive space (ORS) concept is a responsive launch capability. Without such space lift, improvements designed to establish suitable space assets and infrastructure will prove significantly less effective. Air Force Space Command (AFSPC), with support from the Air Force Research Laboratory (AFRL) and the Defense Advanced Research Projects Agency (DARPA), is currently conducting preliminary system-acquisition studies, technology development, and concept demonstrations to make responsive launch a reality. This article presents opposing ORS arguments. (後略)

AFSPC = 空軍宇宙コマンド、 AFRL = 空軍研究所、

0606 Air & Space Power Journal 資料全体は <http://www.space-library.com/> の 5.2 項 米国セキュリティ、軍事関連レポートなど からダウンロード可

ゼウスの雷を盗む、敵の衛星に対抗し物理的に宇宙コントロールすることの利点

Stealing Zeus' s Thunder, Physical Space-Control Advantages against Hostile Satellites

CAPT JOSEPH T. PAGE II, USAF\*

<p>宇宙の暗い深みで無人の宇宙機が米国の軍事力の情報を収集する仕事にでかける。この情報は収集分析され紛争に於けるパワーのバランスの一端となり得る。衛星が期待した通りに機能しなかったら――地球で起こっている変化に目つぶされたりモセン衛星と地上局に信号をリレーバックしない通信衛星――生じる渾沌・混乱を想像してみるとよい。意図的に衛星を壊滅的に故障させるのに使われる民間用語は宇宙戦である。軍事科学の分野では、宇宙戦の概念はまだ新しく、50年ほど前に宇宙時代が来て存在するようになった。多くの異なる分野で宇宙戦が存在する、宇宙環境に適応された陸、空あるいは海の戦闘の技法の延長としてほとんどは開発された。(後略)</p>	<p>IN THE DEEP, dark depths of space, unmanned spacecraft go about their business collecting intelligence information on US military forces. This information, collected and analyzed, could tip the balance of power in a conflict. Imagine the chaos that would result if the satellite did not function as expected—remote-sensing satellites blinded to the changes happening on Earth and communication satellites without signals to relay back to the ground station. The civilian term for intentionally causing catastrophic failure of satellite resources is space warfare. In the realm of military science, the concept of space warfare is quite young, having come into existence only when the space age came about approximately five decades ago. Many different areas of space warfare exist, most of them developed as an extension of land-, air-, or sea-warfare techniques adapted to the space environment.(後略)</p>
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06.08 Air Force Magazine Space Almanac 資料全体は <http://www.space-library.com/> の5.1項 航空宇宙関連 新聞、雑誌 からダウンロード可

US Military/Civil Launches (As of Dec. 31, 2005)

Year	Mil	Civil	Total	Year	Mil	Civil	Total	Year	Mil	Civil	Total	Year	Mil	Civil	Total
1958	0	7	7	1970	18	11	29	1982	6	12	18	1994	11	15	26
1959	6	5	11	1971	16	16	32	1983	8	14	22	1995	9	18	27
1960	11	5	16	1972	14	17	31	1984	11	11	22	1996	11	22	33
1961	19	10	29	1973	11	12	23	1985	4	13	17	1997	9	28	37
1962	32	20	52	1974	8	16	24	1986	4	2	6	1998	5	29	34
1963	25	13	38	1975	9	19	28	1987	6	2	8	1999	7	23	30
1964	33	24	57	1976	11	15	26	1988	8	4	12	2000	11	17	28
1965	34	29	63	1977	10	14	24	1989	11	7	18	2001	7	14	21
1966	35	38	73	1978	14	18	32	1990	11	16	27	2002	1	16	17
1967	29	29	58	1979	8	8	16	1991	6	12	18	2003	11	16	27
1968	23	22	45	1980	8	5	13	1992	11	17	28	2004	5	12	17
1969	17	23	40	1981	7	11	18	1993	12	11	23	2005	6	13	19
								<b>Total</b>	<b>589</b>	<b>731</b>	<b>1,320</b>				

Data changes in prior years reflect recategorization from civil to military launches.

06.08 Air Force Magazine Space Almanac 資料全体は <http://www.space-library.com/> の5.1項 航空宇宙関連 新聞、雑誌 からダウンロード可

What's Up There As of Dec. 31, 2005

<<< Payloads in Orbit >>>

#	Country Organization	Satellites	Space Probes	Debris	Total
1	US	927	55	2,381	3,363
2	Russia*	1,358	35	1,780	3,173
3	People's Republic of China	51	0	277	328
4	France	43	0	202	245
5	India	31	0	103	134
6	Japan	89	7	25	121
7	European Space Agency	36	6	27	69
8	Intl. Telecom Sat. Org.	62	0	0	62
9	Globalsat	52	0	0	52
10	Orbcomm	35	0	0	35
11	European Telecom Sat. Org.	27	0	0	27
12	Canada	23	0	1	24
13	Germany	21	2	1	24
14	United Kingdom	23	0	1	24
15	Italy	11	0	2	13
16	Luxembourg	13	0	0	13
17	Australia	9	0	0	11
18	Intl. Maritime Sat. Org.	11	0	0	11

19	Brazil	10	0	0	10
20	Sweden	10	0	0	10
21	Argentina	9	0	0	9
22	Indonesia	9	0	0	9
23	NATO	8	0	0	8
24	South Korea	8	0	0	8
25	Spain	8	0	0	8
26	Arab Sat. Comm. Org.	7	0	0	7
27	Mexico	6	0	0	6
28	Saudi Arabia	6	0	0	6
29	Czech Republic	5	0	0	5
30	Israel	5	0	0	5
31	Netherlands	5	0	0	5
32	Thailand	5	0	0	5
33	Turkey	5	0	0	5
34	Other**	41	3	0	44
<b>Total</b>		<b>2,969</b>	<b>108</b>	<b>4,802</b>	<b>7,879</b>

\* Russia includes Commonwealth of Independent States (CIS) and former Soviet Union.

\*\* Other refers to countries or organizations that have placed fewer than five objects in space.

06.08 Air Force Magazine      Space Almanac

### Air Force Personnel in Space

As of Sept. 30, 2005

	FY96	FY97	FY98	FY99	FY00	FY01	FY02	FY03	FY04	FY05
<b>Active Duty Air Force</b>	<b>22,224</b>	<b>21,049</b>	<b>19,198</b>	<b>18,201</b>	<b>17,337</b>	<b>17,004</b>	<b>19,064</b>	<b>19,495</b>	<b>19,862</b>	<b>16,758</b>
<b>Selected Guard and Reserve</b>										
Air National Guard	0	0	285	285	354	354	519	519	649	653
Air Force Reserve Command	336	435	508	629	699	705	847	987	1,024	1,050
<b>Total Guard and Reserve</b>	<b>336</b>	<b>435</b>	<b>793</b>	<b>914</b>	<b>1,053</b>	<b>1,059</b>	<b>1,366</b>	<b>-1,506</b>	<b>1,673</b>	<b>1,703</b>
<b>Direct-hire Civilian</b>	<b>4,758</b>	<b>4,740</b>	<b>4,354</b>	<b>4,140</b>	<b>4,351</b>	<b>4,665</b>	<b>6,325</b>	<b>6,333</b>	<b>6,396</b>	<b>6,541</b>

Space News      <http://www.space.com/spacenews/>

Week of August 14, 2006

Sat News

<http://www.satnews.com/>

### TOP NEWS STORIES

**Ariane 5 は8月 11 日に JCSAT-10 と Syracuse 3B 衛星を打上げる予定**

...      [Ariane 5 to Launch JCSAT-10, Syracuse 3B Satellites on August 11](#)

**SES Global は 2006 年の半期で\$276.24M の売上げ、16.6%の増加**

...      [SES Global Reports Profit Increase of \\$276.24-M in 1H 2006 on Revenue Growth of 16.6%](#)

**ボーイングは TSAT の運用の能力のデモを行なう**

...      [Boeing Demonstrates TSAT Operational Capabilities](#)

**Harris 社は Milstar 衛星で AEHF 海軍マルチバンド端末通信を達成**

...      [Harris Corporation Achieves AEHF Navy Multiband Terminal Communications with Milstar Satellite](#)

**シーロンチは Koreasat 5 衛星の打上げ準備**

...      [Sea Launch Prepares to Launch Koreasat 5 Satellite](#)

**DirecTV の第2四半期の利益は急上昇、しかし加入者の伸びは鈍化**

...      [DirecTV 2Q Profit Surges But Subscriber Growth Slows](#)

**RT Logic 社は Honeywell から TDRSS Modem を受注**

...      [RT Logic Awarded TDRSS Modems Contract by Honeywell](#)

## MetOp は 10 月に打上げ予定

... [MetOp to be Launched in October](#)

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[Lockheed Martin Press Releases](#) <http://www.lockheedmartin.com/wms/findPage.do?dsp=fnec&ti=111>

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[Boeing News Releases](#) <http://www.boeing.com/news/releases/index.html>

## ボーイングの製造したコンポーネントが ISS 国際宇宙ステーションを進ませる

Aug. 14, 2006 [Boeing-built Components Advance International Space Station Assembly](#)

[http://www.boeing.com/news/releases/2006/q3/060814c\\_nr.html](http://www.boeing.com/news/releases/2006/q3/060814c_nr.html)

## ボーイングは AH-64D Apache Longbow 501 号機を米陸軍に納入

Aug. 9, 2006 [Boeing Delivers 501st AH-64D Apache Longbow to U.S. Army](#)

[http://www.boeing.com/news/releases/2006/q3/060809b\\_nr.html](http://www.boeing.com/news/releases/2006/q3/060809b_nr.html)

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[France in Space](#) <http://www.france-science.org/home/page.asp?target=nfo-let&PUBLID=9&LNG=us>

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8/7/2006 – 8/11/2006 [AstroExpo.com](#) <http://www.astroexpo.com/News/TopNews.asp>

## Business News

### スペース・アドベンチャーズの宇宙飛行の申込み者の Charles Simonyi は医学審査を通過

[Space Adventures' Orbital Spaceflight Client, Charles Simonyi, Passes Medical Review](#)

<http://www.astroexpo.com/news/newsdetail.asp?ID=27052&ListType=TopNews&StartDate=8/7/2006&EndDate=8/11/2006>

August 10, 2006 – Space Adventures, Ltd., the world's leading space experiences company, announced that Charles Simonyi, Ph.D. has passed the medical review board of the Russian Federation, called the Government Medical Commission (GMK),

signifying the achievement of a major milestone in his orbital spaceflight preparation. The GMK board convened on Aug. 8 to review Dr. Simonyi's general medical condition and fitness for spaceflight.

### NASA Stennis 宇宙センターは契約を発表

[NASA Announces Stennis Space Center Contracts](#)

<http://www.astroexpo.com/news/newsdetail.asp?ID=27033&ListType=TopNews&StartDate=8/7/2006&EndDate=8/11/2006>

Aug. 9, 2006 – NASA's Stennis Space Center, Miss., announced two contract awards Wednesday.

Mississippi Space Services, located at Stennis, received a one-year contract extension to provide facility operating

services at the center. Stennis also exercised the first option on a six-year, cost-plus-award-fee contract with Sverdrup Technology, Inc., to support propulsion test operations at the center and NASA's Marshall Space Flight Center, Huntsville, Ala.

### プラット&ホイットニーRocketdyne は Huntsville における主な発展の計画を発表

[Pratt & Whitney Rocketdyne Announces Plans for Major Growth in Huntsville](#)

<http://www.astroexpo.com/news/newsdetail.asp?ID=27016&ListType=TopNews&StartDate=8/7/2006&EndDate=8/11/2006>

HUNTSVILLE, Ala., Aug. 8 /PRNewswire/ — Pratt & Whitney Rocketdyne (PWR) will grow its Huntsville, Ala. site operations through new business opportunities associated with NASA's Vision for Space Exploration. PWR is a business unit of United Technologies Corp. (NYSE: UTX).

Expansion of the Huntsville operation is part of an overall growth

strategy by Pratt & Whitney Rocketdyne to design, manufacture, assemble and test the engines needed to return the American space program to the moon. This growth initiative is in addition to providing the Space Shuttle Main Engine to NASA as the only reusable liquid-fueled rocket engine.

### RT Logic社はハネウエルよりTDRSSモデムの契約を獲得

#### RT Logic Awarded TDRSS Modems Contract by Honeywell

<http://www.astroexpo.com/news/newsdetail.asp?ID=27008&ListType=TopNews&StartDate=8/7/2006&EndDate=8/11/2006>

Wideband, Narrowband & TT&C Modems Being Delivered

COLORADO SPRINGS, Colo., Aug. 8 /PRNewswire/ -- RT Logic, a wholly owned subsidiary of Integral Systems, Inc. (Nasdaq: ISYS) today announced contract awards by Honeywell Technology Solutions Inc. (HTSI) for the delivery of Wideband,

Narrowband, and Telemetry, Tracking and Commanding (TT&C) modems in support of the Tracking and Data Relay Satellite System (TDRSS).

### GeoEyeは2006年第2四半期に総額\$19.6Mの米国政府契約を得た

#### GeoEye Awarded U.S. Government Contracts Totaling \$19.6 Million in Second Quarter 2006

<http://www.astroexpo.com/news/newsdetail.asp?ID=26983&ListType=TopNews&StartDate=8/7/2006&EndDate=8/11/2006>

DULLES, Va., Aug. 2, 2006 - GeoEye, the world's largest commercial satellite imaging company (OTCPK: ORBM), announced today that the U.S. Government has awarded the company contracts totaling \$19.6 million to supply imagery and value-added products and services to several Federal agencies including the United States Department of Agriculture (USDA), National Park Service, and the National Geospatial-Intelligence

Agency (NGA). GeoEye will supply imagery for these contracts from its constellation of three Earth-imaging satellites. These Agencies will use GeoEye's finished products and services in various capacities such as mapping, change detection and for environmental monitoring. These contracts are in addition to any previously announced awards made to the company.

### TeledyneはCollaborX社を買収する調整に入った

#### Teledyne Enters Agreement to Acquire CollaborX, Inc.

<http://www.astroexpo.com/news/newsdetail.asp?ID=26987&ListType=TopNews&StartDate=8/7/2006&EndDate=8/11/2006>

LOS ANGELES--Aug. 7, 2006--Teledyne Technologies Incorporated (NYSE:TDY) announced today that its subsidiary, Teledyne Brown Engineering, Inc., has entered into an agreement to acquire CollaborX, Inc., based in Colorado Springs, Colo., for \$17.5 million. The transaction is subject to customary closing conditions.

CollaborX provides government engineering services primarily to the U.S. Air Force and select joint military commands, such as the Missile Defense Agency, the United States Joint Forces Command and the United States Northern Command. CollaborX had revenue of \$13.6 million for its fiscal year ended December 2005.

## International Space News

### インド宇宙開発機構と海外の機関との相互のやりとり

#### Interaction Between ISRO And Foreign Based Organisations

<http://www.astroexpo.com/news/newsdetail.asp?ID=27047&ListType=TopNews&StartDate=8/7/2006&EndDate=8/11/2006>

August 10, 2006 - Indian Space Research Organization (ISRO) has built a number of satellites for weather, earth imaging, telecommunication, broadcasting etc. which are extensively used by national agencies. A part of the capacity relating to telecommunication and broadcasting is being leased to Indian

Corporate Houses on commercial basis. ISRO, through its commercial arm ANTRIX Corporation, has bagged commercial contracts to build two communication satellites for European customers.

### Proba-3: ESAのフォーメーション・フライングの第一ステップ

### Proba-3: ESA's first step towards formation flying

<http://www.astroexpo.com/news/newsdetail.asp?ID=27022&ListType=TopNews&StartDate=8/7/2006&EndDate=8/11/2006>

8 August 2006 – Proba-3 is the third in ESA's series of missions for validating developments in space systems while carrying an "added value" user payload which can directly benefit from the innovations under test.

Proba-3 will demonstrate the technologies required for formation flying of multiple spacecraft. An instrument to observe the solar corona is being used for the ongoing design phase.

During the ESA Council at Ministerial Level held in December 2005, new activities were proposed to cover the design, development and in-flight operation of a set of small satellites

for the full-scale testing and validation of formation flying missions.

Formation flying technologies will make new types of missions possible and provide a leap in the performance of future science, Earth observation and application missions.

### ISS クルーReiter は欧州の宇宙滞在の記録を破る

#### Reiter breaks European space endurance record

<http://www.astroexpo.com/news/newsdetail.asp?ID=27002&ListType=TopNews&StartDate=8/7/2006&EndDate=8/11/2006>

7 August 2006 – ESA astronaut and International Space Station (ISS) Expedition 13 crew member Thomas Reiter set a new record for the number of days spent in space by a European astronaut last week when he completed a total of over 209 days in orbit.

On the morning of Friday 4 August, just over 30 days after arriving at the Station on board Space Shuttle Discovery as a member of the STS-121 crew, Reiter broke the previous record of 209 days 12 hours 25 minutes and 11 seconds, which was held by his ESA colleague Jean-Pierre Haigneré.

ESA Director General Jean-Jacques Dordain sent a message of congratulations to Reiter who is scheduled to stay on board ISS until December 2006. "At the end of your mission you will have

spent one year in space. With this outstanding expertise and experience you – as our "highest flying" colleague – symbolise Europe's commitment to space," said Dordain. "We are extremely proud of your achievements and wish you the best of luck in your remaining time up there."

The Astrolab Mission is Thomas Reiter's second stay in space, between September 1995 and February 1996 he was on-board engineer for the ESA-Russian Euromir 95 mission to the Mir space station, along with Russian colleagues Yuri Gidzenko and Serguei Avdeev.

### Proton-M は欧州の衛星を準軌道に投入

#### Proton-M puts European satellites into suborbital trajectory

<http://www.astroexpo.com/news/newsdetail.asp?ID=26975&ListType=TopNews&StartDate=8/7/2006&EndDate=8/11/2006>

MOSCOW, August 5 (Itar-Tass) -- The Russian Proton-M carrier, which blasted off from Baikonur at 01:48 Moscow time (2148 GMT) on Saturday, has put the orbital unit of the Briz-M booster and the European communication satellite Hot Bird-8 to a suborbital trajectory.

The Federal Space Agency told Itar-Tass, "585 seconds after the lift-off, the orbital unit separated from Proton's third stage and started an autonomous flight along the suborbital trajectory with an inclination of 51.5 degrees."

"At the moment of separation the orbital unit was over 150 kilometres from Earth," an agency official said.

The four-stage liquid-fuel heavy modernised carrier Proton-M, with a lift-off mass of 700 tonnes, made by Khruichev, will put the satellite belonging to the European company Eutelsat to a geostationary orbit of 36,000 kilometres.

The satellite will provide space communication services to Europe, the Middle East, and North Africa. It is scheduled to reach the orbit at about 10:59 Moscow time (0659 GMT).

## SMART-1 は先月、軌道に

### Last month in orbit for SMART-1

<http://www.astroexpo.com/news/newsdetail.asp?ID=26990&ListType=TopNews&StartDate=8/7/2006&EndDate=8/11/2006>

2006-08-07 – The SMART-1 lunar mission is drawing to an end. After almost sixteen months of science investigations, it will crash on the lunar surface in the morning of 3 September 2006. The crash would naturally have taken place on 17 August, but as scientists want the SMART-1 to crash on the visible side of the Moon, the spacecraft's orbit has been adjusted. Powerful telescopes on the Earth may observe the crash as a faint flash,

followed by a cloud of dust thrown up by the impact.

SMART-1 was developed for ESA by SSC. The main mission objective – flight demonstration of solar electric propulsion for deep space missions – has been successfully achieved. The probe has also made observations of the lunar surface using miniaturised scientific instruments.

## Launch News

### シーロンチは Koreasat 5 衛星打上げ準備

#### Sea Launch Prepares to Launch Koreasat 5 Satellite

<http://www.astroexpo.com/news/newsdetail.asp?ID=27057&ListType=TopNews&StartDate=8/7/2006&EndDate=8/11/2006>

LONG BEACH, Calif., Aug. 10 /PRNewswire/ — The Sea Launch team is preparing for its fourth mission of the year, the launch of the Koreasat 5 communications satellite. The Odyssey Launch Platform and the Sea Launch Commander are on their way to the launch site at the equator to begin launch operations. Liftoff is expected at the opening of a one-hour launch window, at 8:27 pm Pacific Daylight Time on August 21 (03:27 GMT, Aug. 22).

Upon arrival at the launch site, the team will initiate a 72-hour countdown, ballasting the Launch Platform 65 feet, to launch depth, and performing final tests on the launch system and the spacecraft. A Zenit-3SL vehicle will lift the 4,448 kg (9,806 lb) Spacebus 4000 C1 spacecraft to geosynchronous transfer orbit (GTO), on its way to a final orbital position of 113 degrees East Longitude.

### Ariane 5 は商業衛星と軍事衛星を搭載して打上げ場所に移動

#### Ariane 5 moves to the launch zone with its commercial and military satellite passengers

<http://www.astroexpo.com/news/newsdetail.asp?ID=27062&ListType=TopNews&StartDate=8/7/2006&EndDate=8/11/2006>

August 10, 2006 – Another heavy-lift Ariane 5 is in the launch zone at Europe's Spaceport as preparations enter their final phase for tomorrow evening's (August 11) liftoff with a mixed payload of commercial and military telecommunications satellites. The Ariane 5 ECA emerged from the Spaceport's Final Assembly Building this morning under mostly sunny French Guiana skies. Riding atop its massive launch table, the vehicle proceeded along a 2.8-km. dual-rail track to the ELA-3 launch zone, and was positioned over the massive flame trenches at noon.

Tomorrow's launch will be Arianespace's third mission of 2006, continuing the series of dual-payload flights performed by heavy-lift Ariane 5s. The launcher is fitted with France's Syracuse 3B military relay platform and the JCSAT-10 commercial telecommunications satellite for Japan.

This mission underscores Arianespace's ability to team up satellites of varied utilizations on efficient dual-passenger launches. Syracuse 3B has a liftoff mass of 3,750 kg., while JCSAT-10 weighs in at approximately 4,050 kg.

### ロッキードマーチン製造の JCSAT-10 衛星は打上げ準備完了

#### Lockheed Martin-Built JCSAT-10 Satellite Ready for Launch

<http://www.astroexpo.com/news/newsdetail.asp?ID=27007&ListType=TopNews&StartDate=8/7/2006&EndDate=8/11/2006>

NEWTOWN, Pa., Aug. 8 /PRNewswire/ — The JCSAT-10 telecommunications satellite, designed and built by Lockheed

Martin (NYSE: LMT) for JSAT Corporation of Japan, is ready for launch Aug. 11. The launch is scheduled for 6:14 p.m. EDT aboard

an Ariane V launch vehicle provided by Arianespace.

JCSAT-10 is the fourth in a series of six satellite launches planned this year for Lockheed Martin Commercial Space Systems (LMCSS) and the second of three satellites Lockheed Martin will deliver to JSAT. JCSAT-9 was launched earlier this year on April 12 and JCSAT-11 is scheduled for launch in the third quarter of 2007.

JCSAT-10 is a high-power hybrid satellite consisting of 30 active Ku-band transponders and 12 active C-band transponders that will provide coverage to Japan, the Asia-Pacific region and Hawaii. It marks the 30th of Lockheed Martin's award-winning A2100 series of spacecraft delivered to satellite operators around the world. JCSAT-10 will operate from 128 degrees east and is designed for a minimum service life of 15 years.

### ILS Proton は Eutelsat の HOT BIRD 8 放送衛星の打上げ成功

#### ILS Proton Successfully Launches Eutelsat's HOT BIRD 8™ Broadcast Satellite

<http://www.astroexpo.com/news/newsdetail.asp?ID=26974&ListType=TopNews&StartDate=8/7/2006&EndDate=8/11/2006>

BAIKONUR COSMODROME, Kazakhstan, Aug. 5, 2006 – A Proton Breeze M launch vehicle successfully placed the HOT BIRD 8 satellite into orbit today, for the fourth launch of the year for International Launch Services (ILS).

The launcher lifted off at 3:48 a.m. Saturday local time (21:48 Friday GMT, 5:48 p.m. Friday EDT). The mission lasted 9 hours and 11 minutes before HOT BIRD 8 was released into a

geosynchronous transfer orbit. The satellite is a Eurostar E3000 model built for Eutelsat by EADS Space. From its final orbital position of 13 degrees East longitude, HOT BIRD 8 will serve customers in Europe, the Middle East and North Africa.

### Wallops フライト・ファシリティは空軍の衛星の打上げサイトに選定された

#### Wallops Flight Facility Selected as Launch Site for Air Force Satellite

<http://www.astroexpo.com/news/newsdetail.asp?ID=26976&ListType=TopNews&StartDate=8/7/2006&EndDate=8/11/2006>

WALLOPS ISLAND, Va., Aug. 4 /PRNewswire/ -- The NASA Wallops Flight Facility, Wallops Island, Va., has been selected by the Space and Missile Systems Center's Detachment 12 as the launch site for the Air Force Research Laboratory's TacSat 2 satellite. The launch is scheduled for November 2006.

The satellite will be launched on an Air Force four-stage Minotaur I space launch vehicle contracted through Orbital Sciences Corporation's Launch Systems Group. The mission will be conducted from the Mid-Atlantic Regional Spaceport launch pad on the south end of Wallops Island.

## Program News

### SNAP はジョイント・ダーク・エネルギー・ミッションに関して NASA のサポートを獲得

#### SNAP Wins NASA Support for Joint Dark Energy Mission

<http://www.astroexpo.com/news/newsdetail.asp?ID=27032&ListType=TopNews&StartDate=8/7/2006&EndDate=8/11/2006>

August 9, 2006 – BERKELEY, CA – NASA has announced that it will support an advanced mission concept study for the SNAP experiment, proposed by the Department of Energy's Lawrence Berkeley National Laboratory and the Space Sciences Laboratory of the University of California at Berkeley for NASA and DOE's Joint Dark Energy Mission (JDEM). In addition to SNAP, NASA also selected the ADEPT and DESTINY proposals to perform mission concept studies for JDEM.

"As one of three groups chosen by NASA for further development of the Joint Dark Energy Mission, we are pleased that NASA is interested in our approach to the problem with the SNAP concept," said Berkeley Lab Director Steven Chu. "DOE and NASA have provided funding to us in the past for our approach, and it is a very good sign that the two agencies are moving forward together on the project."

### ボーイングは TSAT の運用能力をデモ



## Boeing Demonstrates TSAT Operational Capabilities

<http://www.astroexpo.com/news/newsdetail.asp?ID=27029&ListType=TopNews&StartDate=8/7/2006&EndDate=8/11/2006>

ST. LOUIS, Aug. 09, 2006 -- The Boeing Company [NYSE: BA] recently demonstrated the interoperability of the Transformational Satellite Communications (TSAT) Space Segment program with other transformational military systems during a quarterly program management review. Boeing conducted the demonstration for the U.S. Air Force

Military Satellite Communications (MILSATCOM) Joint Program Office and representatives of the TSAT user community, including the U.S. Strategic Command, Air Force Space Command, Secretary of the Air Force, Army Forces Strategic Command, Office of the Assistant Secretary of Defense and the Space and Naval Warfare System Command.

## NASA の GLAST パーストモニタが宇宙機インテグレーションのためセットされ、宇宙でもっとも強力な爆発を追跡するのに一歩近づく

### NASA's GLAST Burst Monitor Set for Spacecraft Integration, One Step Closer to Tracking Most Powerful Explosions in Universe

<http://www.astroexpo.com/news/newsdetail.asp?ID=26993&ListType=TopNews&StartDate=8/7/2006&EndDate=8/11/2006>

08.07.06 - NASA scientists and engineers have completed final testing and integration of the GLAST Burst Monitor, a space-based instrument for studying gamma ray bursts. These bursts, scientists believe, originate in the collapse of massive stars up to 100 times that of our sun, a process that eventually forms a black hole in space and poses unanswered

questions to scientists on Earth. The monitor is one of two instruments on the Gamma-ray Large Area Space Telescope, or GLAST, an orbiting observatory scheduled to launch from NASA's Kennedy Space Center, Fla., in fall 2007.

## 宇宙における冒険

### Adventures In Space (Etc.)

<http://www.astroexpo.com/news/newsdetail.asp?ID=27000&ListType=TopNews&StartDate=8/7/2006&EndDate=8/11/2006>

Every summer, scores of college students join the working ranks at APL August 7, 2006 - The countdown to the launch of STEREO - twin space-based observatories designed and built by the Applied Physics Laboratory - has begun, and only weeks remain before liftoff. Chris Olson hopes his carriage won't have turned into a pumpkin

by then. For the past two summers, Olson, a graduate student in computer science at the University of Minnesota, has interned in APL's Space Department. Specifically, he has worked as a software engineer for the NASA-sponsored STEREO Mission, which hopes to bring back the first 3-D "stereo" images of the sun to study the nature of solar eruptions.

## Venus Express ステータスレポート No.39 - 進行中のサイエンス・プラン

### Venus Express Status Report No. 39 - Ongoing Science Plan

<http://www.astroexpo.com/news/newsdetail.asp?ID=27010&ListType=TopNews&StartDate=8/7/2006&EndDate=8/11/2006>

08 Aug 2006 - During the reporting period the mission operations have been conducted according to the plan. The ground and the space segment performance have been nominal. At the end of the last Cebreros pass in the reporting period (DOY 217, 14:00 UT) Venus Express was orbiting Venus at 232

million km from the Earth. The one-way signal travel time was 773 seconds.

## MetOp は 10 月に打上げ計画

### MetOp to be launched in October

<http://www.astroexpo.com/news/newsdetail.asp?ID=26972&ListType=TopNews&StartDate=8/7/2006&EndDate=8/11/2006>

7 August 2006 – MetOp, the first in the new European series of operational meteorological satellites in polar orbit, is now scheduled for launch on 7 October 2006. The new date was established last week following various planning meetings between the partners (ESA, EUMETSAT, CNES, NOAA) and Starsem, the launcher company.

MetOp's planned launch from Baikonur, Kazakhstan on a Soyuz/ST launcher, originally planned for 17 July, had to be called off after three consecutive attempts due to technical reasons related to the Soyuz's ground system.

The MetOp series consists of a total of three satellites, which are designed to provide meteorological operational data from polar orbit until 2020. The global data sets gathered by the MetOp satellites will revolutionise the way the Earth's weather, climate and environment are observed, in particular they are expected to significantly improve operational meteorology through the provision of additional data for Numerical Weather Prediction Models. MetOp will also provide an important contribution towards the improvement of severe weather forecasts and disaster mitigation.

## Science and Exploration News

### 星と惑星とどちらが先にできた？

#### Which Came First, Star or Planet?

<http://www.astroexpo.com/news/newsdetail.asp?ID=27060&ListType=TopNews&StartDate=8/7/2006&EndDate=8/11/2006>

August 11, 2006 – NASA's Hubble Space Telescope has for the first time identified the parent star of a distant planet discovered through gravitational microlensing.

Microlensing occurs when a foreground star amplifies the light of a background star that momentarily aligns with it. The particular

character of the light magnification can reveal clues to the nature of the foreground star and any associated planets. However, without conclusively identifying and characterizing the foreground star, a unique determination of the properties of the accompanying planet is difficult.

### SOHO、1000番目の Kreutz sungrazing 彗星を発見

#### 1000th Kreutz sungrazing comet discovered by SOHO

<http://www.astroexpo.com/news/newsdetail.asp?ID=27053&ListType=TopNews&StartDate=8/7/2006&EndDate=8/11/2006>

10 August 2006 – Polish amateur comet hunter Arkadiusz Kubczak recently discovered his third comet in SOHO LASCO coronagraph images, but this one was special: the 1000th SOHO comet discovery in the Kreutz group of sungrazing comets.

While there is no formal definition of a 'sungrazing comet,' the term typically refers to the Kreutz-group comets, which have a

perihelion distance of less than 0.01 of an Astronomical Unit (the mean distance between the Earth and the Sun), or some 1460000 km.

### グリーンランドの氷が加速的に失われている、重力計測衛星が明らかにした

#### Greenland's ice loss accelerating rapidly, gravity-measuring satellites reveal

<http://www.astroexpo.com/news/newsdetail.asp?ID=27056&ListType=TopNews&StartDate=8/7/2006&EndDate=8/11/2006>

10-Aug-2006 – A new analysis of data from twin satellites has revealed that the melting of Greenland's ice sheet has increased dramatically in the past few years, with much of the loss occurring primarily along one shoreline potentially affecting weather in Western Europe.

The loss of ice has been occurring about five times faster from Greenland's southeastern region in the past two years than in the previous year and a half. The dramatic changes were documented during a University of Texas at Austin study of Greenland's mass between 2002 and 2005.

### Chandra X線天文衛星はハッブル定数を独立に決定

## Chandra Independently Determines Hubble Constant

<http://www.astroexpo.com/news/newsdetail.asp?ID=27012&ListType=TopNews&StartDate=8/7/2006&EndDate=8/11/2006>

August 8, 2006 – critically important number that specifies the expansion rate of the Universe, the so-called Hubble constant, has been independently determined using NASA’s Chandra X-ray Observatory. This new value matches recent measurements using other methods and extends their validity to greater distances, thus allowing astronomers to probe earlier epochs in the evolution of the Universe.

“The reason this result is so significant is that we need the Hubble constant to tell us the size of the Universe, its age, and how much matter it contains,” said Max Bonamente from NASA’s Marshall Space Flight Center (MSFC) in Huntsville, Ala., lead author on the paper describing the results. “Astronomers absolutely need to trust this number because we use it for countless calculations.”

## 火星の生命は、なおファンタジー

### Life-on-Mars still fantasy

<http://www.astroexpo.com/news/newsdetail.asp?ID=27005&ListType=TopNews&StartDate=8/7/2006&EndDate=8/11/2006>

August 08, 2006 –/Xinhua/– It may have been the discovery of the century when scientists claimed ten years ago that they found what was believed to be trace of life on a Martian meteorite. But now “life-on-Mars” still remains a fantasy as the results have not been verified.

The National Aeronautics and Space Administration (NASA)

presented on Sunday magnified pictures of a 1.8-kg Martian meteorite riddled with wormy blobs that looked like bacterial colonies.

Scientists said they had obtained numerous clues from the rock, all supporting their contention that microscopic creatures once existed in its nooks and crannies.

## 宇宙は考えていたよりも大きく、古い可能性がある

### Universe could be bigger, older than thought

<http://www.astroexpo.com/news/newsdetail.asp?ID=26984&ListType=TopNews&StartDate=8/7/2006&EndDate=8/11/2006>

August 06, 2006 –/Xinhua/– The universe could be 15 percent bigger and 15 percent older than any previous calculations suggested, media reported on Saturday.

An U.S. Ohio State University astronomer and his colleagues have determined that the Triangulum Galaxy, otherwise known as M33, is actually about 15 percent farther away from our galaxy than previously measured.

The team used light, velocity, and temperature measurements to

calculate the true luminosity of the two stars, which eclipse one another every five days.

By comparing this intrinsic luminosity to their observed brightness, the team calculated that the galaxy lies 3.14 million light years away from us.

## Technology News

### SpaceDev はハイブリッド推進技術で特許をとる

#### SpaceDev Awarded Patent for Hybrid Propulsion Technology

<http://www.astroexpo.com/news/newsdetail.asp?ID=27039&ListType=TopNews&StartDate=8/7/2006&EndDate=8/11/2006>

POWAY, Calif.– Aug. 9, 2006 — SpaceDev, Inc. (OTCBB:SPDV) has been issued a United States patent for its hybrid propulsion technology. The U.S. Patent Office issued U.S. Patent No. 7,069,717, entitled “Hybrid Propulsion System,” to SpaceDev for technology related to fine altitude and control systems on a spacecraft. The patented Hybrid Propulsion System provides

increased control of thruster minimum impulse over conventional systems while simultaneously reducing oxidizer waste. This translates to reduced costs and higher efficiency for SpaceDev’s systems. According to the patent, liquid oxidizer from a main motor is used in a gas thruster by converting the liquid oxidizer to a gas state. This ensures that gas, rather than liquid, is

delivered to the thruster.

### Kepler Mirror がテストとインテグレーションのため Ball Aerospace に到着

#### Kepler Mirror Arrives at Ball Aerospace for Test and Integration

<http://www.astroexpo.com/news/newsdetail.asp?ID=27015&ListType=TopNews&StartDate=8/7/2006&EndDate=8/11/2006>

BOULDER, Colo. – August 8, 2006 – The largest optical mirror ever built for a mission beyond Earth’s orbit has arrived at Ball Aerospace & Technologies Corp. for environmental testing and spacecraft integration.

NASA’s Kepler mission, with a field of view 70,000 times greater than the Hubble Space Telescope, will attempt to detect Earth-like planets orbiting stars beyond our solar system. By

continuously monitoring the brightness of more than 100,000 stars, Kepler will search for planets that transit in front of stars. As a planet passes in front of its parent star, Kepler will detect the star’s brightness change to determine the planet’s size and orbit. The possible discovery of Earth-size planets in the habitable zone of other stars will be the first step in determining the extent of life in our galaxy.

### Purdue 大の研究は新しいロケット技術の進歩に助けになる

#### Purdue research helps advance new rocket technology

<http://www.astroexpo.com/news/newsdetail.asp?ID=27017&ListType=TopNews&StartDate=8/7/2006&EndDate=8/11/2006>

August 8, 2006 – WEST LAFAYETTE, Ind. – Purdue University engineers are conducting research to help NASA develop rockets faster and less expensively for future missions to Mars and the moon.

The NASA-funded research at Purdue focuses on liquid-fueled

rockets. Specifically, the work deals with understanding how fuel and a component called the oxidizer interact inside the rocket engine’s fuel injectors to cause unstable combustion. The instability results in extreme bursts of heat and pressure fluctuations that could lead to accidents and hardware damage.

### ボーイングは航空宇宙リレーミラーシステムをデモ

#### Boeing Demonstrates Aerospace Relay Mirror System

<http://www.astroexpo.com/news/newsdetail.asp?ID=27004&ListType=TopNews&StartDate=8/7/2006&EndDate=8/11/2006>

ST. LOUIS, Aug. 07, 2006 -- Boeing [NYSE: BA] and the U.S. Air Force achieved major progress in their relay system development program by successfully redirecting a laser beam to a target using their Aerospace Relay Mirror System (ARMS).

The demonstration, conducted recently at U.S. Air Force Research Laboratory facilities at Kirtland Air Force Base, N.M., used a half-scale version of a strategic relay mirror payload that

ultimately could be packaged and carried to high altitudes on airships, long-endurance aircraft or spacecraft. The payload could be used with airborne, ground-based or sea-based high-energy lasers to destroy ballistic missiles and other targets. Relay mirror systems will greatly enhance laser weapon system performance by reducing the atmosphere’s effects on laser beams and extending their range beyond line of sight.

### L-3 Telemetry-West’s 衛星コントロールセンターソフトは Inmarsat の最新衛星の打上げと初期軌道フェイズを管理

#### L-3 Telemetry-West’s Satellite Control Center Software Manages Launch and Early Orbit Phase of Inmarsat’s Newest Satellite

<http://www.astroexpo.com/news/newsdetail.asp?ID=26982&ListType=TopNews&StartDate=8/7/2006&EndDate=8/11/2006>

SAN DIEGO, CA, August 2, 2006 – L-3 Telemetry-West, a division of L-3 Communications, announced today that its I4S Satellite Control Center software was successfully used throughout the launch and early orbit phase for Inmarsat’s latest

satellite, Inmarsat-4 Flight 2 (I-4 F2). The I4S system is based on L-3 Storm’s InControl-NextGeneration™ (InControl-NG) software suite integrated with Inmarsat’s in-house-developed software.

## ロッキードマーチンは AEHF の修正契約\$10M を空軍と結ぶ

11-Aug-2006 Lockheed Martin Space Systems lands US Air Force contract

The US Air Force has awarded Lockheed Martin Space Systems a USD10 million contract modification, which provides for new payload software for the Advanced Extremely...

## UAE アラブ首長国は Longbow FCR の搭載された Apache を装備する計画

11-Aug-2006 \*UAE to equip Apaches with Longbow FCRs

Longbow, a Northrop Grumman/Lockheed Martin-owned joint venture, will fulfil the USD125 million contract, with the value of the contract split evenly between the two companies....

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2006 年 月 日 時事通信社「世界週報」 月 日号 [目次抜粋]

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[平山ニュース 2006 年 月 日] <http://www.wikihouse.com/space/>

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### [NEWS]

8/12 ETS8 のアンテナ縮小モデル展開実験 LDREX-2 を 9/20 に Ariane5 で打上(JAXA)

8/11 2215GMT 打上成功:{(仏)軍事通信衛星 Syracuse 3B,(日)通信衛星 JCSAT 10}, Ariane5ECA,Kourou

### [予定]

宇宙航空研究開発機構 特別展

- ・8/20 まで 特別展 II(航空分野),科学体験館サイエンス・サテライト,大阪

- ・8/18 まで 特別展 I(宇宙開発),未来科学技術情報館,新宿

8/18 応募締切:「空の日・宇宙の日」絵画コンクール,幼児-小学生>JAXA

### [EVENT]

8/26 JAXA タウンミーティング in 奥州,奥州市文化会館,申込先着 300 名

8/21 宇宙法講演会,慶應大三田キャンパス,8/20 参加申込締切

Joanne Gabrynowicz 教授「災害チャーターについて」

<http://www.gsec.keio.ac.jp/event/infection.html>

### [学会]

9/15-17 日本流体力学会 2006,九州大学(筑紫)

8/18 申込締切:JSASS 西部支部講演会(2006),11/17,九州大学(伊都)

### [TV]

0000-0051 NHK 総合 宇宙へ・冷戦と二人の天才

- ・8/15(8/14 深夜) (1)ロケット開発

- ・8/16(8/15 深夜) (2)衛星開発

- ・8/17(8/16 深夜) (3)有人宇宙飛行

- ・8/18(8/17 深夜) (4)月面着陸

ディスカバリーチャンネル

- ・8/16 1600-1700 火星を目指して:人体の限界

- ・8/14 2100-2200,8/15 0100-0200,0700-0800,1100-1200 宇宙 SF と現代テクノロジー-2

### [etc.]

8/18 応募締切:第 4 回航空機による学生無重力実験コンテスト>JAXA

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[宇宙開発] [http://dailynews.yahoo.co.jp/fc/science/space\\_exploration/](http://dailynews.yahoo.co.jp/fc/science/space_exploration/)

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- 9月20日打上げ、再実験＝衛星通信アンテナ、欧州ロケットで宇宙機構(時事通信)(12日18時1分)

[米軍動向] [http://dailynews.yahoo.co.jp/fc/world/us\\_armed\\_forces/](http://dailynews.yahoo.co.jp/fc/world/us_armed_forces/)

[核兵器] [http://dailynews.yahoo.co.jp/fc/world/nuclear\\_weapons/](http://dailynews.yahoo.co.jp/fc/world/nuclear_weapons/)

[ASAGUMO NEWS] 朝雲新聞社 <http://www.asagumo-news.com/>

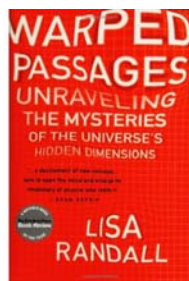
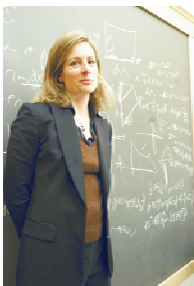
[民間航空機関連 (ex-SJAC 三輪さん)] 夏休み @ ハケ岳です。

「暑中お見舞い」お元気でお過ごしください。

最近、注意を引いた新しい造語:【脳業】【怒力】 いずれもわたしに欠けているものです。

8月10日から20日までハケ岳へ引きこもります。AIA Daily Leadのヘッドライン訳はお休みします。

[新刊紹介] *Warped Passages*, Lisa Randall HarperCollins Publishers 2005



車イスのホーキングが真ん中に、著者は右端に

Contents [http://www.amazon.co.jp/gp/reader/0060531088/ref=sib\\_rdr\\_zmout/249-9878959-6986736?ie=UTF8&p=S001#reader-page](http://www.amazon.co.jp/gp/reader/0060531088/ref=sib_rdr_zmout/249-9878959-6986736?ie=UTF8&p=S001#reader-page)

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## 1 入口の通路: 次元の謎解きをする

### 1 Entryway Passages: Demystifying Dimensions

君は自分の道を行くことができる。 **You can go your own way.**

自分の道を行きなさい。 **Go your own way**

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「アイク、私の書いているストーリーがはつきりではないのだけど。もっとディメンジョンを加えようと考えているのだけど。この考えをどう思うかしら？」	“Ike, I’m not so sure about this story I’m writing. I’m considering adding more dimensions. What do you think of that idea?”
「アテナ、君の兄貴はストーリーの修正のことはほとんど知らないよ。	“Athena, your big brother knows very little about fixing stories. But odds are it won’t hurt to add new dimensions. Do you plan to add new characters, or flesh out your current ones some more?”
しかし、新しいディメンジョンを追加することは害になるということはないだろう。新しい登場人物を加えるのか、それとも現状のものにさらにもっと肉付けするつもりかい？	“Neither; that’s not what I meant. I plan to introduce new dimensions – as in new dimensions of space.”
「どっちでもないわ。私は新しいディメンジョンを導入するつもりなの。空間の新しい次元のように。」	“You’re kidding, right? You’re going to write about alternative realities – like places where people have alternative spiritual experiences or where they go when they die, or when they have near-death experiences?* I didn’t think you went in for that sort of thing.”
冗談でしょう。君はもう1つの現実 – 人々が別の霊的な経験をした所について執筆しようとしているのか？* 君はそのような所に行ったとは思わないが。」(*この質問はほんとに聞かれたものです。)	(*Questions I’ve actually been asked.)
「まさか、アイク。そういう話を書こうとしていないことは分っているでしょ。異なった空間の次元について話しているのよ – 異なった霊的な平面でのことではないの。	“Come on, Ike. You know I don’t. I’m talking about different spatial dimensions – not different spiritual planes!”
「でも異なった空間の次元がどのように何かを変えることができるのかね？ 例えば別の寸法(ディメンジョン) 12” x 9”の紙の代りに 11” x 8”の紙を使ったとしても何も違いはないのでは？」	“But how can different spatial dimensions change anything? Why would using paper with different dimensions – 11” x 8” instead of 12” x 9”, for example – make any difference at all?”
	“Stop teasing. That’s not what I’m talking about either. I’m really planning to introduce new dimensions of space, just like the dimensions we see, but along entirely new directions.”

「いじめないで。それも私が言おうとしていることではないわ。実際、私は空間の新しいディメンジョンを紹介しようと計画しているの。それはちょうど私たちの見ている次元のようで、でもまったく新しい方向をむいているの。」

「次元、わからないな？3次元が全てだと思う。」

「もうちょっと待って、アイク。すぐにわかるから。」

次元という言葉は空間あるいは空間の中での運動を述べる多くの言葉のように多くの解釈がある。そして今までにそれら全てを聞いてきたと思う。空間的な絵の中に物を見るので時間とか考えを含め多くの概念を空間的な用語で記述する傾向がある。

このことは空間に適用される多くの言葉は多くの意味をもっているということである。これら言葉を技術的な目的に使おうとした時に言葉の別の用法がその定義を混乱させるように響くのである。

余分の次元という言葉は特に不可解になる。これらの言葉を空間にあてはめようとした時に空間は我々の感覚の経験を超越しているからである。我々は単に生理的に3次元空間より多くの次元を処理するようには作られていないのである。光、重力そして全部の我々の観測を行なう道具は世界が3次元空間に含まれていると見えるようになっていく。

なぜなら我々は直接余分の次元を - 例えそれが存在したとしても - 知覚しない。人によってはそれらを把握しようと試みるのが彼等の心を傷つけると恐れる。少なくともインタビューの間に BBC のニュースキャスタが一度言ったことである。それは余分の次元について考えることではなく、不安になると恐れさせることを心に想像しているのである。より高次の次元の世界を描こうと努めることは不可避に複雑な方に行く。余分の次元について考えることは全然別の事である。

(後略)

*"Dimensions we don't see? I thought three dimensions is all there are."*

*"Hang on, Ike. We'll soon see about that."*

The word "dimension," like so many words that describe space, or motion through it, has many interpretations - and by now I think I've heard them all. Because we see things in spatial pictures we tend to describe many concepts, including time and thought, in spatial terms.

This means that many words that apply to space have multiple meanings. And when we employ such words for technical purposes, the alternative uses of the words can make their definitions sound confusing.

The phrase "extra dimensions" is especially baffling because even when we apply those words to space, that space is beyond our sensory experience. Things that are difficult to visualize are generally harder to describe. We're just not physiologically designed to process more than three dimensions of space. Light, gravity, and all our tools for making observations present a world that appears to contain only three dimensions of space.

Because we don't directly perceive extra dimensions - even if they exist - some people fear that trying to grasp them will make their head hurt. At least, that's what a BBC newscaster once said to me during an interview. However, it's not thinking about extra dimensions but trying to picture them that threatens to be unsettling. Trying to draw a higher-dimensional world inevitably leads to complications.

Thinking about extra dimensions is another thing altogether.

We are perfectly capable of considering their existence. And when my colleagues and I use the words "dimensions," and "extra dimensions," we have precise ideas in mind. So before taking another step forward or exploring how new ideas fit into our picture of the universe - note the spatial phrases - I will explain the words "dimensions" and "extra dimensions" and what I will mean when I use them later on.

We'll soon see that when there are more than three dimensions, words (and equations) can be worth a thousand pictures.

#### **What Are Dimensions?**

Working with spaces that have many dimensions is actually something everyone does everyday, although admittedly most of us don't think of it that way. But consider all the dimensions that enter into your calculations when you make an important decision, like buying a house. You might consider the size, the school nearby, the proximity to places of interest, the architecture, the noise level - and the list goes on. You need to optimize in a multidimensional context, enumerating all your desires and needs.

The number of dimensions is the number of quantities you need to know to completely pin down a point in a space. The multidimensional space might be an abstract one, such as the space of features you are looking for in a house, or it might be concrete, like the real physical space we will soon consider. But when buying a house, you can think of the number of dimensions as the number of quantities you would record in each entry in a database - the number of quantities you find worth investigating (後略)