THE COMMERCIAL SPACE INSURANCE INDUSTRY

Introduction: The Market

Emerging commercial space technologies, along with complex and substantial financial investments, presented a new type of high-risk exposure. Thus, the space insurance underwriting community was developed, and the niche for specialized insurance was filled. The space insurance market is highly competitive, dynamic, and volatile with a relatively small group of U.S. and European insurance companies in the forefront.[84]

According to one industry representative, Dowa Fire, Marine & Space Insurance:

> *The number of launches of currently insured commercial satellites is about 20 to 30 satellites per year, so the number of contracts is limited . . . .*

Again, according to Dowa Fire, Marine & Space Insurance:

> *Since space insurance coverage began in 1965, the capacity of the market has been steadily increasing.*[85]

This upward trend has been driven by expansion in the communications satellite industry and by growing demand for cheaper, more reliable, and more capable launch systems.

Over the last 30 years, space insurance companies have collected approximately $4.2 billion in premiums and paid nearly $3.4 billion in claims. As outer space is being increasingly used for communications, broadcasting, and remote sensing, the demand for space-based activities is expected to grow, helping risks stabilize. Insurance premiums will thus decrease, and market capacity will in turn increase.[87]

Space insurance is syndicated, meaning that each individual underwriter assumes a percentage of the risk.[88] Approximately 10 to 15 large companies, and 20 to 30 smaller companies, may participate in a given insurance package. Typically, multiple insurance underwriters cover each risk for a fractional share, thereby spreading the risk throughout the global markets.[89]

An insurance package covers risk to the rocket, the satellite, and related equipment.[90] Factors such as market conditions, the type of rocket, orbital deployment conditions, and satellite characteristics determine insurance terms and conditions. While all underwriters use similar terms and conditions, commercial space insurance policies are individually crafted, principally based on the specifications of the satellite and the rocket.[91] The coverage period, premium rates, and other terms and conditions are negotiated among the client, the satellite owner or manufacturers, and the underwriters.[92]

Competition determines which insurers will participate in a specific placement, and the marketplace sets pricing for each policy. Price and availability of space insurance depends primarily on the lead underwriter's ability to understand and assess the intricacies of each risk.[93]

The estimated space insurance market capacity is between $850 million and $1 billion for each satellite program, with an estimated range of $250 to $300 million per launch.[94] Approximately seven to ten underwriters play a significant role in the market, and Europeans ordinarily account for $500-600 million out of the $1 billion available for a single satellite project.[95] Typically, an insurance underwriter will commit only 80-85 percent of its available financial resources to one program.[96]

Space insurance market conditions are cyclical in nature. Currently, the market is "soft," producing more capacity to meet risk needs, and is a buyer's market with many qualified insurers.[97] Launch service providers are more willing to introduce new launch vehicles in this type of market. In contrast, in a "hard" market, or seller's market, underwriters have the greatest influence. Successful market participants must respond to and implement changes within the dynamic satellite launch equipment, launch services, and space insurance markets.

The four primary U.S. insurance brokers are J&H Marsh & McLennan, with about 60 percent of the market, Willis Corroon Inspace, International Space Brokers,

and AON, Inc.[98] Currently, there are 10 to 12 lead underwriters, including one Australian, two French, one U.S., and two British.[99] The U.S. underwriters account for 20 to 30 percent of current space insurance syndication.[100]

Each individual U.S. underwriter has a detailed technical understanding of space risks — based on its own spacecraft engineers — and a sophisticated space industry database.[101] Some European underwriters employ consultants with expertise in the technical assessment of space risks, including experienced former NASA satellite engineers.[102]

Any underwriter may spread the risk to any other insurance company or reinsurer by selling participation in a particular insurance program.[103] Reinsurers receive no technical information but rely on representations by lead underwriters as to risk.[104] Reinsurers occupy numerous layers in the insurance industry, sharing the risk of a particular contract.[105] The reinsurers depend on their relationship with the underwriters and "follow the fortunes" of the underwriters, referred to as "following-on." [106]

There are four essential types of space insurance:

- **Pre-launch insurance,** specifically property and cargo insurance,[107] covers satellites and rockets prior to launch. Pre-launch insurance usually covers risks associated with transportation of the satellite from the manufacturing facility to the launch site, assembly on the launch pad, inspection, and pre-lift-off activities. The period of coverage ends with the intentional ignition or lift-off of the rocket.[108]

- **Launch insurance** is the most common type of space insurance. It may extend from six months to one year after launch. Coverage commences where pre-launch insurance ends. Launch insurance terminates when the satellite separates from the rocket and completes an initial operational phase of functionality testing. The launch period may last approximately 20 to 30 minutes.[109]

- **In-orbit insurance** commences after the satellite has completed its initial operational phase of functionality testing,

and normal operations in space begin. The life expectancy of a satellite is approximately 10 years and ends when the satellite's fuel cell depletes. In-orbit insurance usually consists of one-year renewable policies. "[I]n order for the insurance companies to renew the In-Orbit insurance, they require 'health reports' from the insured regarding the condition of the satellites. Based on these reports they accept renewed coverage." [110]

- **Third-party liability space insurance** covers legal liability arising from damage to a third party during the launch or the in-orbit operations of a satellite program. A variety of coverage options are available: personal injury, property damage, damage to U.S. Government launch facilities, loss of revenue, service interruption, and material changes to ground stations.[111]

Self-insuring for the launch phase is not a common practice. PRC-owned and manufactured commercial satellite launches in the PRC, however, usually are self-insured by the PRC.[112]

Broker Selection and the Underwriting Process

Broker Selection

The following summarizes the space insurance acquisition process and the parties involved. First, a satellite owner contracts with a satellite manufacturer to build a satellite.[113] Next, the insured client, a satellite owner or satellite manufacturer, obtains a list of brokers from the manufacturer.[114]

Then, the broker is appointed following a competitive process.

The broker may negotiate insurance, manage transactions, and, if necessary, settle claims that may arise on behalf of the client.[115] The broker acts as a conduit for all documentation and information.[116] Its primary task is to obtain technical questions

from underwriters and answers from the satellite owner and manufacturer.[117] The broker may assist the satellite owner and manufacturer in developing a presentation and pricing plan for the underwriters.[118] Brokers do not suffer monetary risk in the event of launch accidents; they are paid on a commission basis.[119] Traditionally, commission size depends on the final premium negotiated for the insurance program. The higher the insurance premium, the higher the broker's commission.[120]

Insurance Acquisition

The underwriting process begins with a technical assessment of the satellite and rocket.[121] The client prepares technical reports and presentations regarding the satellite and rocket for the brokers.[122] Usually, the satellite manufacturer prepares the initial project package containing detailed technical information and launch service procedures.[123]

This package is presented to the underwriters by the broker.[124] The technical information consists of the specifics of the launch and satellite operations, coverage for partial or full loss, associated costs, and launch service availability.[125] Also, it includes the program risks, history of the rocket, modifications, and reasons for using new technology, if any.[126]

The presentation is designed to build the confidence of the underwriters in the insured client.[127] Technical questions regarding the following are often raised by the underwriters:

- **Communication systems**
- **Payload**
- **Electrical power system**
- **Attitude control system**
- **Mechanical systems, including appendage and solar arrays**[128]

Normally, two rounds of questions and answers by the satellite manufacturer and launch service provider to underwriters are sufficient to complete the bidding phase.[129] Additionally, underwriters rely on databases and their own technical staff or other experts for information.[130]

Typically, non-disclosure agreements binding underwriters accompany technical materials for the presentations.[131] Underwriting information is part of the insurance contract, and the insured is obligated to use its best efforts to provide insurers with information relating to risk of loss.[132] The insured has an obligation to notify the underwriters if any characteristic of the satellite or the launch service changes.[133]

A second briefing to the underwriters may be necessary if such a "material change" occurs affecting the terms and conditions of the policy. In the case of Intelsat 708, for example, Loral had to make such a presentation after changing the material that was used for the satellite's solar arrays to galium arsenide.[134]

The underwriters submit bids for the insurance package, including a decision to insure the satellite program, the amount of the premium, and the terms and conditions of the policy. Various risk assessment factors, including the history and reliability of the hardware to be used, are discussed. Also, previous failure and success rates, disposition of previous failures, experience of operations and operators, testing and product assurance provisions, and monitoring conditions by the satellite manufacturers or the insured are factors taken into account.[135]

Lastly, the policy is negotiated and written prior to launch.[136] The insured client, acting through the brokers, answers any outstanding questions from the underwriters.[137] Post-launch reporting advises the underwriters of the mission's progress.[138]

The entire insurance acquisition process takes about one year to complete.[139] Typically, insurance contracts are finalized from six months to three years prior to launch.[140]

Space Insurance Premiums

A space insurance deposit between 10 and 20 percent of the premium is required when the policy period commences. The balance of the premium is usually due to the underwriters no later than 30 days prior to the launch.[141]

Typically, insurance premiums range from eight to 15 percent of the total costs associated with a launch.[142] Premium rates have declined over the last few years.[143] Even though there have been a large number of substantial claims in the last few

years, premiums decreased by 50 percent in 1997.[144] Claims incurred will surpass premiums collected in 1998, a disappointing year for underwriters.[145]

Launch insurance premiums depend on such factors as:

- **Reliability of the rocket**
- **Reliability of the satellite**
- **Level of complexity of the satellite**
- **Scope of coverage**
- **Amount of insurance**[146]
- **Rocket history**
- **Overall design of the satellite**
- **Product assurance plan**
- **Satellite's operational lifetime**
- **Insurance capacity**
- **Commercial versus government launched**
- **Regulatory standards for rockets**[147]

According to a September 1998 article: "[C]ustomers can pay less than 10 percent [of the total costs] with an emphasis on launch-plus-3-year or even launch-plus-5-year coverage plan . . . In-orbit policies are generally negotiated separately from launch plus 3 or 5 year policies. Rates tend to be 1.2 to 1.5 percent per year at present." [148]

Space Insurance Claims of Loss

Despite the availability of insurance, the satellite owner has every incentive to place the satellite in orbit and make it operational because obtaining an insurance settlement in the event of loss does not help the owner continue to operate its telecommunications business in the future. To increase the client's motivation to complete the project successfully, underwriters will also ask the client to retain a percentage of the risk.[149]

Insurers are advised of any occurrence likely to result in a claim. The insured is obligated to disclose any relevant issues, including the results of any failure investi-

gations.[150] The insurers must have this information—and a substantiated theory of the failure—from the parties that were involved in the launch.[151]

The claims settlement process continues until agreement is reached on the loss sustained.[152]

In the event of a launch or satellite failure, the insurance representative of the insured client is responsible for drafting the Proof of Loss and Notice of Loss:[153]

- **The Proof of Loss** is a statement issued to the insurers and is signed and notarized by the insured client. It includes the time the loss occurred, details as to what happened, and technical information such as telemetry data, frequencies, and power levels at the time of the failure.[154]
- **The Notice of Loss** is a one-page statement that places the insurers on notice of a possible claim.[155]

Both statements are provided to the insurers by the insured client through the broker.[156]

The Applicability of Export Controls To the Space Insurance Industry

Security Clearances and the Transfer of Controlled Technical Information

The broker reviews drafts of the Proof of Loss and Notice of Loss and makes sure that all relevant information is contained therein. The broker does not alter them, but offers suggestions as to changes.[157] The broker is the last party to sign the statements prior to release of a claim payment.[158]

Security clearance requirements for space insurance industry personnel handling sensitive data are not clear.[159]

Timothy Rush, Vice President of J&H Marsh & McLennan's Space and Telecom Group and a former Intelsat employee, testified that underwriter employees do not usually have security clearances.[160]

In the case of Intelsat, data requiring protection is kept in a secure facility.[161] Intelsat authorizes insurance-related technical information to be forwarded to the Defense Department for review.[162] The Defense Department's responsibility is to monitor technical data reviews and transfers that take place in the course of the insurance process for space projects.[163]

The amount of technical data that is required to be disclosed in the space insurance process depends on the maturity of both the satellite and the rocket.[164] Mark Quinn, former Vice President for J&H Marsh & McLennan's Space and Telecom Group, states that the information provided at space insurance presentations is "not very technical in nature." [165] Newer satellites and rockets, however, present greater risks since they are not technically and operationally known quantities, and the insurers thus want additional information about them.[166]

Intelsat officials state that the PRC launch service provider receives only satellite interface information. Interface information consists of satellite dimensions and critical point locations of satellite components such as antennas. A user's handbook contains most of the information on rockets.[167]

Nevertheless, as Donald Cromer, President of Hughes Space and Communications, who had attended insurance industry briefings, testified, technical information subject to export controls "could" be communicated in such briefings.[168]

Export Licenses

According to insurance industry personnel, the obligation to obtain an export license rests with the owner of the technology. Thus, prior to Intelsat's taking title to the Loral-built Intelsat 708 satellite, Loral had the responsibility to obtain export licenses for all related exports of controlled technology.[169]

The burden is on the insured client, agrees J&H Marsh & McLennan's Michael Hewins, former Chairman of that firm's Space and Telecom Group, to obtain all appropriate export licenses, and no special licenses are required by the space insurance industry.[170] In light of the destinations of the data, insured clients must determine whether the data is sensitive and export licenses are required.[171]

Hewins, a broker with substantial space insurance experience, says he believes that no export licenses are required for the space insurance presentations that contain technical information. Further, Hewins believes that no export licenses are required for the questions and answers that are passed between the underwriters, brokers and insured clients.

Hewins says that he assumes that all information shared in the insurance process is given to all entities, foreign or domestic, unless covered by non-disclosure agreements.[172]

Another experienced broker, Timothy Rush of J&H Marsh & McLennan, says that the broker requires the originators of any technical data to certify that proper licenses have been obtained for technology transfers, or to certify that the data in question does not require such licenses for transfer.

According to Rush, brokers do not enforce licensing requirements. But, he says, brokers do help protect against technology transfers prohibited by U.S. law, by informing their insured clients of where they send any data the client submits to them under the insurance contract.[173]

Yet another J&H Marsh & McLennan broker, Mark Quinn, says that the insured client is supposed to indicate whether an export license is in place for the satellite program. However, Quinn reports that he has not seen a technology transfer license, although he assumes one exists for each project.[174]

According to Terry Edwards, Manager of Intelsat's Launch Vehicle Program Office, and Donald Bridwell, Manager of Intelsat's Major Programs in the Procurement Division: "Intelsat Headquarters Agreement does not exempt Intelsat from U.S. laws in respect to export licenses. U.S. spacecraft manufacturers are subject to U.S. export control laws." The export license, they say, covers the entire scope of the satellite project.[175]

Intelsat's Edwards also states that Defense Department monitors have a very difficult assignment.[176] Quinn adds that the Defense Department monitor who worked on his project several years ago did a very good job and knew the details of the pro-

ject well.[177] However, Quinn states that he has not been present at any meeting where a Defense Department monitor has interceded to stop the transfer of technical information. He states that the briefer usually has a rehearsal briefing with a Defense Department monitor present, prior to the meeting.[178]

Space Insurance and Export Controls for PRC Launches

The space insurance process does not differ for projects that include PRC rockets and satellites.[179]

Insurance for PRC clients must comply with local regulations and is provided by re-insuring an indigenous insurer.[180] The PRC, however, does not have a developed insurance market. Therefore, a broker such as J&H Marsh & McLennan acts as an intermediary company since the PRC is not financially stable.[181]

J&H Marsh & McLennan's Hewins states that the PRC insurance companies, China Pacific Insurance Company (CPIC) and the People's Insurance Company of China (PICC), are difficult to deal with from a business standpoint. Further, CPIC and PICC are not lead underwriters in the international market, do not possess satellite insurance expertise, and tend to work on multiple projects.[182]

The J&H Marsh & McLennan Beijing office handles property and casualty insurance for the PRC, and for U.S. companies conducting business there. The J&H Marsh & McLennan London office also issues third-party liability insurance for China Great Wall Industry Corporation.[183]