

Intro to Space Insurance

First party

August 2015

Bob Whearty – 202 263 7840
Marsh Space Projects

Marsh Space Projects

A History of Leadership and Innovation

- Marsh Space Projects (MSP) operates within the Aviation and Aerospace Practice of Marsh Inc.
- During the 1970's the MSP founding team developed the market for satellite and launch vehicle insurance with niche underwriters
- MSP senior colleagues have worked together for more than 30 years through changing market cycles and a myriad of risk management scenarios
- MSP has maintained a reputation for achieving lowest rates, best coverage terms, and demonstrated creativity in problem solving through soft and hard markets
- Marsh was first broker to break "Best Terms" and achieve the now standard "Vertical Marketing" forcing even lower rates than ever before.

We continue to be the market leader for insurance coverage innovations and rating that other brokers follow

Marsh Space Projects

A Specialized Global Space Insurance Broker

- We continually invest in the MSP team
 - MSP brokerage teams based in our core 3 offices
 - Recruit college graduates and hire within the industry, where appropriate
- Specialists are employed in every discipline
 - Insurance marketing and placing
 - Contractual and legal analysis
 - Policy wordings
 - Engineering and technical evaluation
 - Insurance Administration
 - Policy review
 - Non-Disclosure Agreements
 - ITAR coordination DSP 83s and TAAs

Marsh Space Projects Market INTRODUCTION

Aug 15, 2012



Robert P. Whearty
Sr. Vice President

Washington DC

Launch Insurance Recent Market Events

SpaceX

ISS Launch Failure

- DOL: June 28, 2015 – Falcon 9 rocket failure
 - No launch insurance placed (first party)
 - Total Loss of Rocket and 4,000 pounds of NASA cargo
 - NASA ISS adapter ring lost
 - SpaceX did not insure NASA incentives (\$30-50M est.)
 - No reports of third party liability



Proton Launch Failure Mexsat 1 Launch

- DOL: 16 May 2015 – Proton Launch Failure
- Loss of approximately \$390 million – includes Satellite, Launch Vehicle and Capitalized Expenses.
- Total Loss of Satellite and Launch Vehicle.
- One of the largest single event losses in the commercial space market



Antares Pad Damage

Wallops Island

- DOL: October 28, 2014 - Antares rocket failure
 - \$48 million of Launch insurance placed
 - Total Loss
 - \$52 million MPL requirement for damage to US. Government Property
 - Minor damage reported
 - No reports of third party BI
 - Incident is expected to raise market concern over launch liability

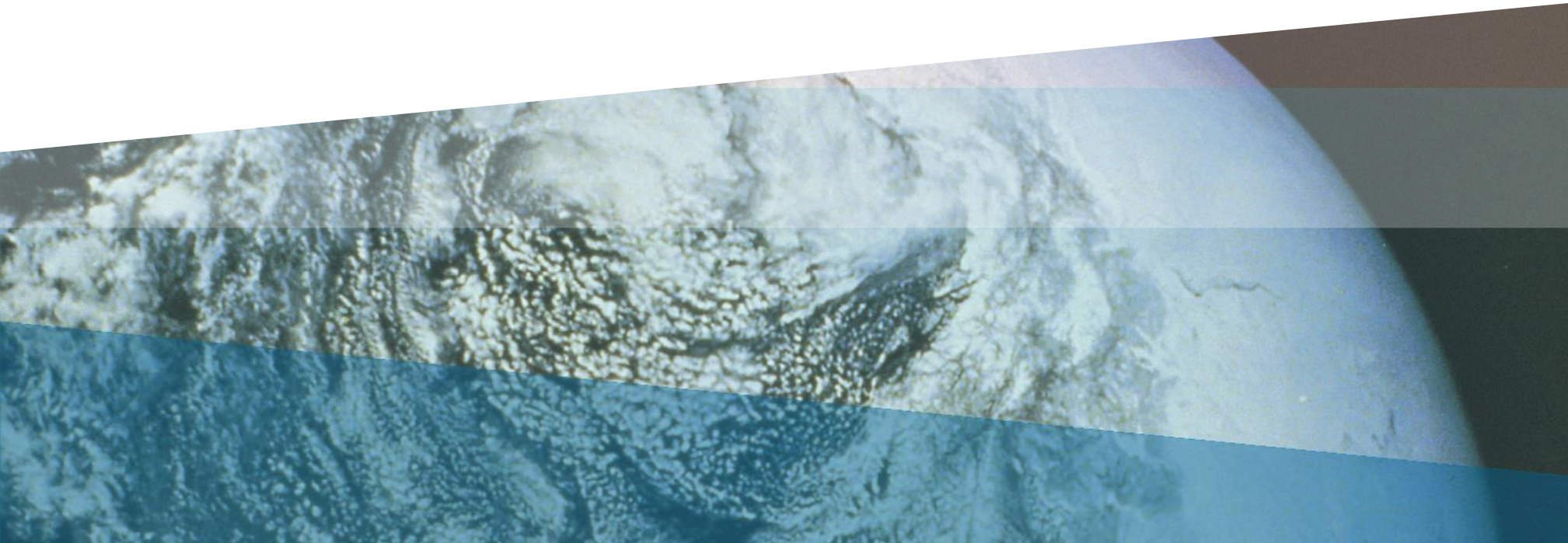


SpaceShip Two Accident

- DOL: October 31, 2014 - SpaceShip Two destroyed during flight test
 - Co-pilot killed, Pilot seriously injured
 - Hull reportedly insured by Virgin Galactic/The Spaceship Company
 - Hull Value of \$40-50M (Total Loss)
 - Flight operated under FAA Experimental Permit issued to Scaled Composites
 - CSLA Cross waivers apply
 - TPL MPL \$9,000,000
 - No indemnity above MPL



Space Insurance Overview



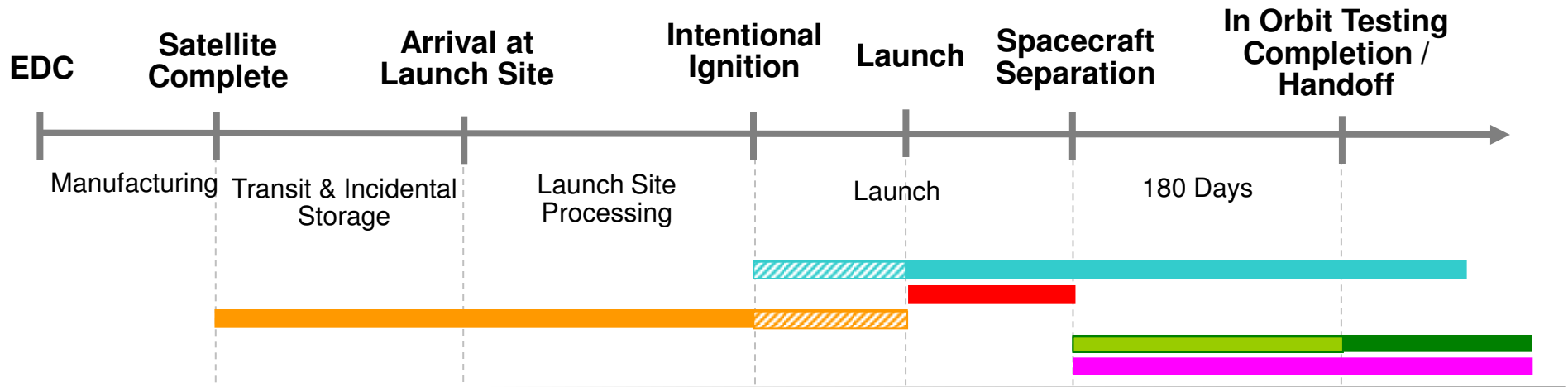
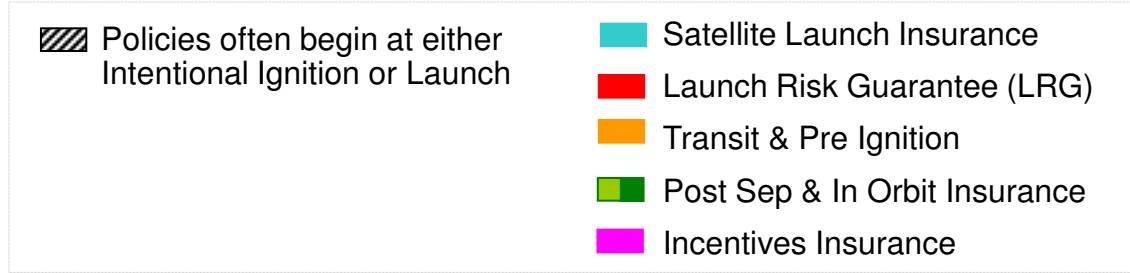
Customer Satellite Insurance Types

Construction through End of Life (EOL)

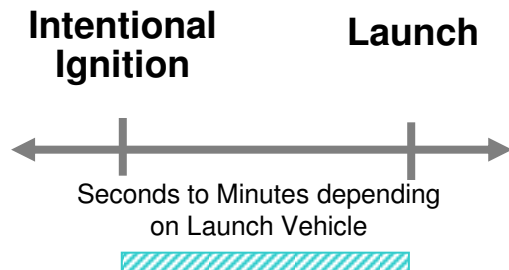
Program Phase →	Construction	Shipment to Launch Facility	Launch Facility Activity	Launch/ Intentional Ignition	Post Sep through (up to) 1 year	In-Orbit (year 2 through EOL)
Type of Insurance ↓						
Manufacturers Property Policy						
Transit and Pre-Ignition						
Launch (+1)						
Launch & In Orbit Liability (Third Party Liability, TPL)						
Incentives						
In-Orbit						

Satellite Lifecycle Risk Coverage Overview

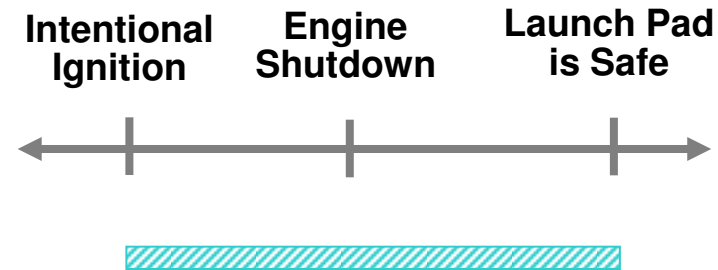
Commercial Programs



Nominal Launch



Launch Abort



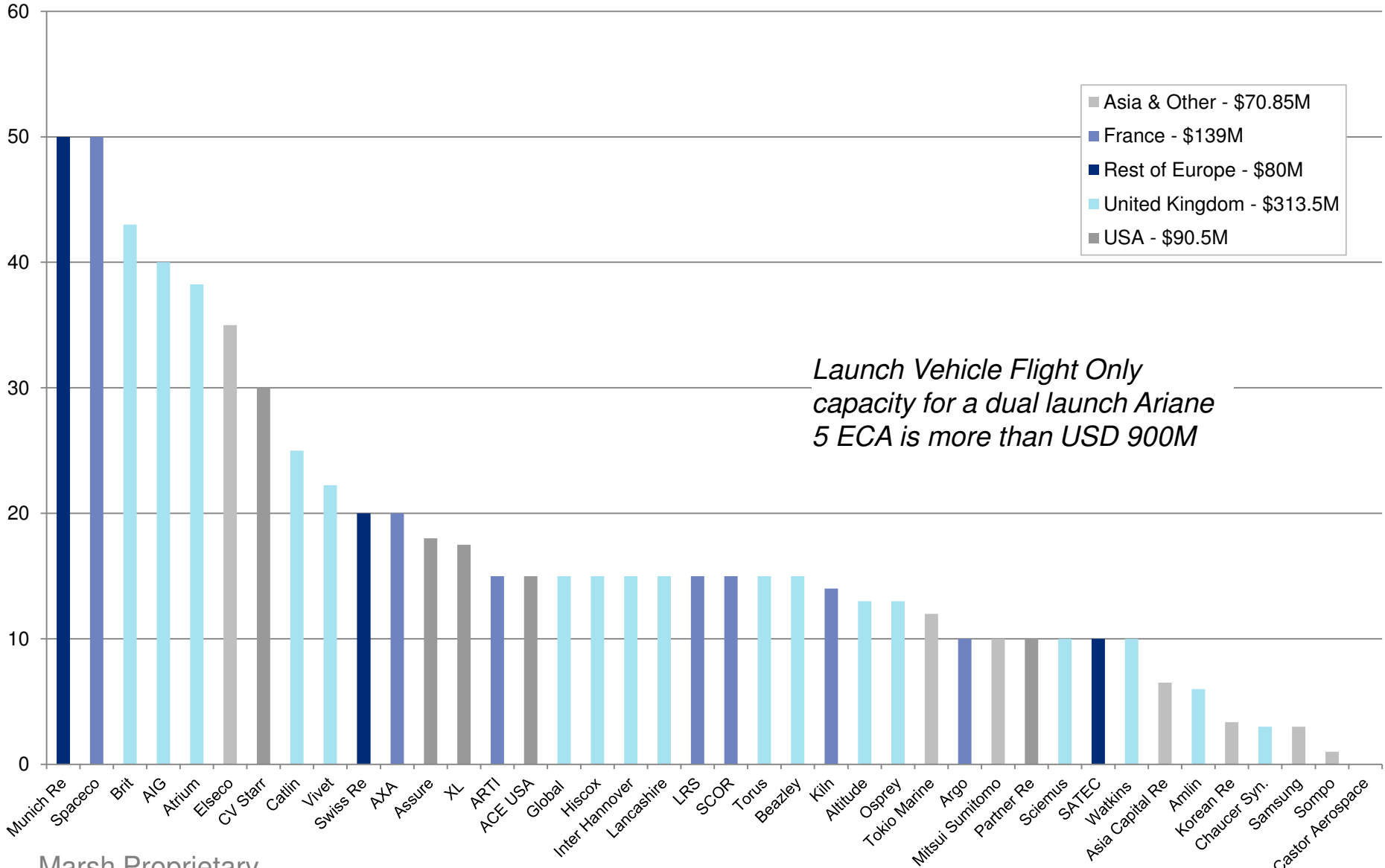
Marsh Space Projects

A Specialized Global Space Insurance Broker

- We continually invest in the MSP team
 - MSP brokerage teams based in our core 3 offices
 - Recruit college graduates and hire within the industry, where appropriate
- Specialists are employed in every discipline
 - Insurance marketing and placing
 - Contractual and legal analysis
 - Policy wordings
 - Engineering and technical evaluation
 - Insurance Administration
 - Policy review
 - Non-Disclosure Agreements
 - ITAR coordination DSP 83s and TAAs

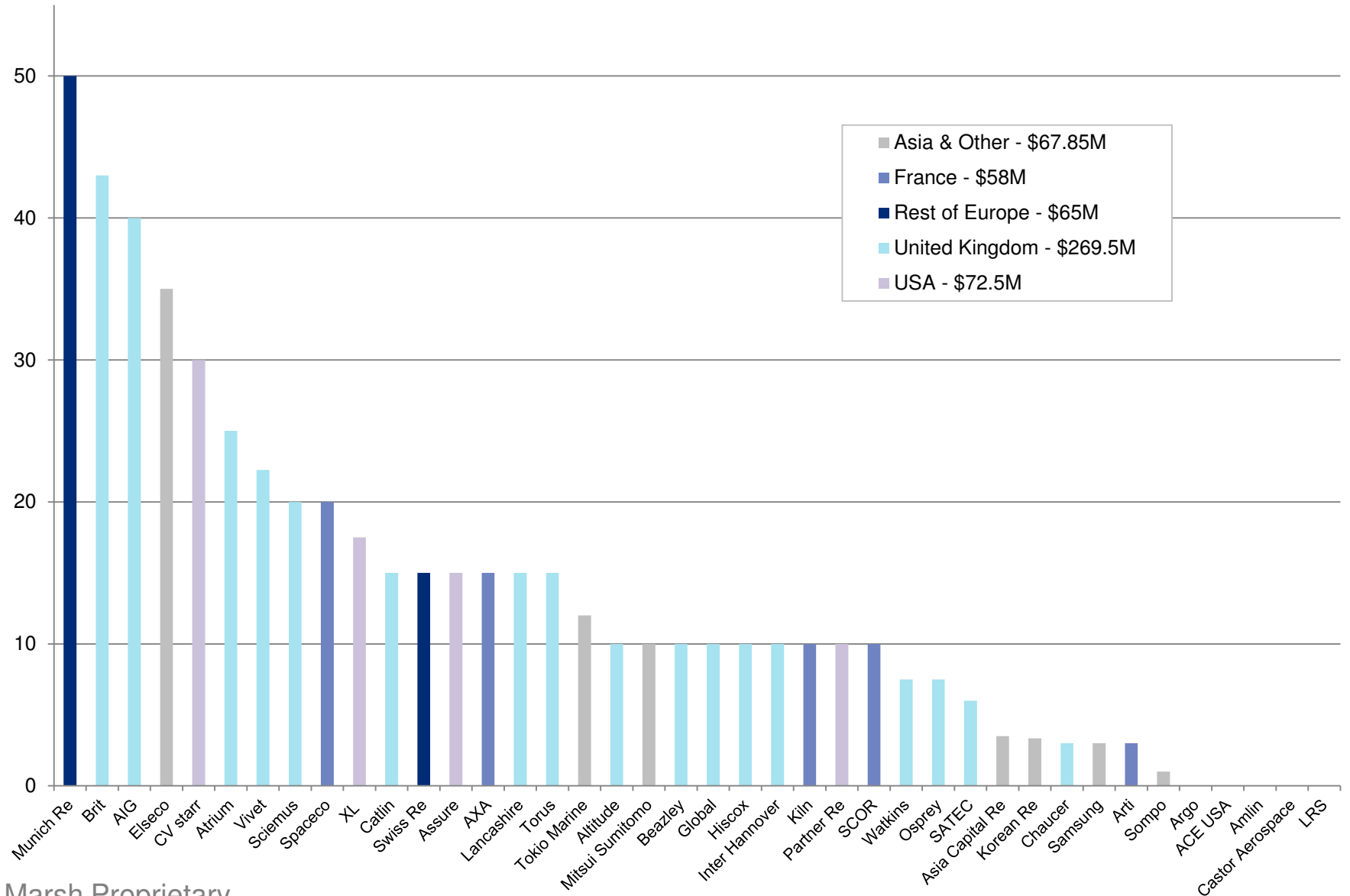
2015 International Market Capacity (Millions)

Launch – USD 694M

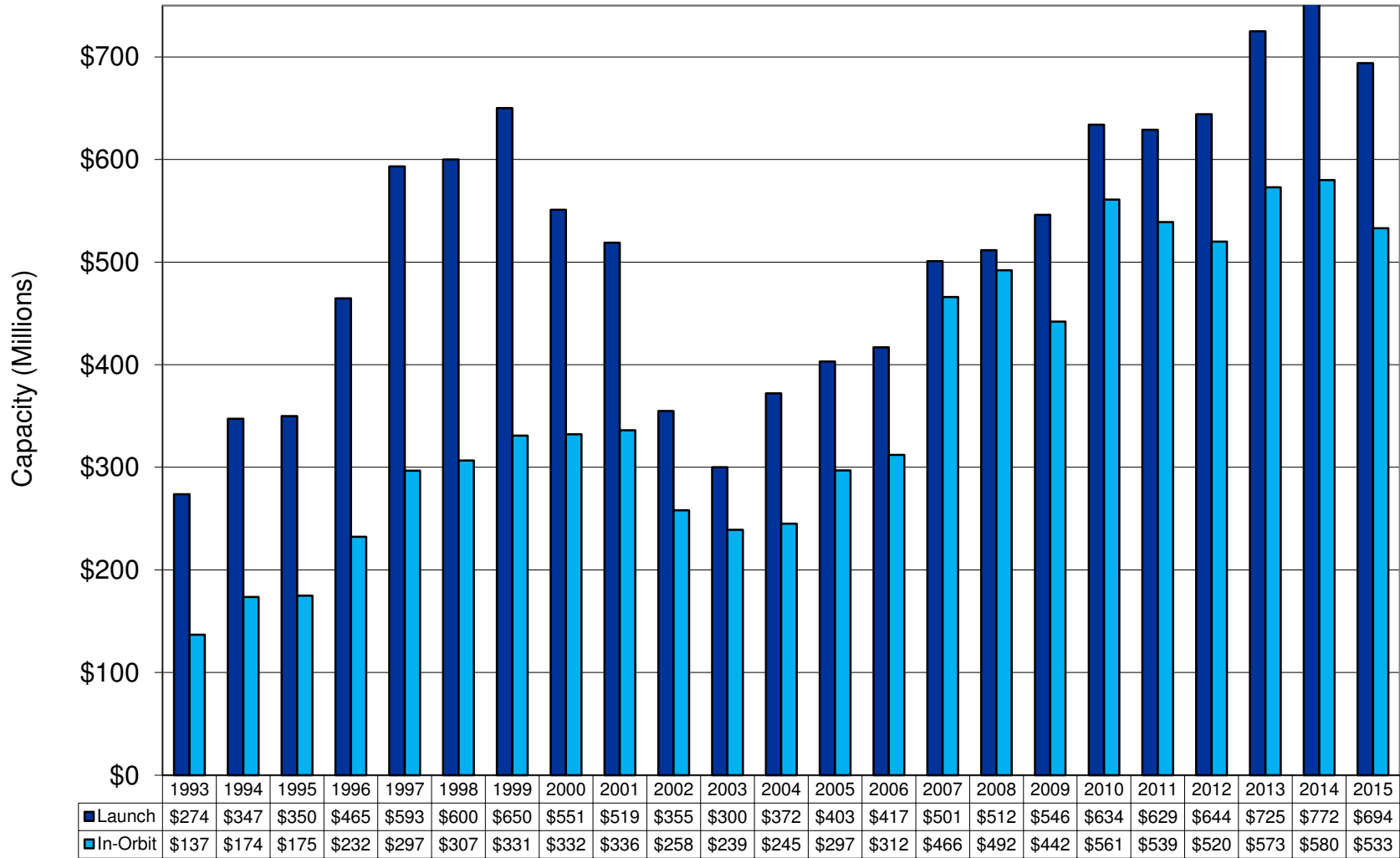


2015 International Market Capacity (Millions)

In-Orbit – USD 533M



Historical International Market Capacity

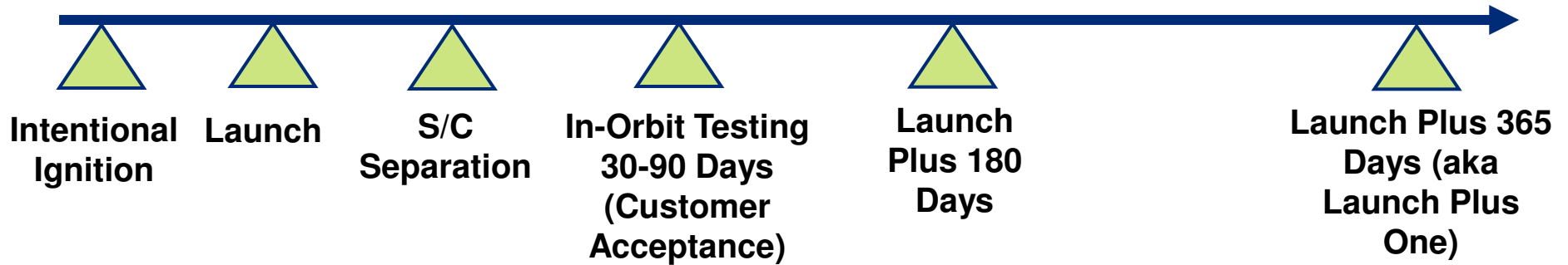


Transit Insurance & Pre-Ignition Insurance



- Provides coverage for direct physical loss or damage to the launch vehicle or satellite, including its related launch equipment.
- Incentives (both positive and negative) and consequential loss insurance can be included to provide cover for extra expenses, etc. arising out of the physical loss or damage to the satellite and launch vehicle.
- Market offers delay start up and consequential loss cover for any launch delay

Launch Insurance

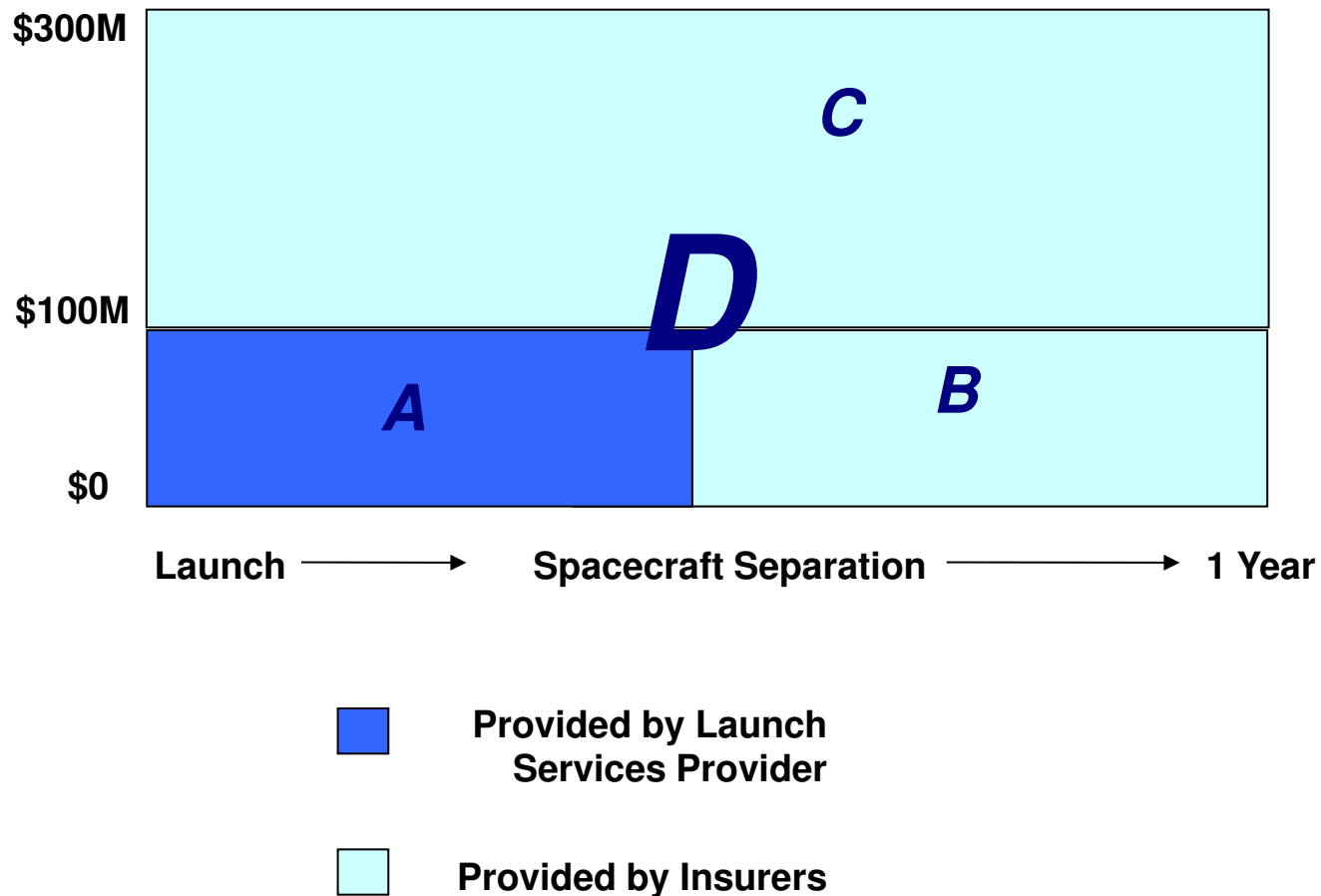


- Requires in depth technical presentation
- Provides coverage for the value of the satellite and launch vehicle for physical loss or damage from Intentional Ignition or Launch through In-Orbit testing to Commissioning and for some period of initial operation between 180 days to 365 days after launch.
- Amount to be insured (sum insured) can include the cost of a replacement satellite, replacement cost of launch services, capitalized interest and the insurance premium.
- Provides coverage for the loss of operational capability due to occurrences during the coverage period.
- Future losses (fuel and power) are covered if the loss manifests itself during the coverage period.

Launch Risk Guarantees (LRG)

- Provides refund or credit towards a re-launch
- Intended to cover launch phase perils (Intentional Ignition/Lift-Off to Separation)
- Covers only damage caused by the launch vehicle failure to perform within specification as measured by telemetry
- Does not include the value of the spacecraft
- Satellite owner's insurance needs must be integrated with LRG, without gaps or overlaps in protection
 - “Wrap around” to cover spacecraft induced launch failure
 - Difference in conditions (DIC)

Launch Risk Guarantee (LRG) with a Wrap Around Launch Insurance Placement



In-Orbit Insurance



- Requires Health Status Review
- Similar to Launch insurance
- Amount of Insurance can include Replacement Cost/Re-launch Cost or Asset Value, Loss of Revenue, Extra Expenses or Contractual Obligations
- Material anomalies generally dealt with via exclusions or deductibles or higher rates.

Incentives Insurance

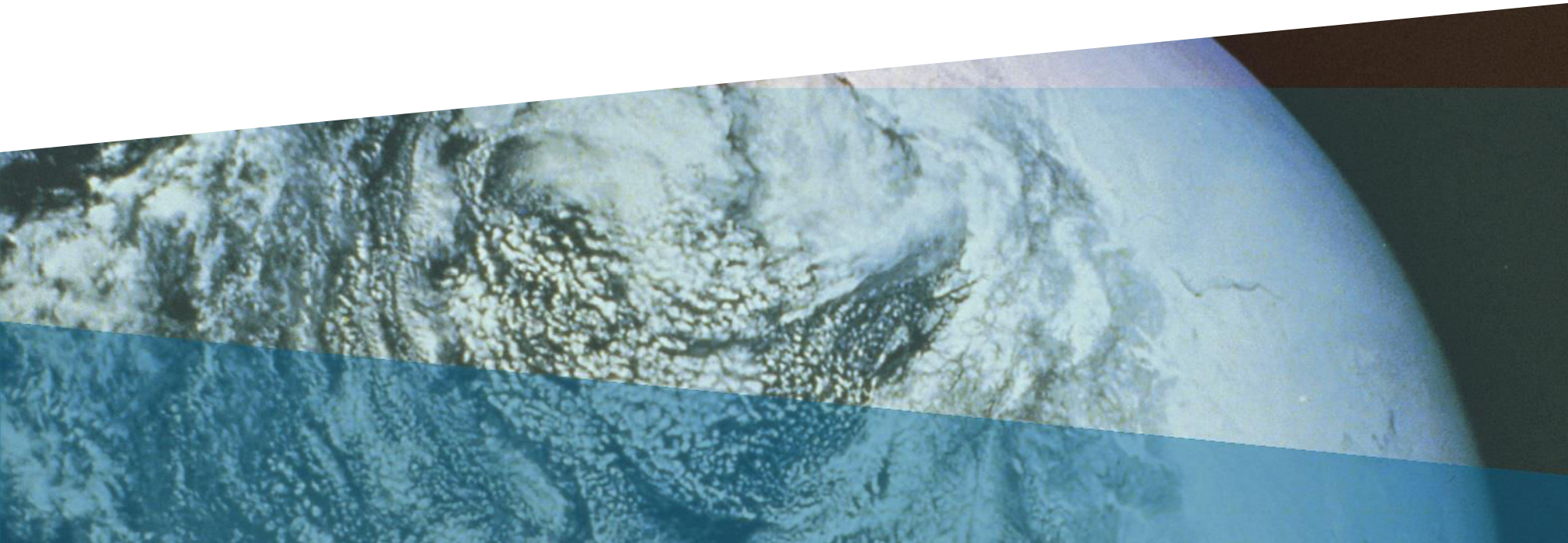


- Similar to Launch and In Orbit Insurance; covers loss of or repayment of incentives (in accordance with the contract with their customer) as a result of a launch vehicle or satellite anomaly during the Policy Period
- Amount of Insurance is the amount of incentives/warranty paybacks per contract
- Can commence at Intentional Ignition, Launch or Satellite Separation and continue until one year after Launch or Acceptance

Procurement/Risk Transfer Techniques

- The procurement Process can result in risk transfer in a variety of ways
 - Ground delivery
 - More typical
 - Title and risk of loss transfers at intentional ignition or liftoff/launch – i.e. “point of no return” (need to ensure Policy and Launch Service Providers definitions are consistent)
 - Satellite Owner/Operator purchases Launch Service with or without a launch risk guarantee
 - In-Orbit Delivery
 - Title and risk of loss transfers after completion of in orbit testing, acceptance (as defined) or designated period
 - Satellite manufacturer usually buys launch service
 - Option for customer to purchase insurance

Space Risk Analysis



How Premium is Determined

- Rates are based on the following factors:
 - Type of launch vehicle
 - Type of satellite
 - Amount of Insurance
 - Loss formulas
 - Type of coverage
 - Insured's premium/loss history
 - Profitability of the Space and/or overall Insurance Market

Insurance Rates

Launch Vehicle Factors

- Launch Vehicles: Ariane 5, Proton M/Breeze M, Delta IV, Falcon 9, Sea Launch, etc.
 - Heritage
 - Flight record
 - Integration of new equipment or operations
 - Testing program
 - Technical presentations
 - Launch vehicle development
 - Previous flight failures or anomalies
 - Multiple satellite dispenser experience
 - Access to information
 - Some insurers are very technical - they require a significant amount of information
 - Crucial to maintaining market confidence and relationships
 - Export control regulations - always a concern

Insurance Rates

Satellite Factors

- Satellites:
 - Heritage
 - Satellite systems and subsystems
 - Previous flight history
 - Level of Redundancy - Bus and Payload
 - Spare components
 - Single point failures
 - Customer Oversight
 - Performance Margin
 - Test Program
 - Qualification
 - Quality Control and workmanship screening
 - Waivers
 - Access to Information
 - Technical presentation
 - Disclosures prior to launch – i.e. Pre-ship review
 - Post launch and in-orbit updates and claims information
 - Export control regulations – May need to establish TAA or DSP licenses in order to export data to underwriters for insurance purposes. Marsh provides a monthly Export License List detailing all particulars of the space insurance community

Launch and In Orbit Insurance

Key Policy Terms & Conditions

- Key Policy Terms
 - Fuel life and power margins
 - Insuring Agreement
 - Intended “commercial communications purpose”
 - Subrogation
 - Material Change
 - Salvage
 - Named Insured’s duties - Sunset clause
 - Premium (paid 30 days before launch for Launch Insurance)
 - Export control
 - Due diligence
 - Definitions

ITAR: International Traffic in Arms Regulations

- Impacts level of technical information dissemination without a license
- State Department oversight via DTSA
 - Alternatives for licensing
 - DSP-5
 - TAA
- Master list of insurers, brokers and consultants
 - Marsh sends on monthly basis (Export License List)
 - Marsh to assure NDA's are in place with all insurers, consultants, and brokers
- Timing for licensing
 - The earlier the better to start the licensing process
 - Own Customer TAA or Manufacturer TAA?
 - Can be customer driven because their concurrence is required for:
 - Launch Presentations
 - In-orbit health reports
 - Claims



This document and any recommendations, analysis, or advice provided by Marsh (collectively, the “Marsh Analysis”) are intended solely for the entity identified as the recipient herein (“you”). This document contains proprietary, confidential information of Marsh and may not be shared with any third party, including other insurance producers, without Marsh’s prior written consent. Any statements concerning actuarial, tax, accounting, or legal matters are based solely on our experience as insurance brokers and risk consultants and are not to be relied upon as actuarial, accounting, tax, or legal advice, for which you should consult your own professional advisors. Any modeling, analytics, or projections are subject to inherent uncertainty, and the Marsh Analysis could be materially affected if any underlying assumptions, conditions, information, or factors are inaccurate or incomplete or should change. The information contained herein is based on sources we believe reliable, but we make no representation or warranty as to its accuracy. Except as may be set forth in an agreement between you and Marsh, Marsh shall have no obligation to update the Marsh Analysis and shall have no liability to you or any other party with regard to the Marsh Analysis or to any services provided by a third party to you or Marsh. Marsh makes no representation or warranty concerning the application of policy wordings or the financial condition or solvency of insurers or reinsurers. Marsh makes no assurances regarding the availability, cost, or terms of insurance coverage.