GUY CARPENTER

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Marine and Insurance Claims Association
MICA [MARINE INDUSTRY CLAIMS ASSOCIATION, INC.] [NOT-FOR-PROFIT CORPORATION]

Marine Insurance – A Global Perspective
Catastrophe Models – Changing Your World

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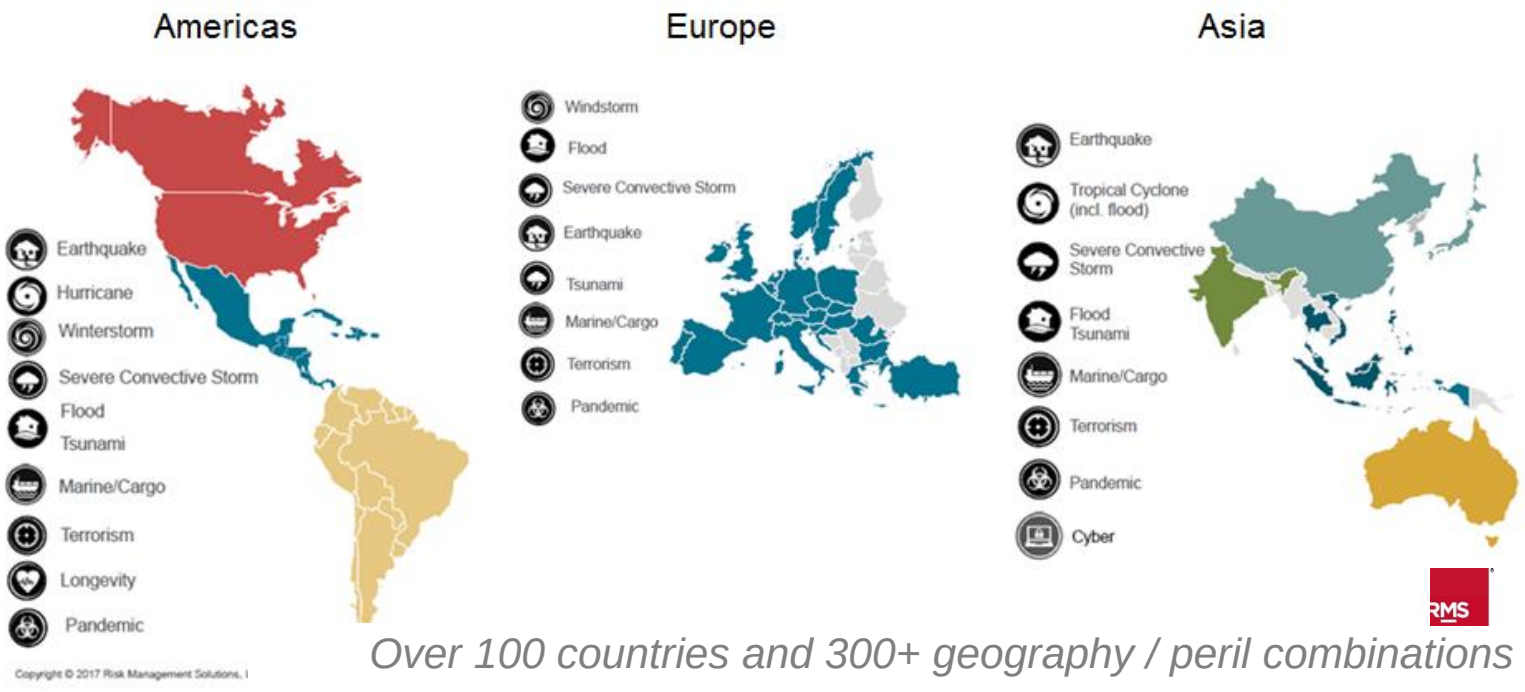
MARSH & McLENNAN COMPANIES

Discussion Topic

- Catastrophe Models
  - Overview
  - Today - Underwriting and Claims
  - Tomorrow’s Possibilities

Catastrophe Models
Overview

- A catastrophe hazard model is software that simulates thousands of synthetic events to estimate damage and loss for modeled risks
  - Commercially available for over thirty years
  - Improved risk identification and quantitative analysis
  - Global footprint covering “natural” and “man-made” catastrophic perils



Over 100 countries and 300+ geography / peril combinations

Catastrophe Models - Overview
Marine Lines of Business

- Marine capabilities are relatively new and limited
- Capabilities vary by marine lines of business

Requires Alternatives

- Marine fixed property (marinas, piers / docks)
- Recreational boats / yachts (2006)
- Cargo warehouse Specie / fine art (2016)

- Builders' risk
- Contractors' equipment
- Cargo port accumulation
- Off-shore energy

- In-transit cargo (air, land and sea)
- Commercial hull
- Protection and Indemnity

Catastrophe Models – Today
Underwriting Impact – New Challenges

- Data capture
  - Additional requirements
- Output applications
  - New decision inputs
- Workflow
  - Efficient when integrated
- Holistic perspective
  - Risk decisions impact portfolio performance

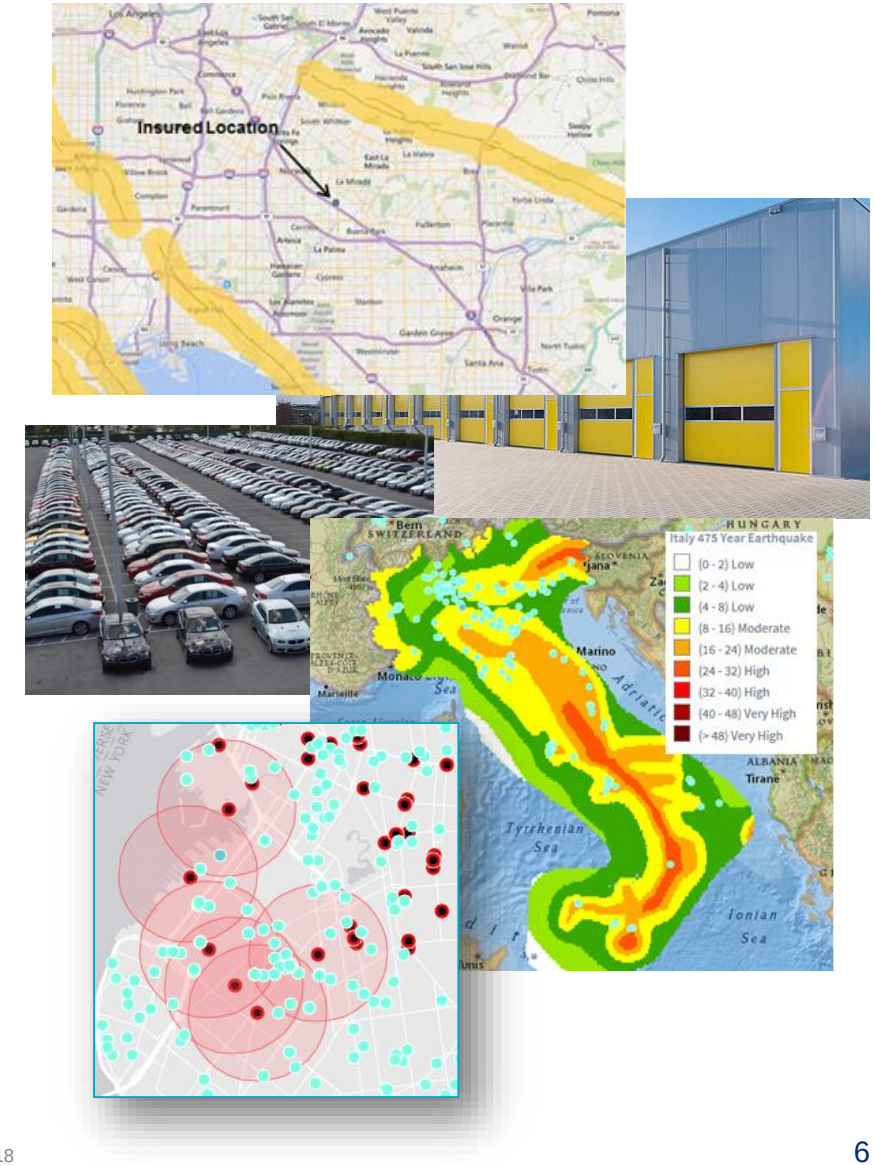
Catastrophe Models – Today
Impact on Underwriting Process

- Additional data requirements
  - RMS Marine Module (2016)
    - Cargo Warehouse / Specie
      - 19 occupancies
      - 12 structure types
      - 500 different combinations
- System changes
  - Design and implementation expense to support new requirements in a timely manner

Product Type (Occupancy Type)	Storage Configuration (Construction Class)
Automobiles	Special Design Facility
Break Bulk	Silo
Dry Bulk	Liquid Tank
Liquid Bulk	Gas Tank
Consumables	Inside Warehouse at Port
Temperature Controlled	Containerized – Inside Whse
Electronics	Containerized – Stacked Outside
Explosives	At Destination - Warehouse
General Cargo	At Destination - Retail
Heavy Industry	
Petroleum	
Pharmaceuticals	
Project Cargo	
Livestock	
Fine Art & Collectables	Museum & Institutions
Fine Art & Collectables	Retail & Private
Cash in Transit	
Jewelers Block	
Unknown	Unknown

Catastrophe Models – Today
Deeper Insight, Better Decisions

- Geospatial / Characteristics
  - Distance to major fault or coastline
  - Soil classification
  - Flood or brush fire zone
  - Proximity to “trophy” targets
- Visuals
  - Condition, verification, classification
- Loss Potential
  - Expected annual damage and loss
- Exposure Accumulation
  - Risk concentration



Catastrophe Models – Hidden Pitfalls

The Bigger Picture

Leadership

- Influences LOB strategies
- Corrupts portfolio results

- Growth, reduction
- Rate indications
- Capital / resources
- Risk transfer

Underwriting Decision

Coverage and premium booked based on incorrect hazard model analysis

Underwriting / Claims Impact

- Geographical caps
- Underwriting guidelines
- Rates
- Budget allocation
- Claims response

Start Risk Analysis

Cargo (Cold Storage Warehouse) New Orleans, LA - $3m TIV

RMS Mapping

Correct - Temp Controlled, Destination Warehouse - AAGL $3,600

Incorrect - General Cargo, Destination Warehouse - AAGL $1,500

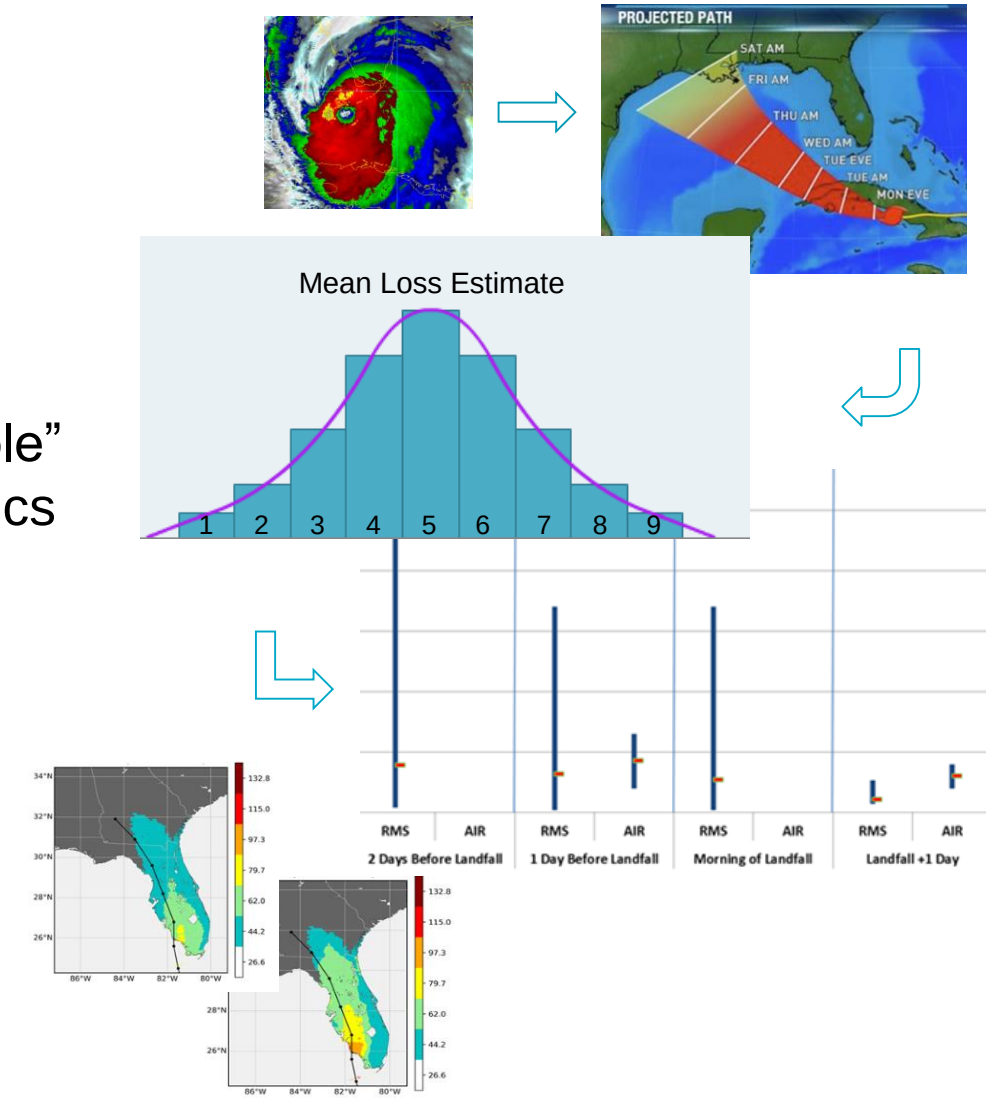
Poor Data Quality Can Be Costly

Catastrophe Models – Today
Catastrophic Event Response

- Catastrophe models generate reasonably credible loss estimates for active events considering the circumstances, but …
- Blindly accepting and using “out of the box” loss estimates can send false signals and trigger poor decisions
- Key Message
  - Users need to understand modeling methodology to temper both internal and external communications

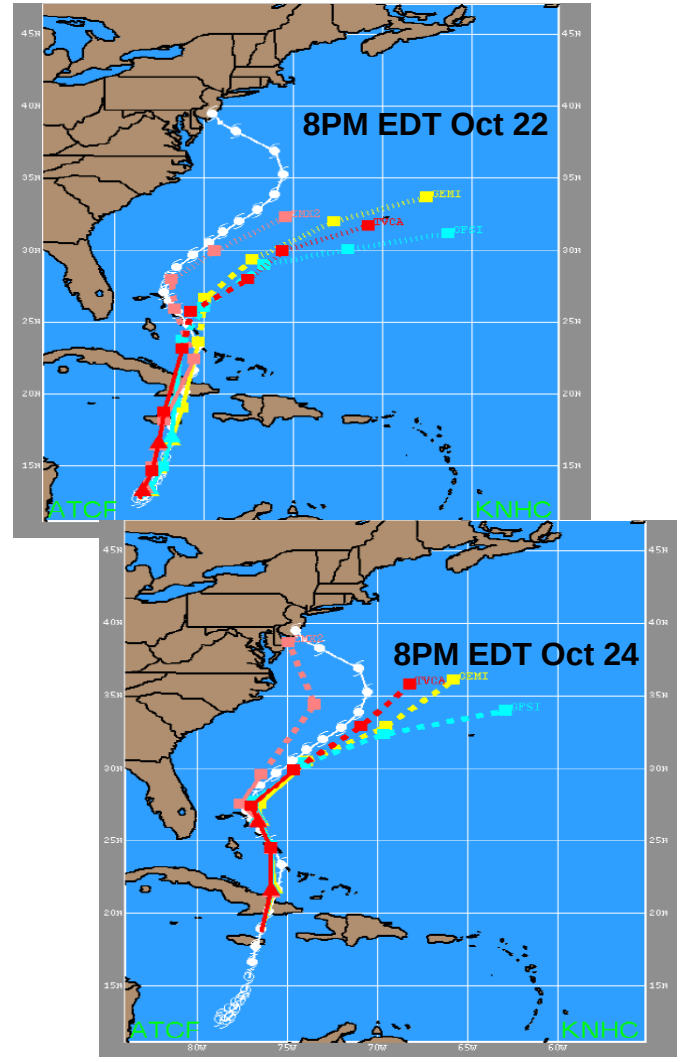
Catastrophe Models – Today
Catastrophic Event Response – Understanding Limitations

- Early estimates are subject to different opinions, unknowns and model methodologies
  - Modelers can differ on evolving event parameters
  - Methodology assumes “ensemble” (events with similar characteristics from catalogue) reflects actual event characteristics
  - Wide loss band that limits value
- Loss estimates can be subject to post–event differences



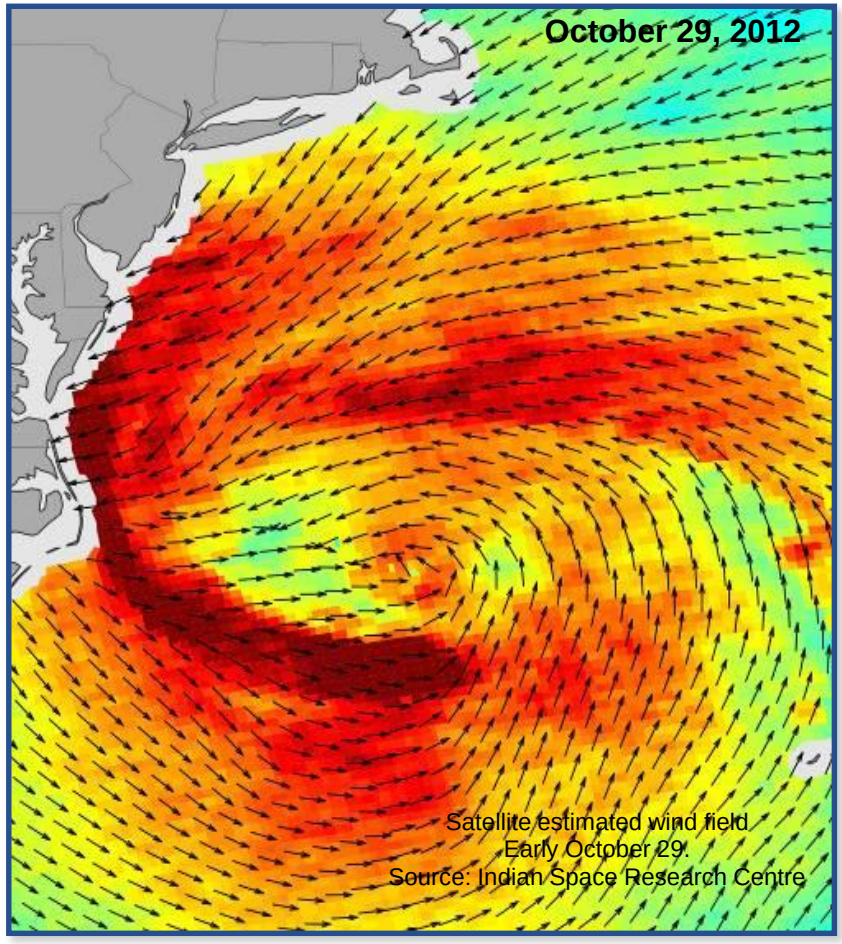
Catastrophe Modeling – Claims Response
Super Storm Sandy (October, 2012) - Pre Landfall

- James Waller, PhD – GC Meteorologist
  - Potentially a deadly, historic storm relative to scope, severity, storm track and landfall angle
  - Primarily a flood event with battering wave impacts along NJ, NY, RI
  - Wind impacts light but widespread with most severe in northern NJ, Long Island and RI
- GC Global Marine Analytics
  - Concerned actual event was not well represented in hazard model event catalogues
  - GC Marine decided “not” to release any pre-landfall cat model loss estimates



Catastrophe Modeling – Claims Response
Super Storm Sandy - Post Landfall

- James Waller, PhD
  - Prior to landfall winds extended to 485 miles from center as storm transitioned from tropical to extratropical
  - Significant storm surge and flooding driven by both wind and area affected
  - Estimated return period for wind 20 -30 years, 100 to 120 years for surge and 700+ years for track
- GC Global Marine Analytics
  - Confirmed Sandy characteristics were not well represented
  - Maintained a position “not” to release any loss projections but…
  - Provided clients with reports noting exposed risks by hazard bands



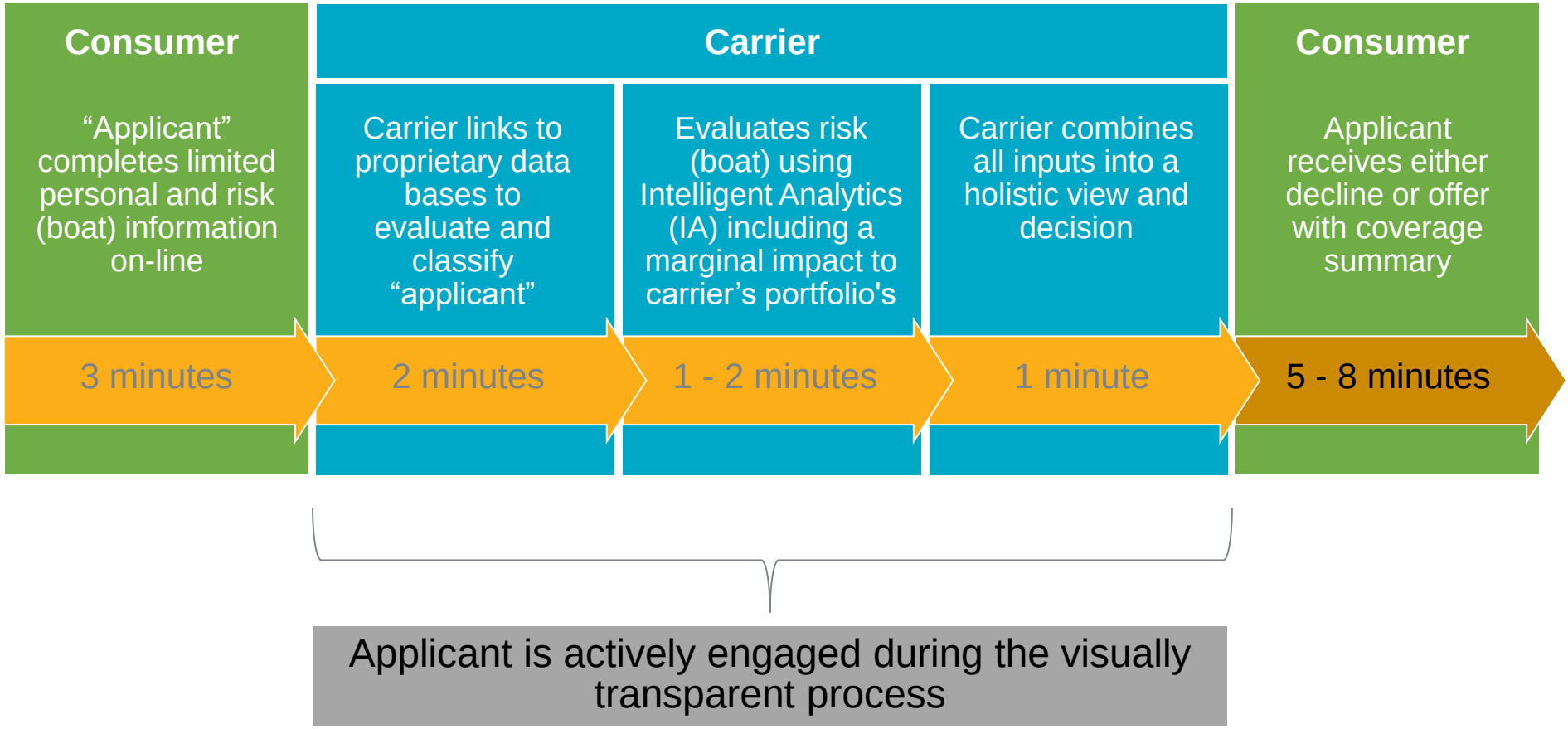
Satellite estimated wind field
Early October 29.
Source: Indian Space Research Centre

Catastrophe Models – Tomorrow
Changing Client Needs and Industry Environment

- InsurTechs – Innovators using data, analytics and digital technology to increase efficiency in current insurance model and enhance customer experience
- Industry InsurTech Conference, October, 2018
  - Estimated 6,000 attendees from 50 countries
  - Participants
    - AIG, Allstate, Chubb, Progressive, Travelers, USAA, etc.
    - Microsoft, Oracle, SalesForce
    - Accelerators such as Blue Owl, Dacadoo, Hippo, Lemonade, Roost, SevenCorners, Simplify, Zesty…….
- InsurTechs are moving the insurance business model forward by "disrupting" as well as "transforming"
- In addition to artificial intelligence (AI), intelligent analytics (IA) will be a key pillar supporting our changing environment

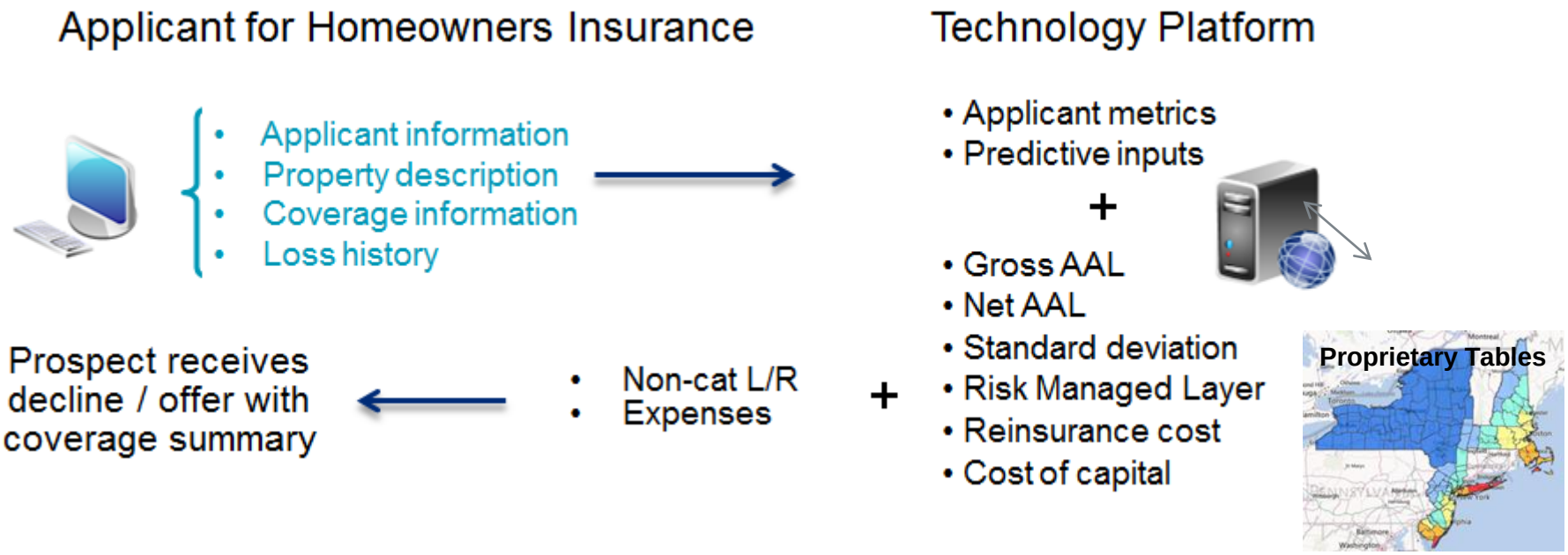
Catastrophe Models – Tomorrow

Technology Is Driving Industry Changes – Looking Forward



Catastrophe Models – ~~Tomorrow~~ Today (Non-Marine)
Intelligent Analytics

- Need - A “dynamically” develop hazard loss cost and reinsurance charge combined with other loss (attritional) and expense factors
- Benefits – More accurately reflects the risk, more effectively manages the portfolio and opens new opportunities



Catastrophe Models – Wrap-up

1. Is data quality a core element emphasized and monitored (scorecard) in the marine underwriting process / organization's culture ?
   - Above average data quality can be positively leveraged
2. Is catastrophe modeling output integrated into a holistic, well-defined analysis process?
   - Fragmented, poorly defined approach is likely inefficient and ineffective
3. Are the benefits and limitations of catastrophe models well communicated throughout the process?
   - Understanding facilitates support and effective implementation
4. Is leadership challenging the traditional marine business model in response to changing customer needs and new opportunities?
   - Challenging legacy and leading with innovation, analytics and technology

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