PLANETiQ

CRITICAL DATA FOR A SMARTER PLANET

Weather Satellites: Following the Path of Remote Sensing Commercialization

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GeoBuiz 2015

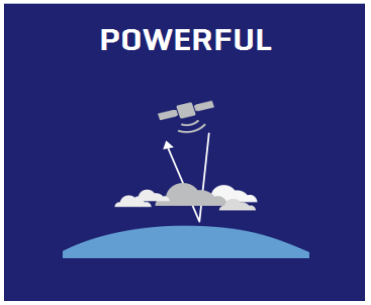
Topics

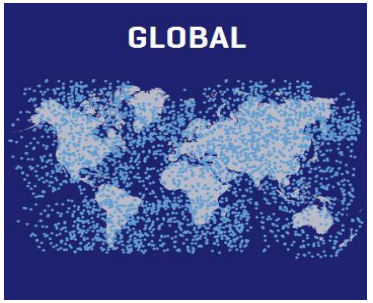
- What is PlanetiQ?
- What's the problem we're addressing?
- What's the Market Potential?
- Following the Commercialization Path of other space industries
- PlanetiQ's Constellation and Global Coverage
- The impact on Weather Forecasting and Weather Value chain
- How we're now converging toward Next-Generation Analytics
- The PlanetiQ Foundation

What Is PlanetiQ?

PlanetiQ will build, launch and operate the first commercial constellation of weather satellites exclusively focused on weather, climate and space weather applications

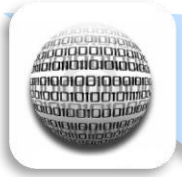
- The initial constellation of 12 privately funded satellites will be on orbit by end of 2017, expanding to 18 satellites by 2020
  - 6U-size microsats (at ~15kg) with 7 year design life each carrying the 4th generation "Pyxis" GPS-RO sensor
- GPS-Radio Occultation (GPS-RO) is a highly precise technique for collecting atmospheric soundings from space. It's a high-impact, cost-effective data set that's critical to weather forecasting, space weather prediction and climate monitoring
  - Over 2,500 users today in 75 countries
- PlanetiQ's constellation will provide a continuous stream of over 34,000 occultations per day covering the entire globe; equates to 8.5+ million high-quality observations of pressure, temperature and water vapor
  - 10 times the amount currently available from GPS-RO research satellites



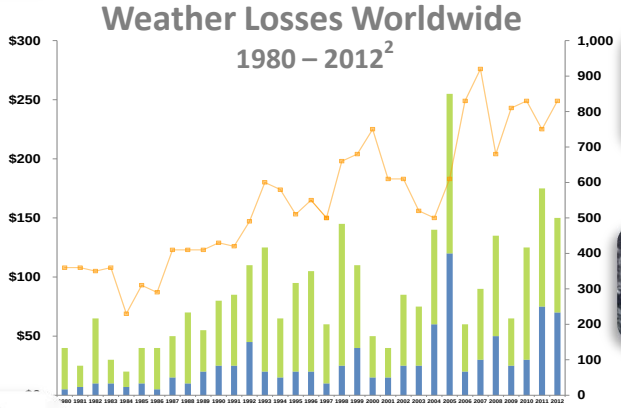


The Problem: Better Weather Data Needed

In the face of growing weather and climate costs, new weather data sources are critical



Today's Models Depend on Vastly Undersampled Globe



75% Decline in Gov't Weather Data by 2020

Weather Losses $70 Bn Annually and Growing

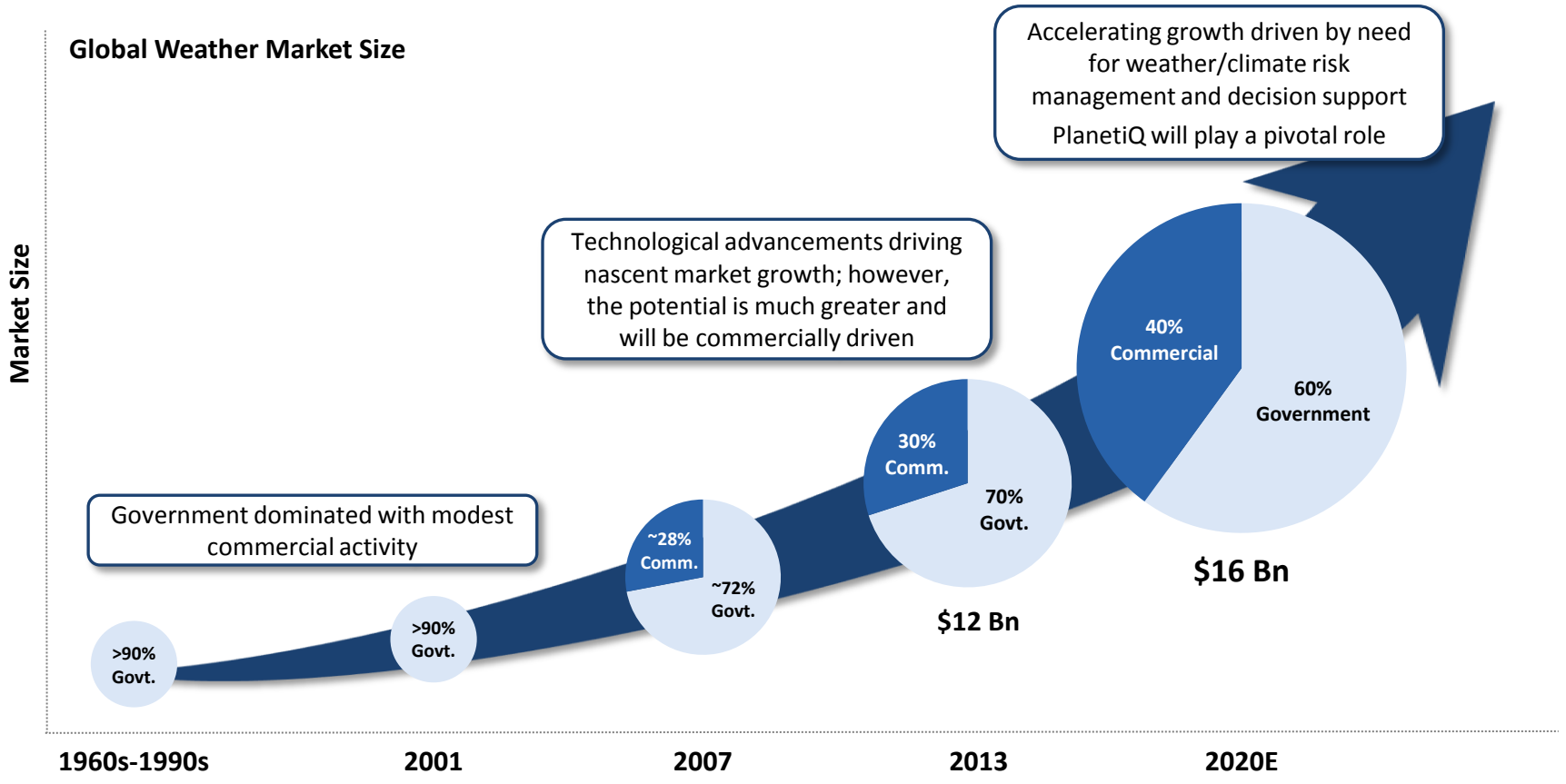
Better Risk Management & Preparedness Needed

New Data Sources Urgently Needed

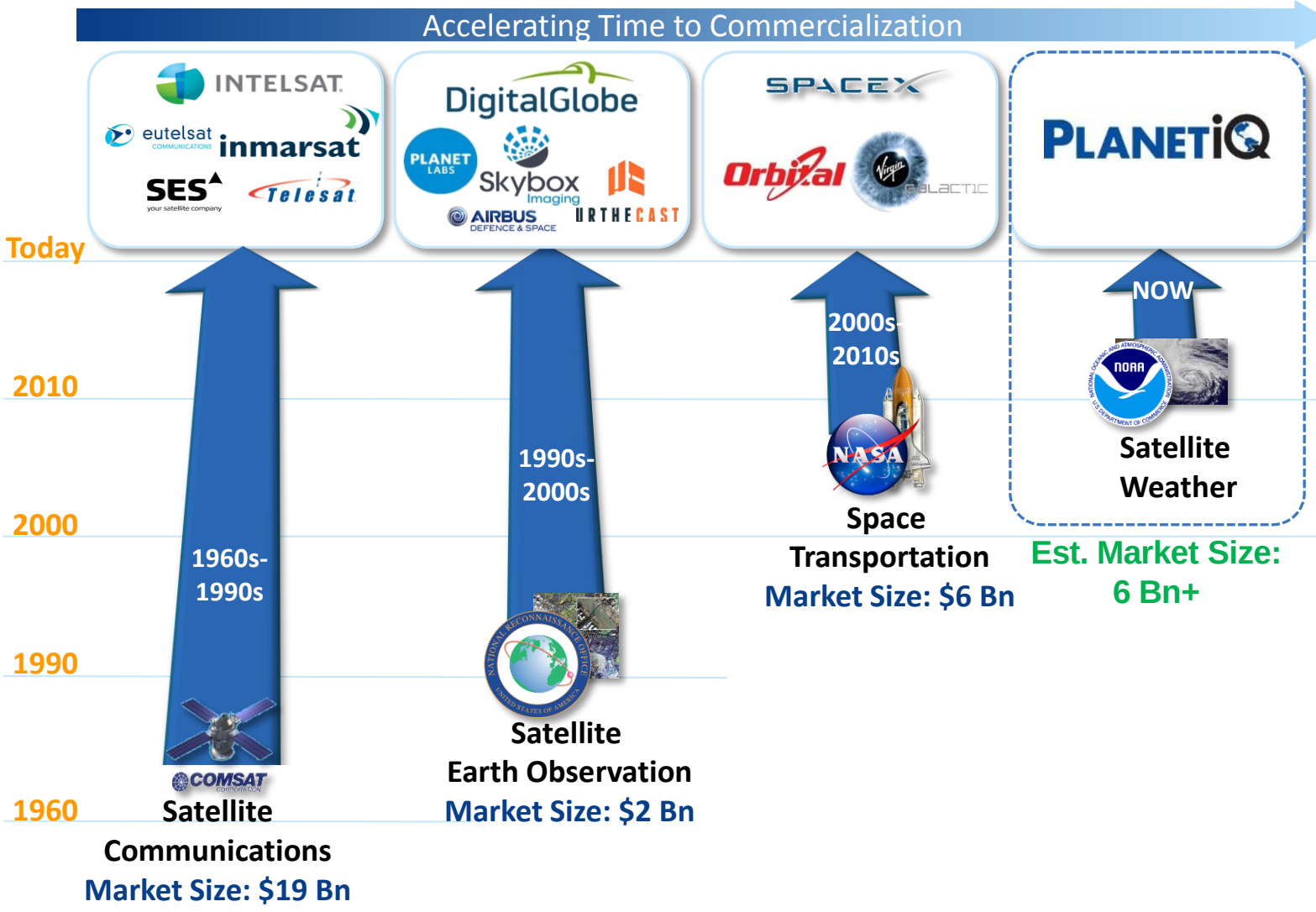
Sources: Weather losses worldwide from Munich Re. 75% decline in earth observing instruments by 2020 from National Research Council (2012). $70 Bn annual insurance payouts due to weather from Allianz Risk Transfer (2013).

$12 Billion Market Poised for Expansion

Commercialization of weather data & decision-support tools will accelerate broader industry growth, much as it has in analogous markets



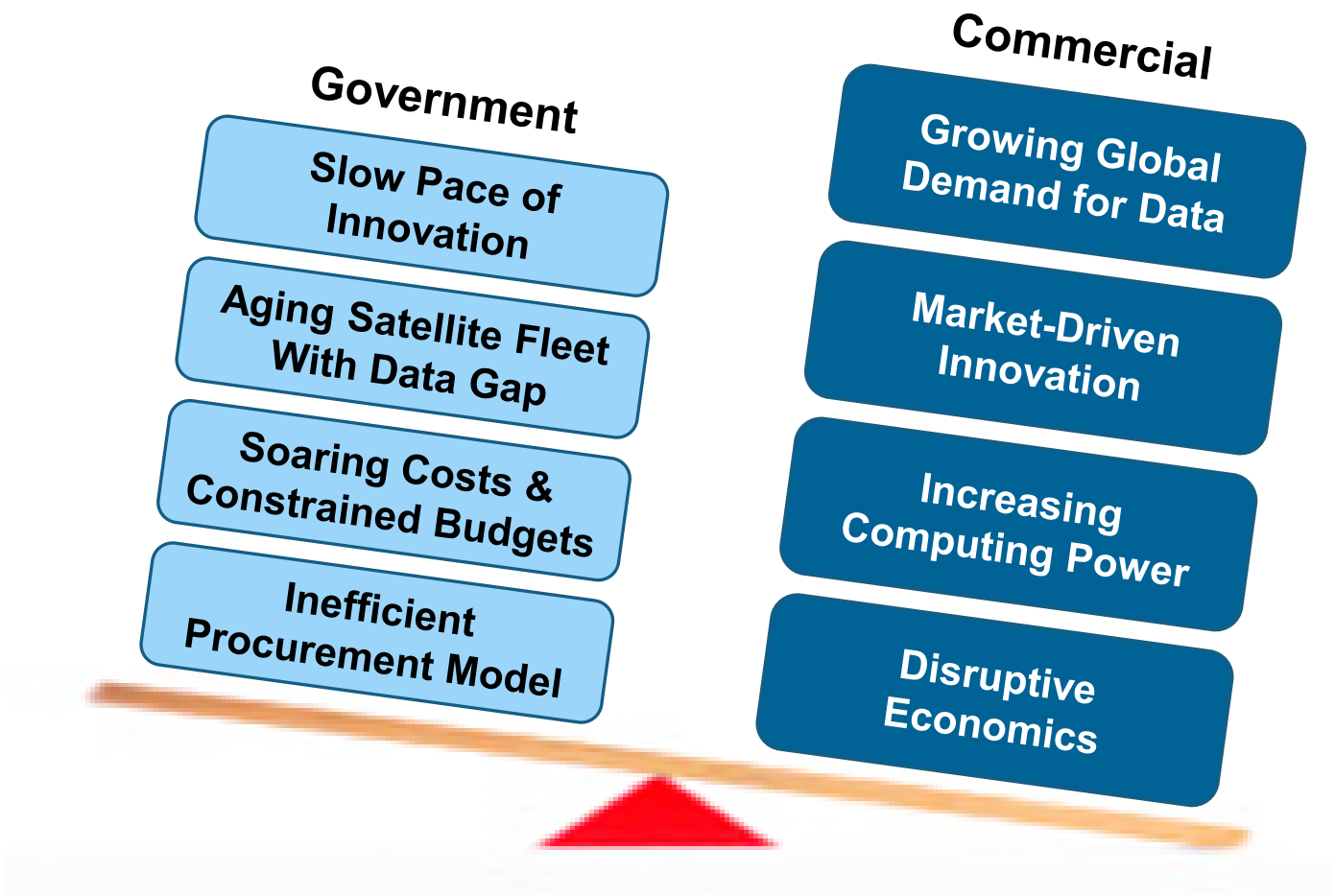
Following Well-Paved Commercialization Path



Note: Arrow heights illustrate accelerating time to each successive market's commercialization

Weather Data Commercialization at Tipping Point

Commercial providers will help solve the weather data problem

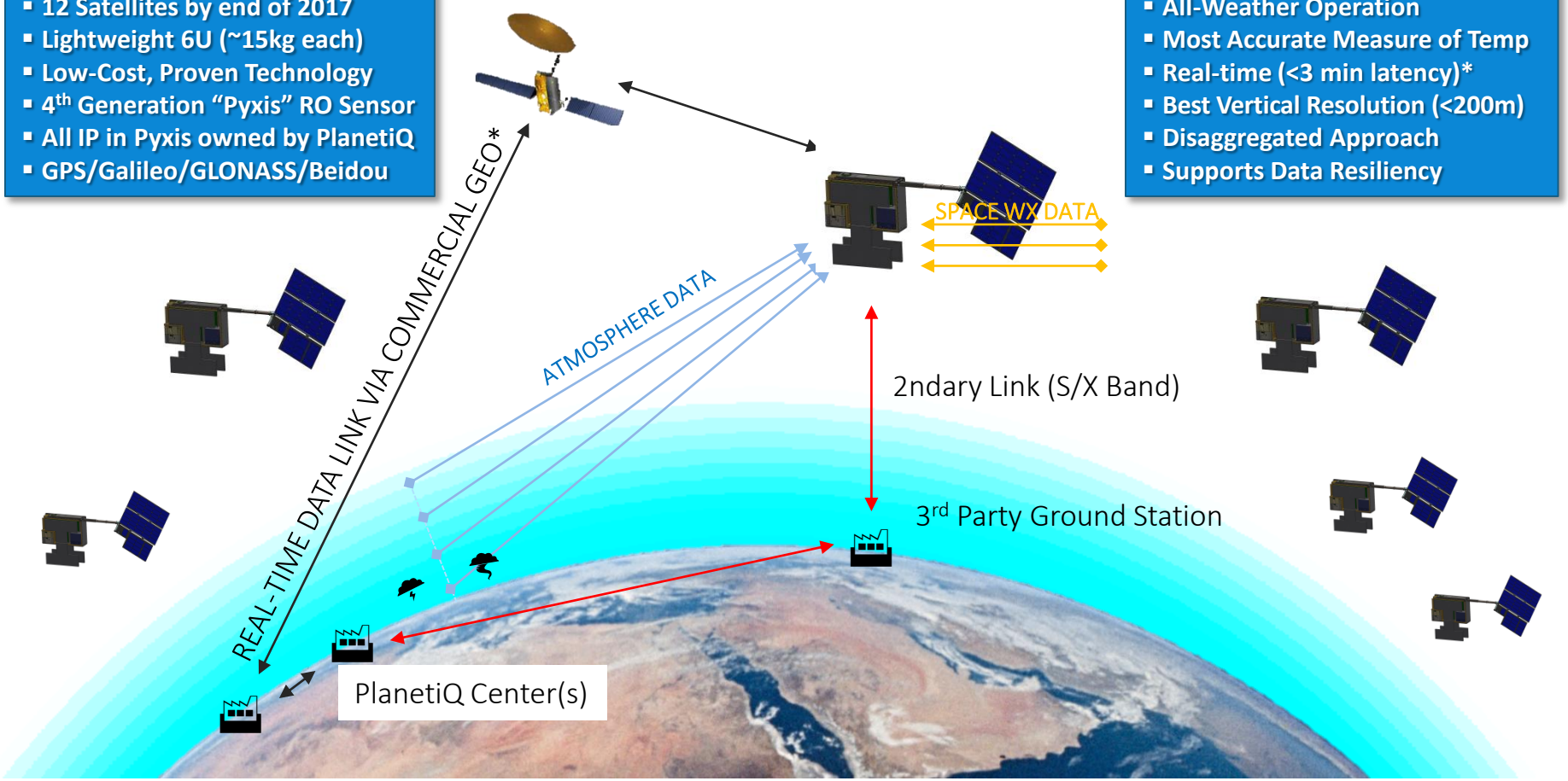


PlanetiQ Constellation

Constellation of 12-18 GPS Radio Occultation Satellites Will Collect 30,000-50,000 Occultations/Day for Weather, Climate & Space Weather

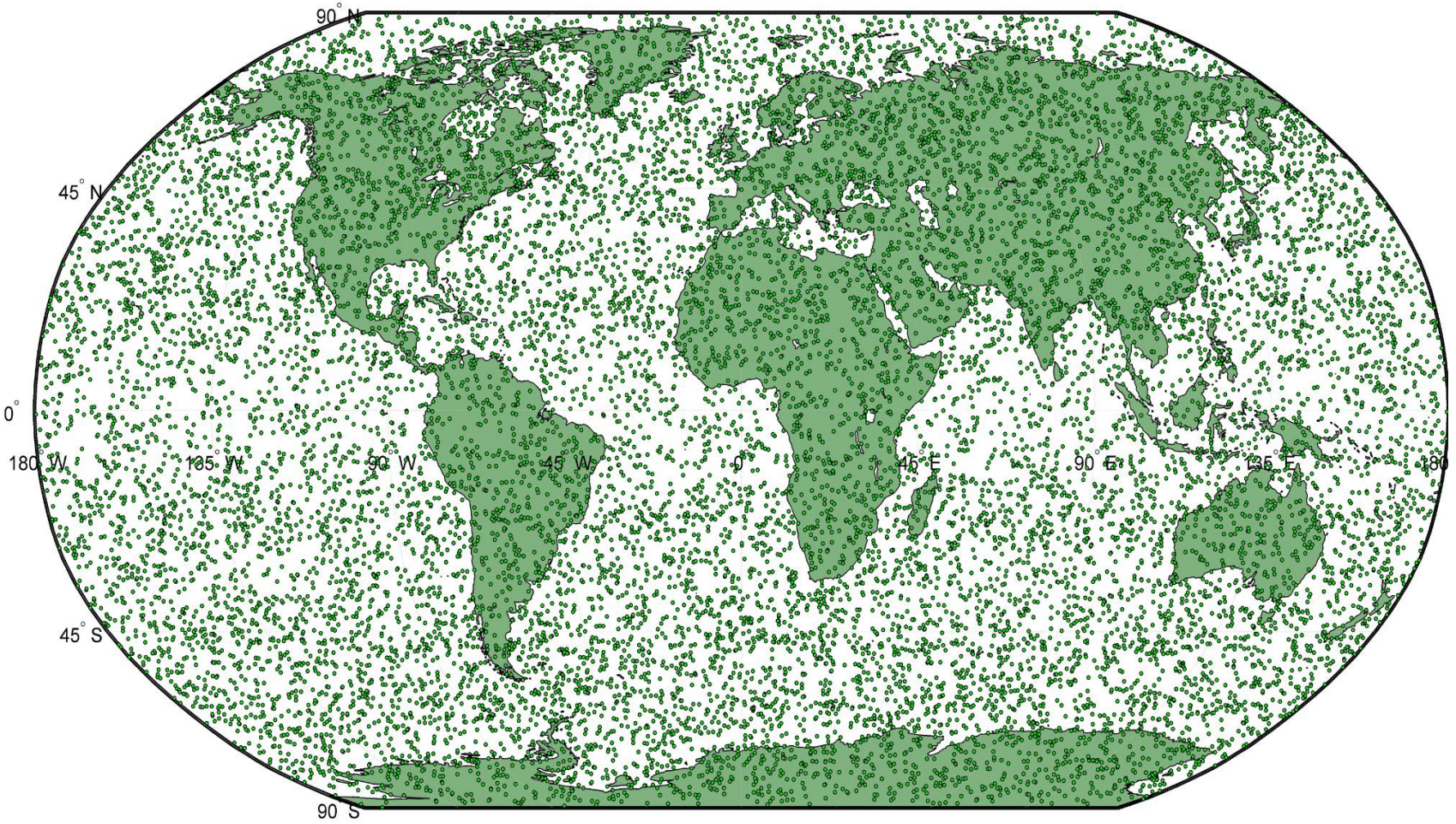
- 12 Satellites by end of 2017
- Lightweight 6U (~15kg each)
- Low-Cost, Proven Technology
- 4th Generation "Pyxis" RO Sensor
- All IP in Pyxis owned by PlanetiQ
- GPS/Galileo/GLONASS/Beidou

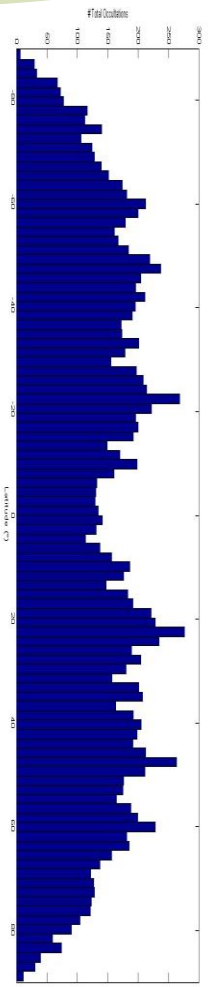
- All-Weather Operation
- Most Accurate Measure of Temp
- Real-time (<3 min latency)*
- Best Vertical Resolution (<200m)
- Disaggregated Approach
- Supports Data Resiliency



*Real-time data link available starting with satellites 7-12

Occultations from 12 satellites in only 12 hrs

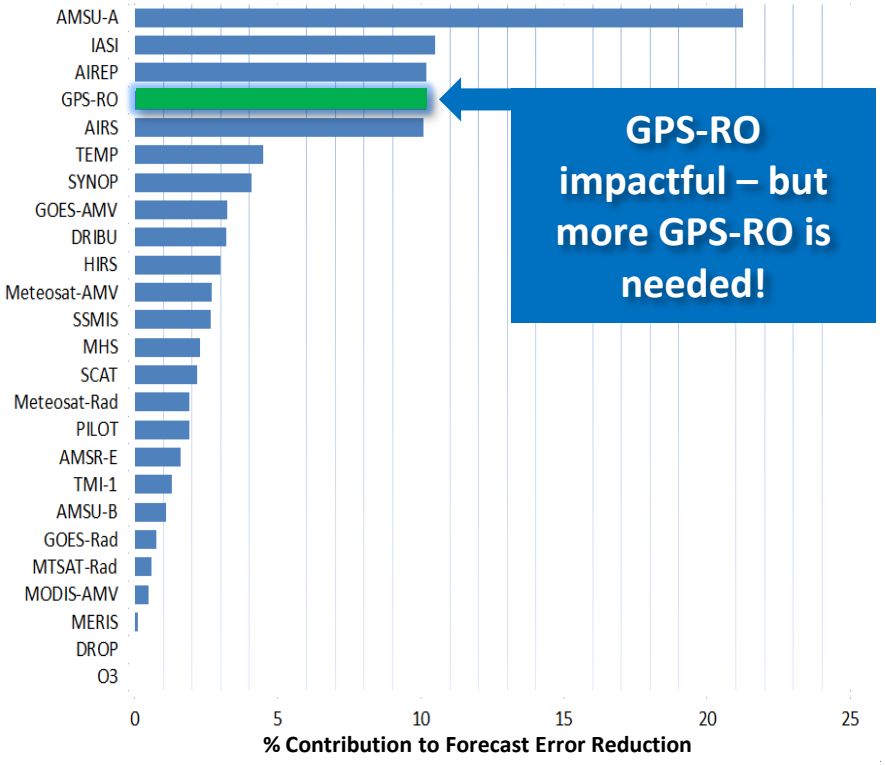




24 hours of data from 12 satellites, tracking all four major GNSS, ~34,000 occultations/day

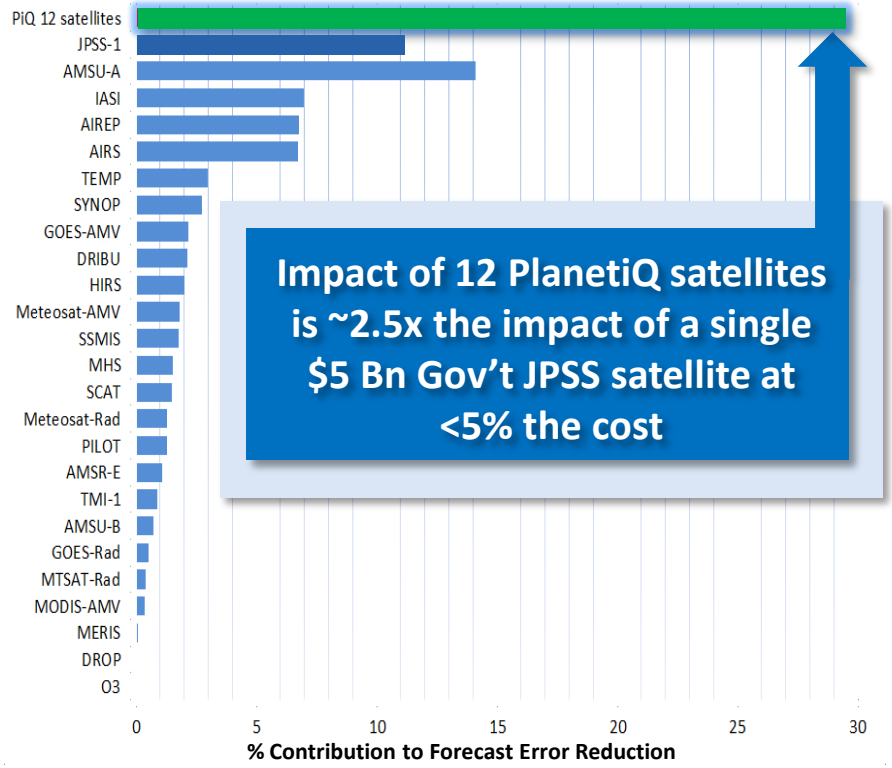
Impact of our Game Changing GPS-RO Data

Current Weather Forecast Impact of GPS-RO @ **2,500** Occs/Day(1)



Cardinali & Healy (2013)

PlanetiQ's Game-Changing Impact of 12 Satellites Producing **34,000** Occs/Day(1)



Extrapolated by R. Kursinski based on Harnisch et al. (2012, 2013)

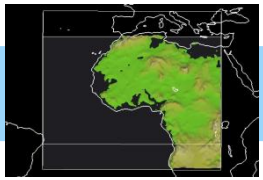
(1) An occultation ("occ") provides a vertical profile of atmospheric weather data. Globally ~2,500 occultations/day collected as of 2010, to increase by 34,000 with PlanetiQ system

GPS-RO's Impact Across the Weather Value Chain

As the foundational dataset of the future,
GPS-RO will play a pivotal role across all aspects of the weather value chain

Global Models

- GPS-RO already proven the highest-impact, most cost-effective weather satellite data
- Improves the impact of other satellite data (microwave and infrared)



Regional Models

- GPS-RO greatly improves hurricane & cyclone forecasts
- Fills in large data gaps over oceans and developing world
- Untapped potential to exploit high vertical resolution of GPS-RO (<200m)

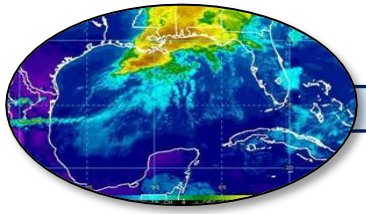
Hyperlocal Forecasts

- GPS-RO to become the most important contributor to global models that feed into regional and local forecasts.
- Foundational dataset that will ensure ROI in crowd-sourced data, drones, big-data computing, etc.

Climate Analytics

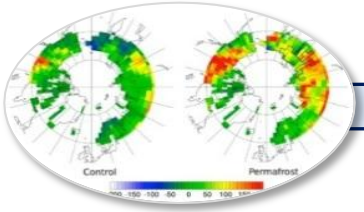
- Archive of 8 Mn measurements/day to fuel weather risk management tools
- Improves performance of climate models
- Potential through data mining to reveal precip trends critical to ag, insurance, energy, etc.

Empowering Numerous High-Value Applications



Improved Severe Strom Tracking → (Re)Insurance Underwriting

Long-Range Weather Planning → Demand Forecasting



Climate Analytics → Urban Planning

Agriculture Micro Forecast → Agriculture Optimization

Power Demand Forecast → Utilities

PlanetiQ Foundation: Free Data for Research

Archived data available at no cost to research and education users

Over 8 million daily observations around the world will:

- Establish long-term climate record based on most accurate measure of temperature, etc.
- Enhance climate monitoring, climate change detection, and evaluation and improvement of climate models
- Encourage research to improve the impact of GPS-RO data on weather forecasting and space weather prediction
- Empower faculty and students with high-quality data and support research on additional uses for the data

Benefits to PlanetiQ LLC include:

- Goodwill in the science and research community
- Drive demand and increase user acquaintance with GPS-RO data
- Accelerates innovation in sensor design

THANK YOU!

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