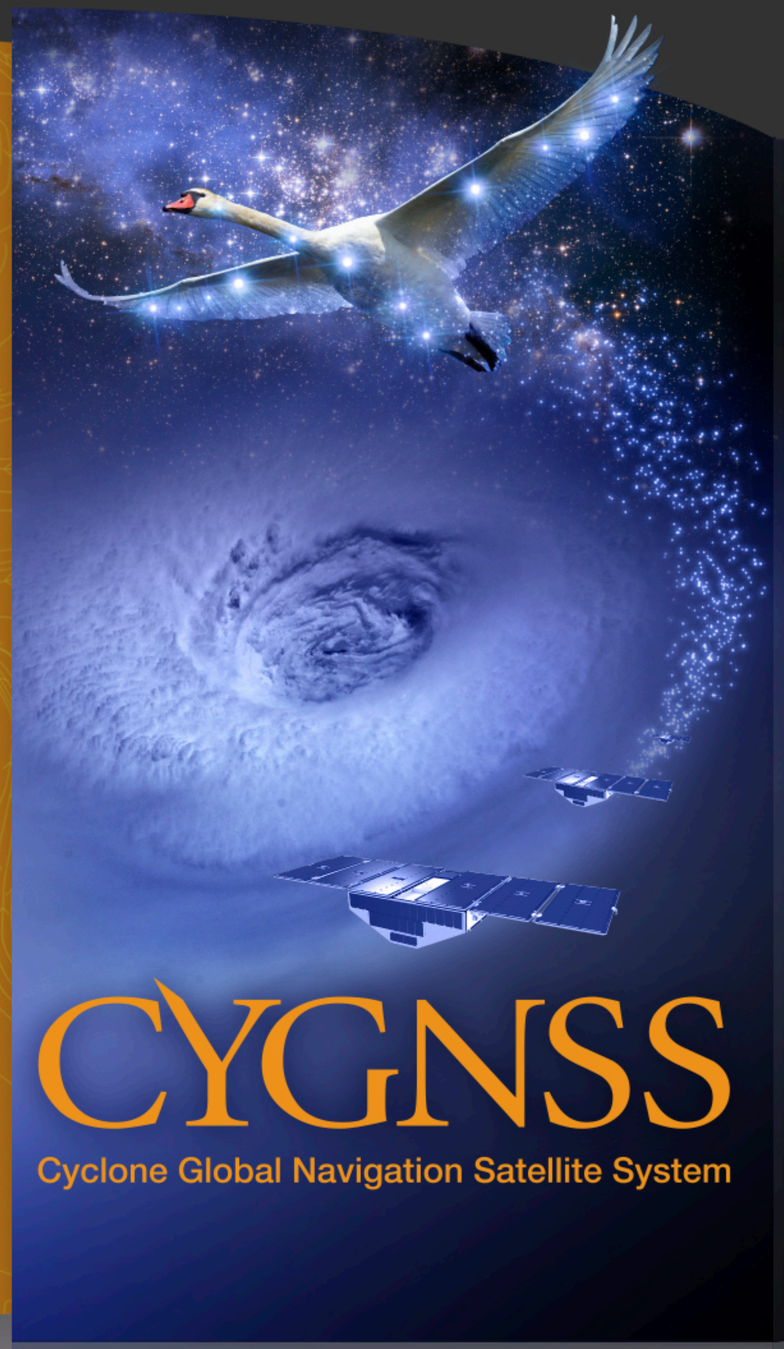


CYGNSS

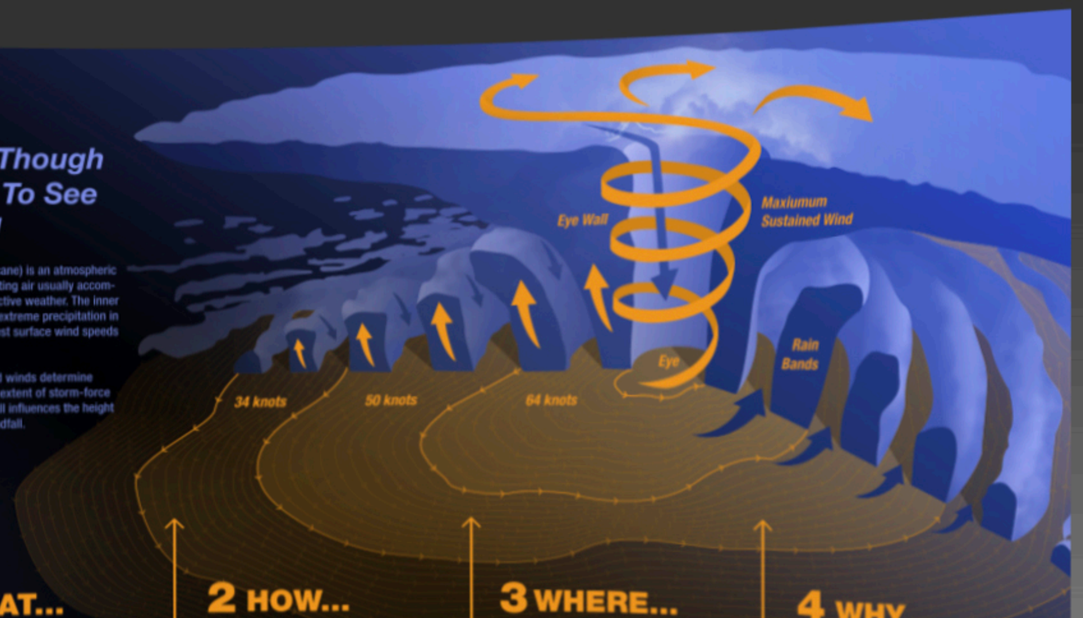
Cyclone Global Navigation Satellite System

www.nasa.gov

Looking Though the Rain To See the Wind

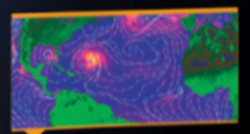
A tropical cyclone (hurricane) is an atmospheric system of rapidly circulating air usually accompanied by stormy destructive weather. The inner core is distinguished by extreme precipitation in the rain bands and highest surface wind speeds near the eyewall.

The maximum sustained winds determine hurricane intensity. The extent of storm-force winds outside the eyewall influences the height of the storm surge at landfall.



1 WHAT...

...is CYGNSS? The Cyclone Global Navigation Satellite System (CYGNSS) uses a constellation of eight microsatellites to measure ocean surface winds of tropical storms and hurricanes. The goal is a fundamental improvement in hurricane forecasting.



The CYGNSS-measured wind fields (like those above produced by the QuikSCAT mission) when combined with precipitation fields data from other NASA missions, will enable new insights into hurricane inner core dynamics and energetics.

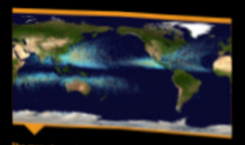
2 HOW...

...does it work? Signals penetrate through heavy precipitation in the rain bands of tropical cyclones to map the wind speed underneath. Measurements of wind structure in the inner core will advance forecasting of the storm, intensity and surge.

Each CYGNSS microsatellite will receive both direct and reflected signals from Global Positioning System (GPS) satellites, and be capable of measuring four simultaneous reflections, resulting in 32 wind measurements per second across the globe. The complete constellation will provide nearly gap-free Earth coverage.

3 WHERE...

...do Cyclones form? The Pacific Ocean west of the International Date Line sees more tropical cyclones than any other basin, while there is almost no activity in the Atlantic Ocean south of the Equator.



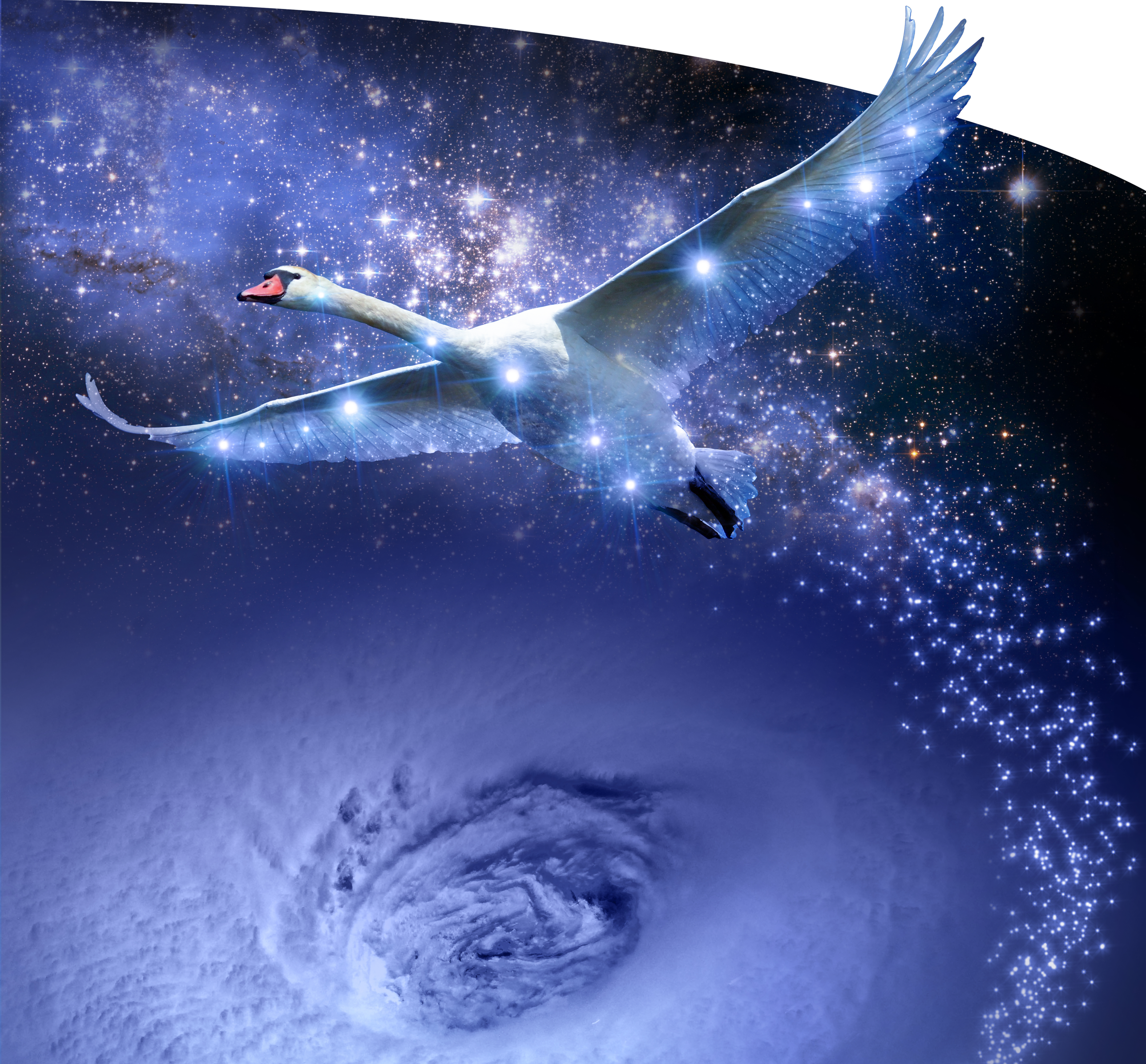
The map above shows global tropical cyclone tracks between 1985 and 2005, indicating the areas where tropical cyclones usually develop. The points show the locations of the storms at six-hourly intervals.

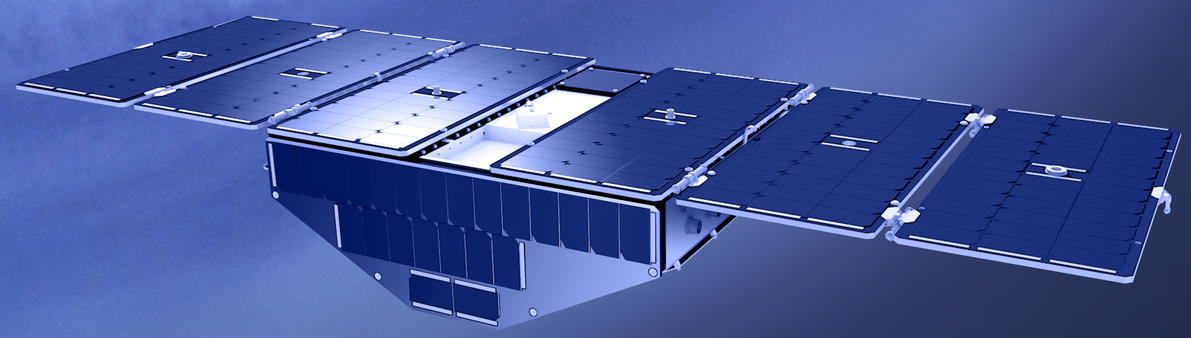
4 WHY...

...does it matter? Tropical cyclones pose a threat to life and property in coastal locations around the globe and to vessels and structures on the ocean. Impacts include damaging winds, storm surges, and heavy rains.

A significant fraction of a hurricane's impact on a coastal community is related to the destructive nature of the storm surge. Storm surge is an abnormal rise of water over and above the expected water levels that would result from astronomical tides.

Learn more: http://cygnss-michigan.org





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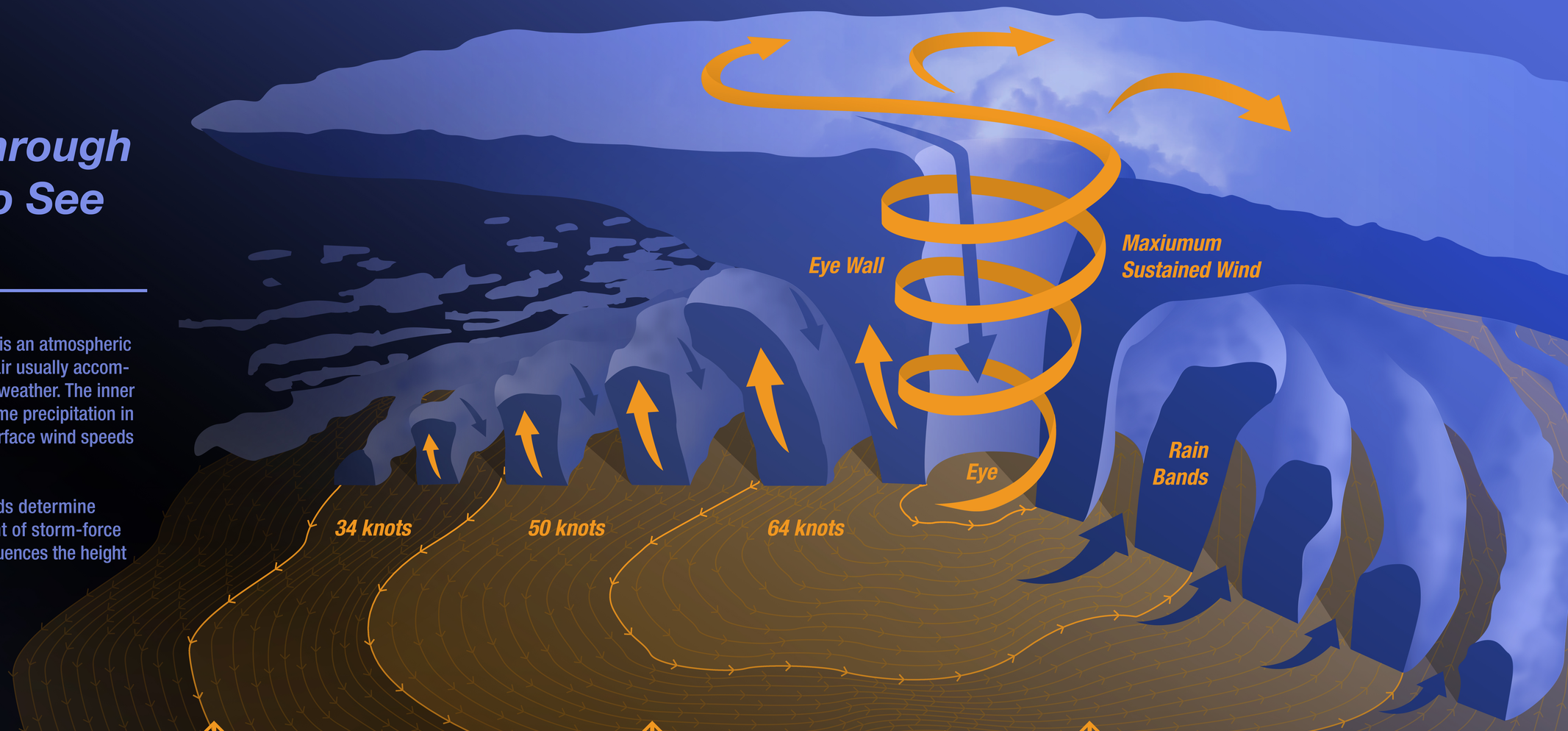

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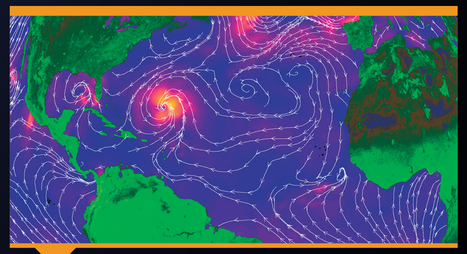

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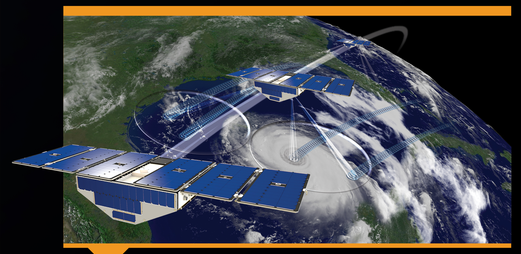

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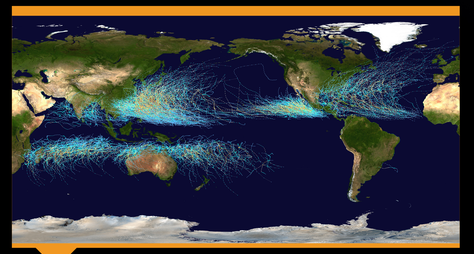

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