Design Guidelines

DRAGONFLY MISSION

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Logo Mark

1.1 PRIMARY LOGO

The primary logo combines a typographic treatment of the mission title with an abstract dragonfly illustration. The image is made up of interlocking hexagons, resembling a double helix and amino acid geometry. The mark comes in two color options, as well as black and white.

1.2 TYPOGRAPHIC LOGO

The primary logo can be difficult to read when scaled down significantly, so a typographic logo should be used in scenarios where space is limited. This mark comes in red, black, and white.

1.3 SHELL LOGO

A shell logo exists primarily for novelty items, such as stickers, pins, and patches. The shape of the logo is the silhouette of the protective shell that houses the Dragonfly spacecraft on its decent through Titan's atmosphere. This mark is not recommended for use in complex layouts because its large size and unconventional shape make it difficult to use.

1.4 LOGO RULES

Don't rearrange elements.	**Don't** change colors.	**Don't** rotate.	**Don't** remove elements.
Don't use outlines.	**Don't** heavily use effects.	**Don't** change fonts.	**Don't** distort.

Color & Texture

2.1 COLOR PALETTE

The primary color of the mission is a rich yellow (1235C), relating to the golden hue of Titan. This color is supported by a secondary palette consisting of a rich red (201C, 95% tint) and black (426C).

Black can be tinted as needed to provide a full range of grays.

PANTONE 1235C
R:253 G:183 B:26
HEX: FDB71A

PANTONE 201C 95% TINT
R:173 G:41 B:61
HEX: AD293D

PANTONE 426C
R:47 G:50 B:53
HEX: 2F3235

2.2 TEXTURE GRAPHIC

The organic hexagonal texture relates to the geometry of the mission logo. This texture can be used on imagery and as background artwork. Use sparingly and only when space provides. Never place text or logos directly on top of the texture. When used on an image, be sure not to obscure important features of the image.

Typography

3.1 TYPEFACES

The Dragonfly brand uses fonts from two type families: Orbitron and Univers LT Std.*

Orbitron medium and black weights should be used sparingly. When used, always set these fonts in uppercase with wide tracking. In layouts with plenty of text, Orbitron should never be the largest font.

Univers is the workhorse typeface. The light weight should be used for large headers and body text. Light condensed can be used for both body text and subheads. Condensed and bold condensed can only be used for headers and subheaders.

*Univers is also acceptable if Univers LT Std is not available.

ORBITRON BLACK

ABCDEFGHIJKLMNO
PQRSTUVWXYZ
1234567890

ORBITRON MEDIUM

ABCDEFGHIJKLMNO
PQRSTUVWXYZ
1234567890

UNIVERS LT STD BOLD CONDENSED

ABCDEFGHIJKLMNO
PQRSTUVWXYZ
1234567890

UNIVERS LT STD CONDENSED

ABCDEFGHIJKLMNO
PQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890

UNIVERS LT STD LIGHT CONDENSED

ABCDEFGHIJKLMNO
PQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890

UNIVERS LT STD LIGHT

ABCDEFGHIJKLMNO
PQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890

3.2 SAMPLE TEXT

The example on the right shows how Orbitron and Univers can be used to create a simple article layout. Note how Univers light is used as both header and body text. Condensed faces are used for subheads and caption text. Orbitron is used only as the running header.

RUNNING HEADER
7pt/12pt Orbitron Medium
120 Tracking

HEADLINE/ARTICLE TITLE
25pt/28pt Univers Condensed

HEADER
9pt/16pt Univers Condensed
120 Tracking

PARAGRAPH TEXT
9pt/13pt Univers Light

CAPTION
8pt/11pt Univers Light Condensed

LOREM IPSUM

Lorem ipsum dolor

DUIS AUTE IRURE DOLOR

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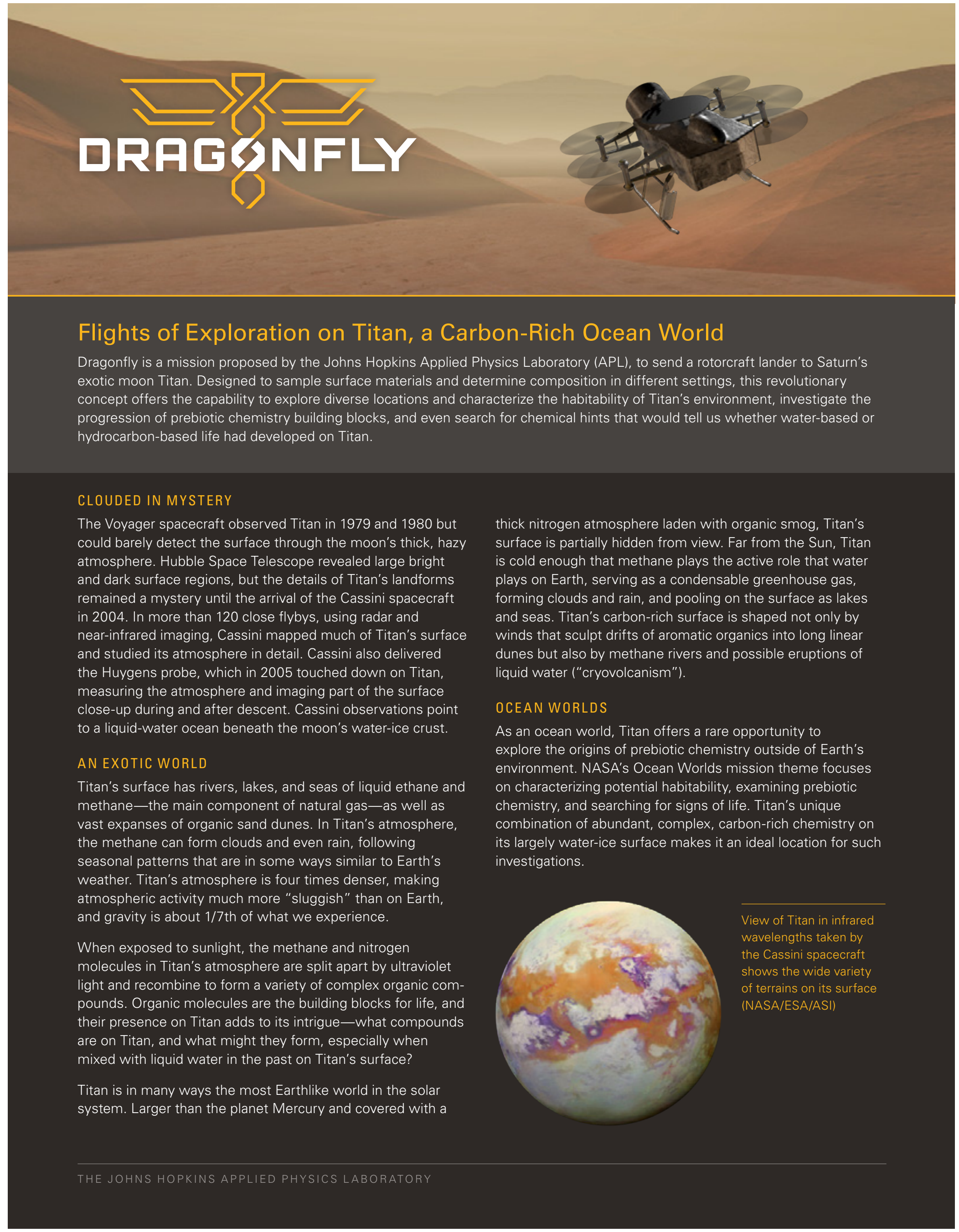
Other Graphics

4.1 POSTERS / PROPOSAL COVERS

Shown on the right is an example of how Dragonfly graphic elements can be combined to create a simple proposal cover.

4.2 FACT SHEET

Shown on the right is an example of how Dragonfly graphic elements can be combined to create a basic fact sheet layout.



DRAGONFLY

Flights of Exploration on Titan, a Carbon-Rich Ocean World

Dragonfly is a mission proposed by the Johns Hopkins Applied Physics Laboratory (APL), to send a rotorcraft lander to Saturn's exotic moon Titan. Designed to sample surface materials and determine composition in different settings, this revolutionary concept offers the capability to explore diverse locations and characterize the habitability of Titan's environment, investigate the progression of prebiotic chemistry building blocks, and even search for chemical hints that would tell us whether water-based or hydrocarbon-based life had developed on Titan.

CLOUDED IN MYSTERY

The Voyager spacecraft observed Titan in 1979 and 1980 but could barely detect the surface through the moon's thick, hazy atmosphere. Hubble Space Telescope revealed large bright and dark surface regions, but the details of Titan's landforms remained a mystery until the arrival of the Cassini spacecraft in 2004. In more than 120 close flybys, using radar and near-infrared imaging, Cassini mapped much of Titan's surface and studied its atmosphere in detail. Cassini also delivered the Huygens probe, which in 2005 touched down on Titan, measuring the atmosphere and imaging part of the surface close-up during and after descent. Cassini observations point to a liquid-water ocean beneath the moon's water-ice crust.

AN EXOTIC WORLD

Titan's surface has rivers, lakes, and seas of liquid ethane and methane—the main component of natural gas—as well as vast expanses of organic sand dunes. In Titan's atmosphere, the methane can form clouds and even rain, following seasonal patterns that are in some ways similar to Earth's weather. Titan's atmosphere is four times denser, making atmospheric activity much more "sluggish" than on Earth, and gravity is about 1/7th of what we experience.

When exposed to sunlight, the methane and nitrogen molecules in Titan's atmosphere are split apart by ultraviolet light and recombine to form a variety of complex organic compounds. Organic molecules are the building blocks for life, and their presence on Titan adds to its intrigue—what compounds are on Titan, and what might they form, especially when mixed with liquid water in the past on Titan's surface?

Titan is in many ways the most Earthlike world in the solar system. Larger than the planet Mercury and covered with a thick nitrogen atmosphere laden with organic smog, Titan's surface is partially hidden from view. Far from the Sun, Titan is cold enough that methane plays the active role that water plays on Earth, serving as a condensable greenhouse gas, forming clouds and rain, and pooling on the surface as lakes and seas. Titan's carbon-rich surface is shaped not only by winds that sculpt drifts of aromatic organics into long linear dunes but also by methane rivers and possible eruptions of liquid water ("cryovolcanism").

OCEAN WORLDS

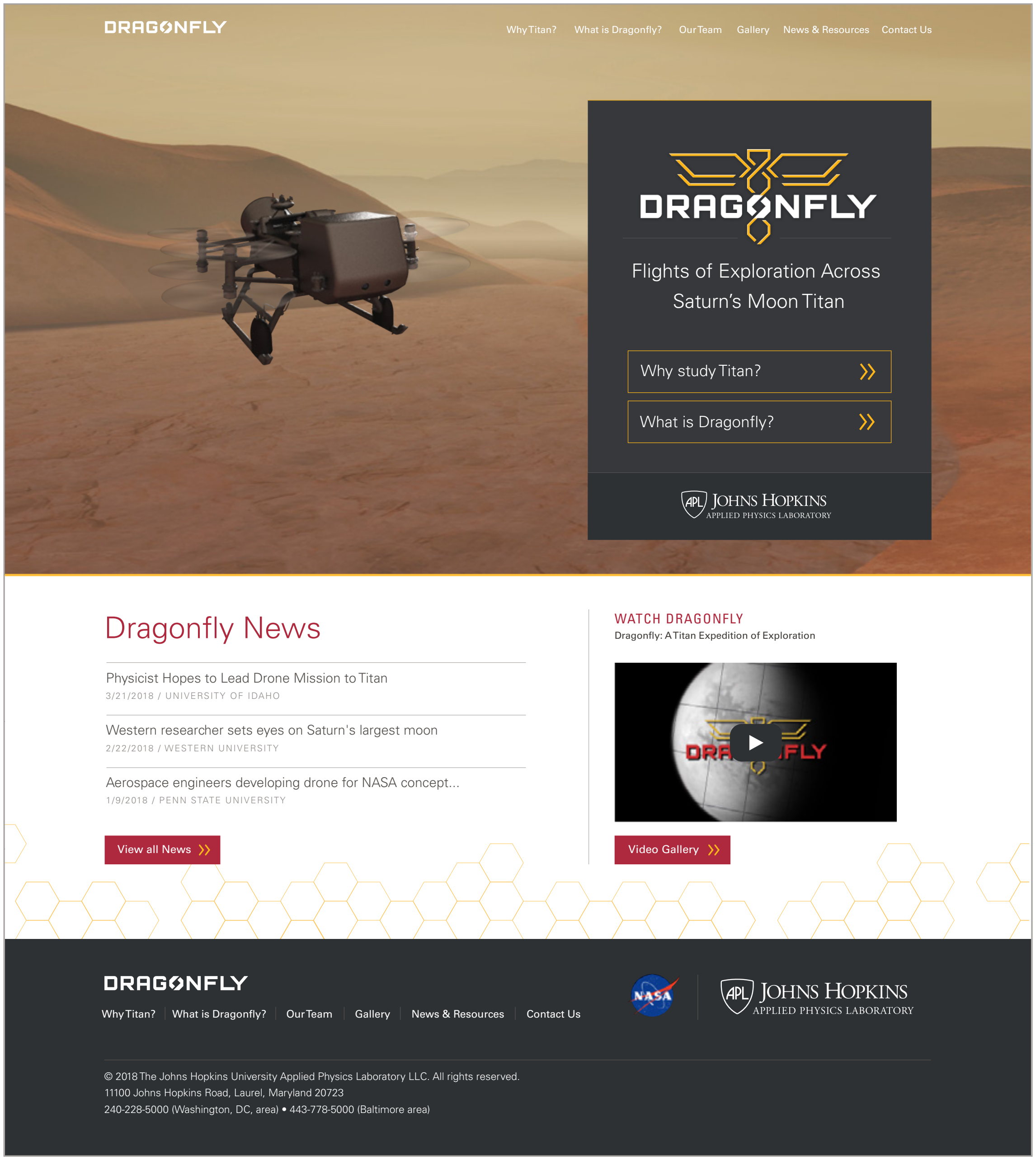
As an ocean world, Titan offers a rare opportunity to explore the origins of prebiotic chemistry outside of Earth's environment. NASA's Ocean Worlds mission theme focuses on characterizing potential habitability, examining prebiotic chemistry, and searching for signs of life. Titan's unique combination of abundant, complex, carbon-rich chemistry on its largely water-ice surface makes it an ideal location for such investigations.

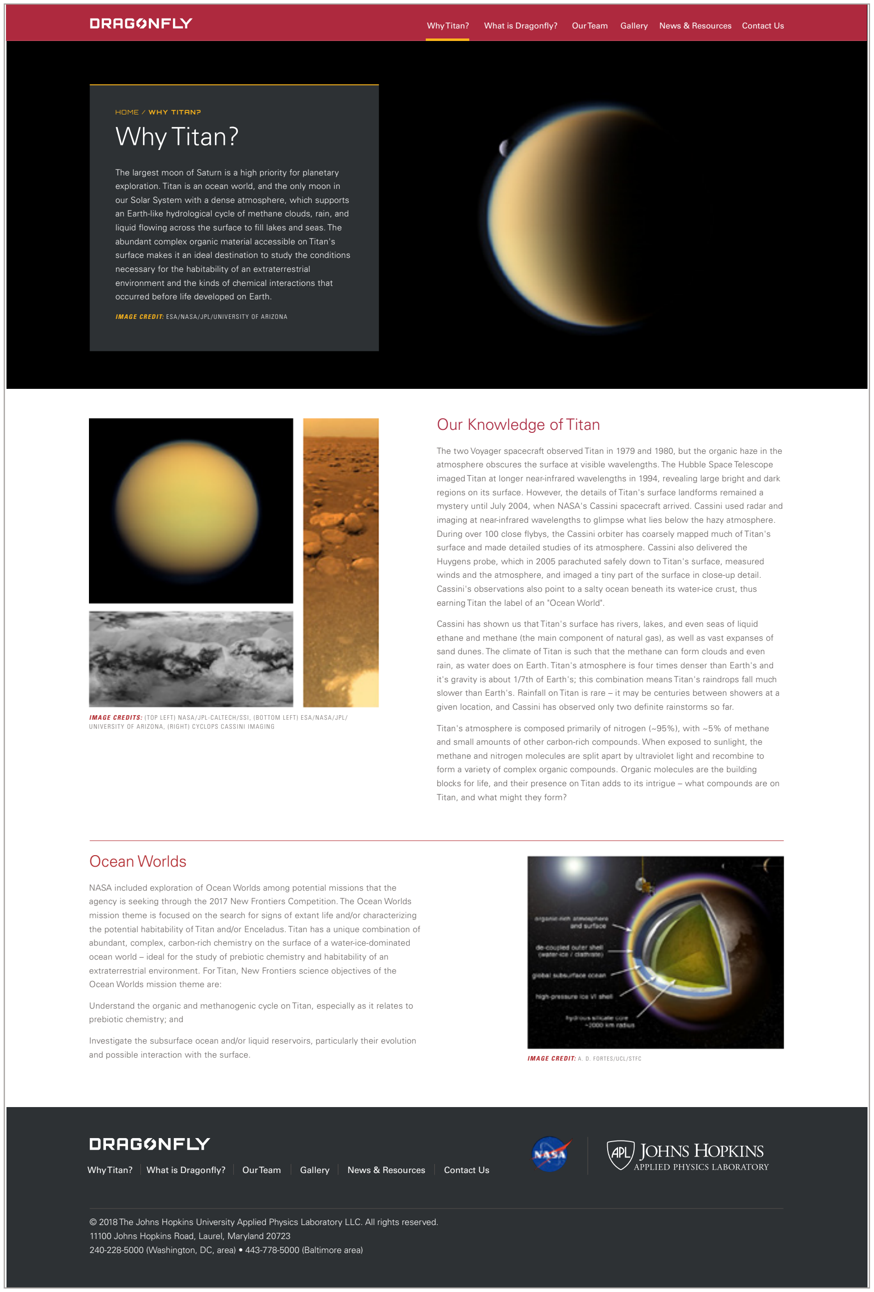
View of Titan in infrared wavelengths taken by the Cassini spacecraft shows the wide variety of terrains on its surface (NASA/ESA/ASI)

THE JOHNS HOPKINS APPLIED PHYSICS LABORATORY

4.3 WEBSITE HOMEPAGE

Shown on the right is an example of how branding elements can be combined to create a basic website homepage layout. On the following page are two secondary webpage examples.





DRAGONFLY

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HOME / WHY TITAN?

Why Titan?

The largest moon of Saturn is a high priority for planetary exploration. Titan is an ocean world, and the only moon in our Solar System with a dense atmosphere, which supports an Earth-like hydrological cycle of methane clouds, rain, and liquid flowing across the surface to fill lakes and seas. The abundant complex organic material accessible on Titan's surface makes it an ideal destination to study the conditions necessary for the habitability of an extraterrestrial environment and the kinds of chemical interactions that occurred before life developed on Earth.

IMAGE CREDIT: ESA/NASA/JPL/UNIVERSITY OF ARIZONA

IMAGE CREDITS: (TOP LEFT) NASA/JPL-CALTECH/SSI, (BOTTOM LEFT) ESA/NASA/JPL/UNIVERSITY OF ARIZONA, (RIGHT) CYCLOPS CASSINI IMAGING

Our Knowledge of Titan

The two Voyager spacecraft observed Titan in 1979 and 1980, but the organic haze in the atmosphere obscures the surface at visible wavelengths. The Hubble Space Telescope imaged Titan at longer near-infrared wavelengths in 1994, revealing large bright and dark regions on its surface. However, the details of Titan's surface landforms remained a mystery until July 2004, when NASA's Cassini spacecraft arrived. Cassini used radar and imaging at near-infrared wavelengths to glimpse what lies below the hazy atmosphere. During over 100 close flybys, the Cassini orbiter has coarsely mapped much of Titan's surface and made detailed studies of its atmosphere. Cassini also delivered the Huygens probe, which in 2005 parachuted safely down to Titan's surface, measured winds and the atmosphere, and imaged a tiny part of the surface in close-up detail. Cassini's observations also point to a salty ocean beneath its water-ice crust, thus earning Titan the label of an "Ocean World".

Cassini has shown us that Titan's surface has rivers, lakes, and even seas of liquid ethane and methane (the main component of natural gas), as well as vast expanses of sand dunes. The climate of Titan is such that the methane can form clouds and even rain, as water does on Earth. Titan's atmosphere is four times denser than Earth's and it's gravity is about 1/7th of Earth's; this combination means Titan's raindrops fall much slower than Earth's. Rainfall on Titan is rare – it may be centuries between showers at a given location, and Cassini has observed only two definite rainstorms so far.

Titan's atmosphere is composed primarily of nitrogen (~95%), with ~5% of methane and small amounts of other carbon-rich compounds. When exposed to sunlight, the methane and nitrogen molecules are split apart by ultraviolet light and recombine to form a variety of complex organic compounds. Organic molecules are the building blocks for life, and their presence on Titan adds to its intrigue – what compounds are on Titan, and what might they form?

Ocean Worlds

NASA included exploration of Ocean Worlds among potential missions that the agency is seeking through the 2017 New Frontiers Competition. The Ocean Worlds mission theme is focused on the search for signs of extant life and/or characterizing the potential habitability of Titan and/or Enceladus. Titan has a unique combination of abundant, complex, carbon-rich chemistry on the surface of a water-ice-dominated ocean world – ideal for the study of prebiotic chemistry and habitability of an extraterrestrial environment. For Titan, New Frontiers science objectives of the Ocean Worlds mission theme are:

Understand the organic and methanogenic cycle on Titan, especially as it relates to prebiotic chemistry; and

Investigate the subsurface ocean and/or liquid reservoirs, particularly their evolution and possible interaction with the surface.

IMAGE CREDIT: A. D. FORTES/UCL/STFC

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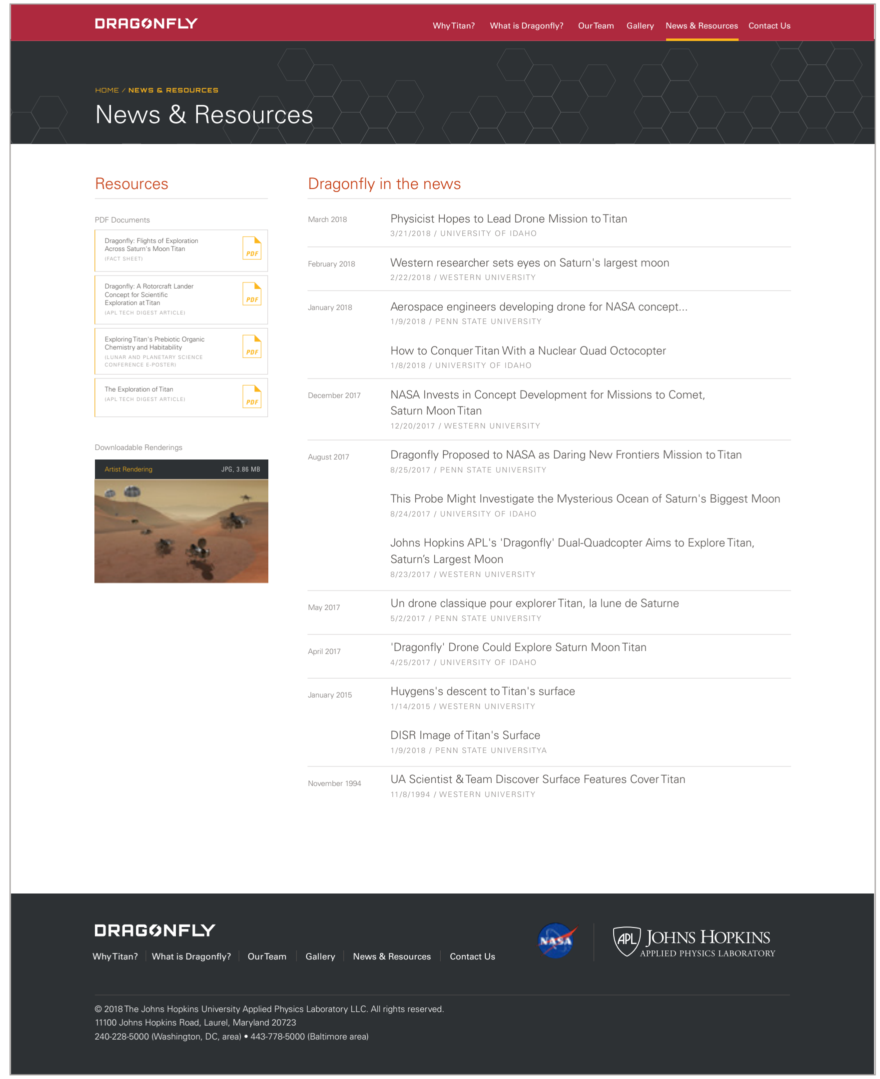
11100 Johns Hopkins Road, Laurel, Maryland 20723
240-228-5000 (Washington, DC, area) • 443-778-5000 (Baltimore area)



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HOME / NEWS & RESOURCES

News & Resources

Resources

PDF Documents

- Dragonfly: Flights of Exploration Across Saturn's Moon Titan (FACT SHEET) PDF
- Dragonfly: A Rotorcraft Lander Concept for Scientific Exploration at Titan (APL TECH DIGEST ARTICLE) PDF
- Exploring Titan's Prebiotic Organic Chemistry and Habitability (LUNAR AND PLANETARY SCIENCE CONFERENCE E-POSTER) PDF
- The Exploration of Titan (APL TECH DIGEST ARTICLE) PDF

Downloadable Renderings

Artist Rendering JPG, 3.86 MB

Dragonfly in the news

March 2018
Physicist Hopes to Lead Drone Mission to Titan
3/21/2018 / UNIVERSITY OF IDAHO

February 2018
Western researcher sets eyes on Saturn's largest moon
2/22/2018 / WESTERN UNIVERSITY

January 2018
Aerospace engineers developing drone for NASA concept...
1/9/2018 / PENN STATE UNIVERSITY

How to Conquer Titan With a Nuclear Quad Octocopter
1/8/2018 / UNIVERSITY OF IDAHO

December 2017
NASA Invests in Concept Development for Missions to Comet, Saturn Moon Titan
12/20/2017 / WESTERN UNIVERSITY

August 2017
Dragonfly Proposed to NASA as Daring New Frontiers Mission to Titan
8/25/2017 / PENN STATE UNIVERSITY

This Probe Might Investigate the Mysterious Ocean of Saturn's Biggest Moon
8/24/2017 / UNIVERSITY OF IDAHO

Johns Hopkins APL's 'Dragonfly' Dual-Quadcopter Aims to Explore Titan, Saturn's Largest Moon
8/23/2017 / WESTERN UNIVERSITY

May 2017
Un drone classique pour explorer Titan, la lune de Saturne
5/2/2017 / PENN STATE UNIVERSITY

April 2017
'Dragonfly' Drone Could Explore Saturn Moon Titan
4/25/2017 / UNIVERSITY OF IDAHO

January 2015
Huygens's descent to Titan's surface
1/14/2015 / WESTERN UNIVERSITY

DISR Image of Titan's Surface
1/9/2018 / PENN STATE UNIVERSITYA

November 1994
UA Scientist & Team Discover Surface Features Cover Titan
11/8/1994 / WESTERN UNIVERSITY

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4.4 SWAG ITEMS

The Dragonfly logos and color palette can be used to create a number of swag items, such as stickers, patches, and lanyards. It is important that swag items abide by the specifications described in this brand guide.