

National Aeronautics and Space Administration



# 2020

BRINGING NASA TECHNOLOGY DOWN TO EARTH

**NASA TECHNOLOGY  
TRANSFER PROGRAM**  
Glenn Research Center

# Aircraft Engine Icing Event Avoidance and Mitigation

Reduces icing risk without sacrificing specific fuel consumption

[technology.grc.nasa.gov/patent/lew-tops-125](http://technology.grc.nasa.gov/patent/lew-tops-125)

Inventors: Philip Jorgenson, Joseph Veres



- Potential Applications:
- Aerospace
  - Electronics
  - Navigation systems
  - Process controls
  - Propulsion
  - Thermal management
  - Turbines

## JANUARY

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			New Year's Day			
			1	2	3	4
5	6	7	FILE YOUR NTR	9	10	11
12	13	14	15	16	17	18
19	Martin Luther King Jr. Day	21	22	23	24	25
26	27	28	29	30	31	

# Terahertz Quantum Cascade Laser Source

Significantly increases available frequency channels for imaging, sensing, and spectroscopy



[technology.grc.nasa.gov/patent/lew-tops-86](https://technology.grc.nasa.gov/patent/lew-tops-86)

**Potential Applications:**  
 Aerospace  
 Communications  
 Medical devices  
 Process controls  
 Security  
 Sensors

**Inventors:**  
 Rainee Simons  
 Hung Nguyen  
 \*Ed Wintucky

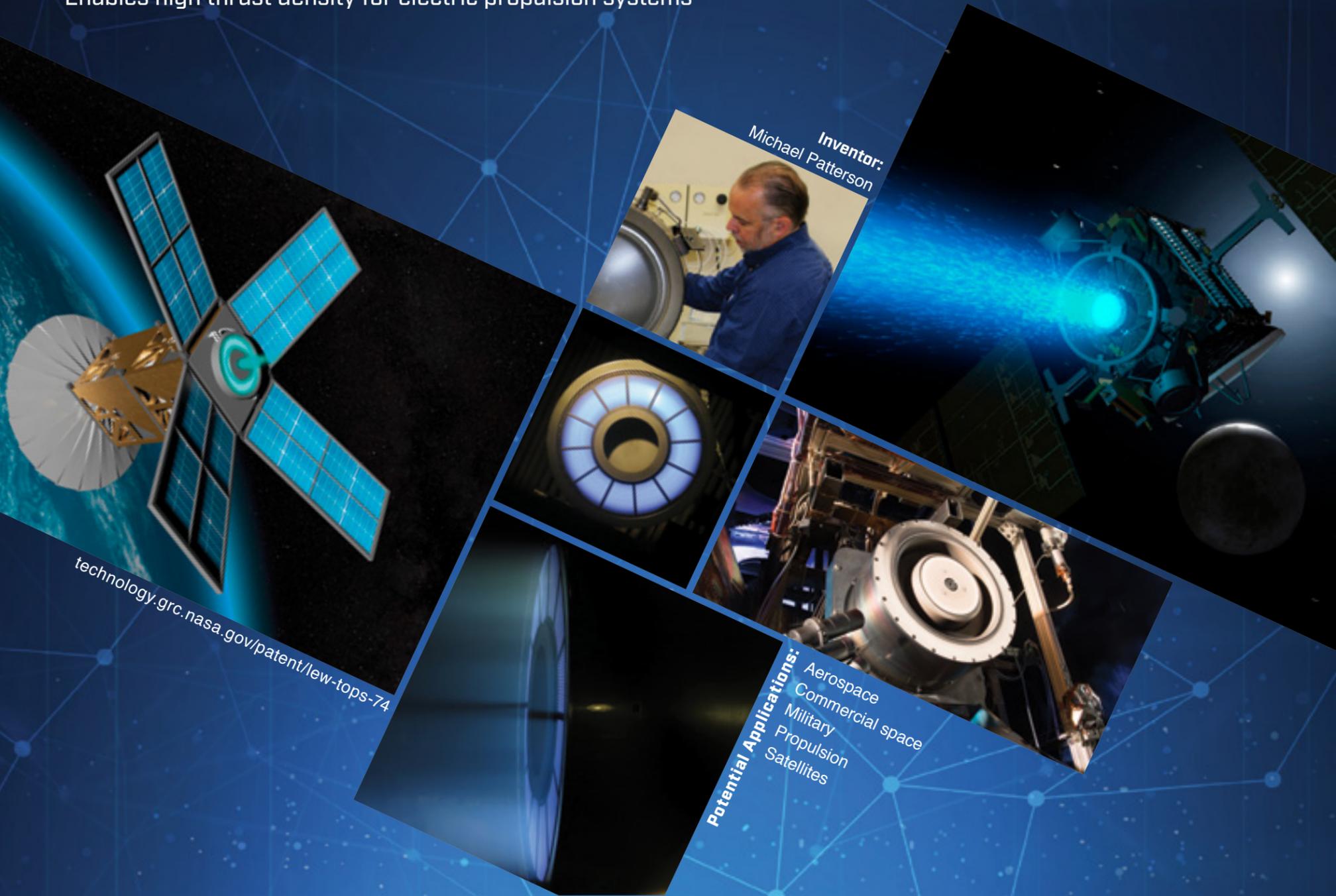
## FEBRUARY

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						1
2	3	4	5	6	7	8
9	10	11		13	14	15
16	Presidents' Day	18	19	20	21	22
23	24	25	26	27	28	29

\*Inventor not pictured

# Annular Ion Engine

Enables high thrust density for electric propulsion systems



**Inventor:**  
Michael Patterson

**Potential Applications:**  
Aerospace  
Commercial space  
Military  
Propulsion  
Satellites

[technology.grc.nasa.gov/patent/lew-tops-74](http://technology.grc.nasa.gov/patent/lew-tops-74)

## MARCH

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2	3	4	5	6	7
8	9	10	FILE YOUR NTR	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

# Functionalization of Single-Wall Carbon Nanotubes

A new technique for carbon nanotube oxidation



**Inventors:**  
Michael Meador  
Marisabel Kelly

**Potential Applications:**  
Aerospace  
Automotive  
Composites  
High-performance sports  
Protective gear

[technology.grc.nasa.gov/patent/lew-tops-64](http://technology.grc.nasa.gov/patent/lew-tops-64)

## APRIL

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1	2	3	4
5	6	7		9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

# Advancements in Nanomaterials

New materials and methods to make nanomaterials versatile, reliable, and effective

Inventors: Gary Roberts, Sandi Miller, \*Lee Kohlman



- Potential Applications:**
- Aerospace
  - Automotive
  - Biotech
  - Composites
  - Electronics
  - Nanomaterials
  - Power
  - Protective gear
  - Sensors

[technology.grc.nasa.gov/patent/lew-tops-27](https://technology.grc.nasa.gov/patent/lew-tops-27)

## MAY

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1	2
3	4	5	6	7	8	9
10	11	12	FILE YOUR NTR	14	15	16
17	18	19	20	21	22	23
24	Memorial Day					
31	25	26	27	28	29	30

\*Inventor not pictured

# Luminescence-Based Temperature Mapping and Sensing Systems

Luminescence-based temperature mapping using  $\text{Cr:GdAlO}_3$  is capable of measuring temperatures up to  $1300^\circ\text{C}$

[technology.grc.nasa.gov/patent/lew-tops-60](http://technology.grc.nasa.gov/patent/lew-tops-60)

**Inventors:**  
Jeffrey Eldridge  
\*Matthew Chambers

**Potential Applications:**  
Chemical and material processing  
Furnaces  
Industrial machinery  
Military  
Oil and gas  
Power  
Propulsion  
Sensors  
Turbines



## JUNE

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1	2	3	4	5	6
7	8	9	10 <b>FILE YOUR NTR</b>	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

\*Inventor not pictured

# Durable Polyimide Aerogels

Stronger and flexible, polyimide aerogels provide insulation and structural support

**Inventors:** Mary Ann Meador, Baochau Nguyen (OAI), Rocco Viggiano, Haiquan Guo (OAI), \*Jarrod Williams



- Potential Applications:**
- Aerospace
  - Antennas
  - Automotive
  - Biotech
  - Chemical manufacturing
  - Communications
  - Filters
  - High-performance sports
  - Insulation
  - Power
  - Protective gear
  - Satellites
  - Sensors
  - Unmanned vehicles

[technology.grc.nasa.gov/patent/lew-tops-133](https://technology.grc.nasa.gov/patent/lew-tops-133)

## JULY

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					Independence Day Observed	Independence Day
			1	2	3	4
5	6	7	FILE YOUR NTR	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

\*Inventor not pictured

# Spanwise Adaptive Wing

Shape memory alloy actuators reconfigure aircraft wings in flight

**Inventors:** Othmane Benafan, Ronald Noebe,  
 \*Matthew Moholt, \*Travis Turner, \*Christopher Kostyk,  
 \*James Mabe (Boeing), \*Stefan Bieniawski (Boeing)

**Potential Applications:**  
 Aerospace  
 Military  
 Unmanned vehicles

[technology.grc.nasa.gov/patent/lew-tops-124](http://technology.grc.nasa.gov/patent/lew-tops-124)



# AUGUST

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						1
2	3	4	5	6	7	8
9	10	11	FILE YOUR NTR	13	14	15
16	17	18	19	20	21	22
23	24					
30	31	25	26	27	28	29

\*Inventor not pictured

# Silicon Carbide Fiber Tows

Rapid processing method produces stronger materials, even “heals” lower-quality fibers

**Inventors:**  
Amjad Almansour, Maricela Lizcano, Janet Hurst



**Potential Applications:**  
Aerospace  
Chemical manufacturing  
Furnaces  
Industrial machinery  
Power  
Propulsion  
Turbines

[technology.grc.nasa.gov/patent/lew-tops-131](https://technology.grc.nasa.gov/patent/lew-tops-131)

# SEPTEMBER

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1	2	3	4	5
	Labor Day		FILE YOUR NTR			
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

# Superelastic Tire

A viable alternative to the pneumatic tire

**Inventors:** Vivake Asnani, Colin Creager, Santo Padula, \*James Benzing (Goodyear), \*Joseph Lettieri (Goodyear)



**Potential Applications:** Aerospace  
Automotive  
High-performance sports  
Industrial machinery  
Military

[technology.grc.nasa.gov/patent/lew-tops-99](https://technology.grc.nasa.gov/patent/lew-tops-99)

# OCTOBER

Sunday      Monday      Tuesday      Wednesday      Thursday      Friday      Saturday

					1	2	3
4	5	6	7	8	9	10	
11	Columbus Day	13	FILE YOUR NTR	15	16	17	
18	19	20	21	22	23	24	
25	26	27	28	29	30	31	

\*Inventor not pictured

# Conductive High-Toughness Oxides

Metastable phases provide unique coatings with durable, conductive, and insulating properties

[technology.grc.nasa.gov/patent/lew-tops-132](http://technology.grc.nasa.gov/patent/lew-tops-132)

**Inventors:**  
Bryan Harder  
Brian Good  
\*Michael Schmitt

**Potential Applications:**  
Aerospace  
Automotive  
Chemical manufacturing  
Coatings  
Electronics  
Filters  
Insulation  
Oil and gas  
Power  
Semiconductors

## NOVEMBER

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2	3	4	5	6	7
8	9	10	Veterans Day	12	13	14
15	16	17	FILE YOUR NTR	19	20	21
22	23	24	25	Thanksgiving	27	28
29	30					

\*Inventor not pictured

# Fuel Cell Power Management

Produces multiple power levels from a single fuel cell stack

Inventor: Kenneth Burke

[technology.grc.nasa.gov/patent/lew-tops-23](http://technology.grc.nasa.gov/patent/lew-tops-23)

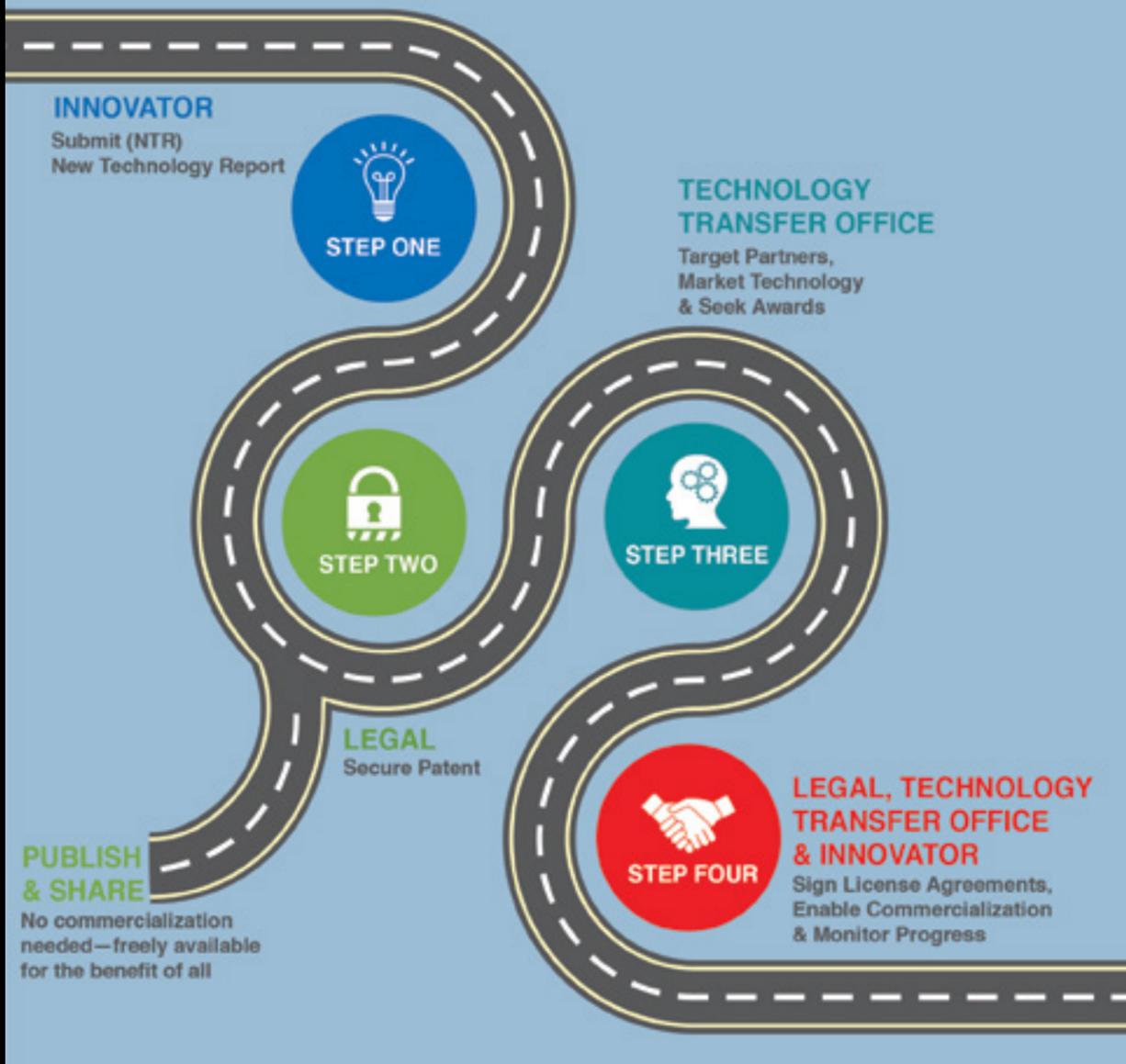


**Potential Applications:**  
Aerospace  
Communications  
Industrial machinery  
Military  
Power  
Turbines  
Unmanned vehicles

## DECEMBER

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	Christmas	26
27	28	29	30	31		

# Your New Technologies Road to Commercialization



## New Technology Report (NTR)

A new technology is any invention, discovery, improvement, or innovation—whether or not patentable—which includes, but is not limited to, new processes (or new applications of existing processes), machines, manufactures, and compositions of matter. New technologies also include new computer programs, and improvements to, or new applications of, existing computer programs.

Any solution to a technical problem or new way of doing things that is somehow better than before is reportable as an NTR. Any improvement—no matter how big or small—should be reported in an NTR.

## We Are Here to Help You



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216.433.8063

## Bring your New Technology Down to Earth

It is our responsibility at NASA to help drive innovation. One of the most successful ways to do this is by transferring our technology into the marketplace.

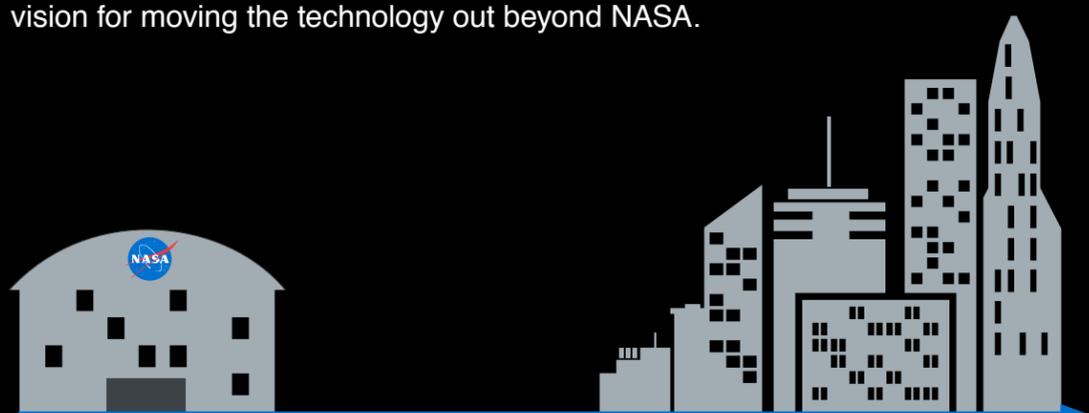
We are here to help you get your technology recognized and used by millions. The first step is submitting your NTR.

### How to submit your NTR

Submitting your NTR is easy. Just go to [invention.nasa.gov](https://invention.nasa.gov) to get started. The process takes under an hour. If you don't have time or need help, please email us at [grc-techtransfer@mail.nasa.gov](mailto:grc-techtransfer@mail.nasa.gov). Our Technology Managers oversee our portfolio of technologies and can assist you.

### Benefits of filing NTRs

Reported technologies can potentially lead to patents, awards, financial compensation, and connections to further the science and R&D. Submitting an NTR will win you a partner in the Technology Transfer Office that will share your vision for moving the technology out beyond NASA.



Contact us at [grc-techtransfer@mail.nasa.gov](mailto:grc-techtransfer@mail.nasa.gov). We will connect you with the appropriate Technology Manager.

National Aeronautics and Space Administration  
**NASA Glenn Research Center**



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