



**Fabrication pour  
l'aérospatiale et la défense**

<https://www.osmos-x.com>

# Our Vision



OSMOS X aims to :

- Become the first multi-mission reusable OTV operator
- Support the infrastructure needed for "Space 2.0"

➔ **Made possible by a groundbreaking electro-plasmic thruster technology**



15/04/2025

# About us



## Creation

- December 2022

## Operational team

- M. Cavellier, PhD – DG , Hi-tech
- A. Masson – DG, Space (X, Supaero, Stanford, ex-Galileo technical director)
- A. Miniussi, PhD – Technical Director (ex-NASA, ex-ONERA)

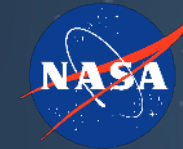


## Strategic and Scientific Advisory Board

- J-J. Dordain, ex-ESA CEO
- M. Courtois, ex-ESA CTO
- S. Della Negra, CNRS emeritus

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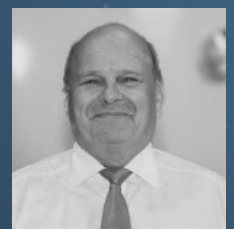
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Staff : 12 people

## Funding

- 2.1 M€ raised in series A (including Expansion VC)
- 1.5 M€ in BPI loan

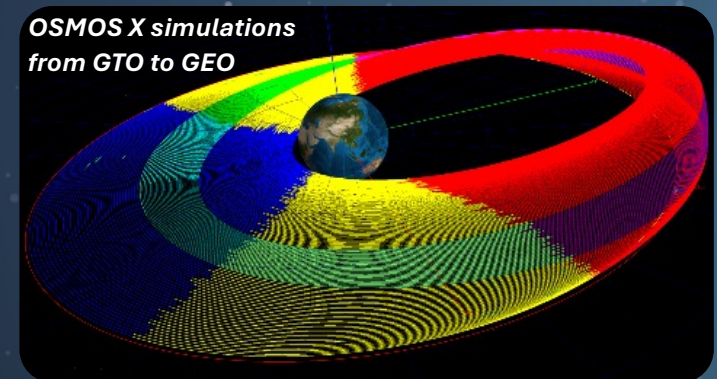


# Value Proposition



## Space system transportation

- From medium to large satellites, anywhere from low LEO to GEO
  - LEO to LEO : ~ 1 days for a 500kg sat from 550 to 600km
  - LEO to MEO : ~ 4 mo for a 2t sat from 550 to 20 000km
  - LEO to GEO : ~ 6 mo for a 2.4t sat from 550 to 36 000km
  - GTO to GEO : ~ 4 mo for a 2.4t sat → **enable a cut price of 80% in launch cost**



## Satellite / Space station repositioning<sup>20</sup>

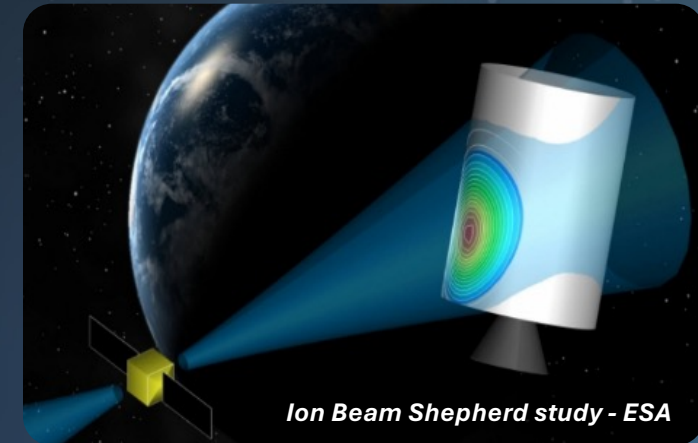
- Raise orbit of space stations
  - ISS Reboost : ~ 1 mo from 410 km to 425 km
  - Change of inclination at MEO : ~ 1 mo for 2t sat from 55° to 64°
  - Change of latitude at GEO : ~ 1 mo for 5t sat from EU to Asia

# Value Proposition



## Cooperative and non-cooperative debris removal

- Contactless debris removal suitable for debris of any sizes (micrometers to meters) and attitude (spinning)
- No risk to generate new debris
- Reduce by factor 2.5 to 5 the deorbiting time for debris from 800 km



## In-orbit refueling

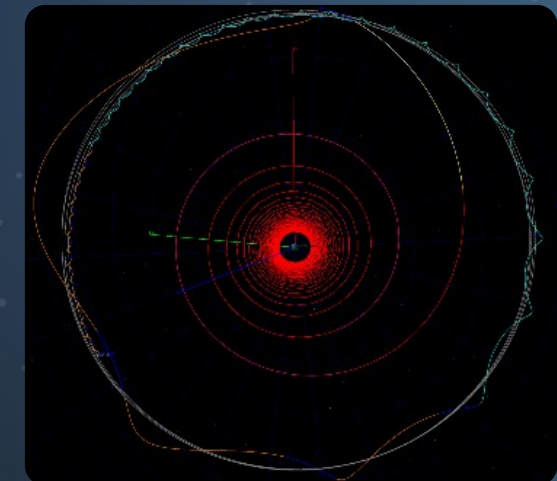
- Extend the life of the satellites

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## Missions beyond earth orbit

- Technological capacities enable missions to the Moon and even Mars



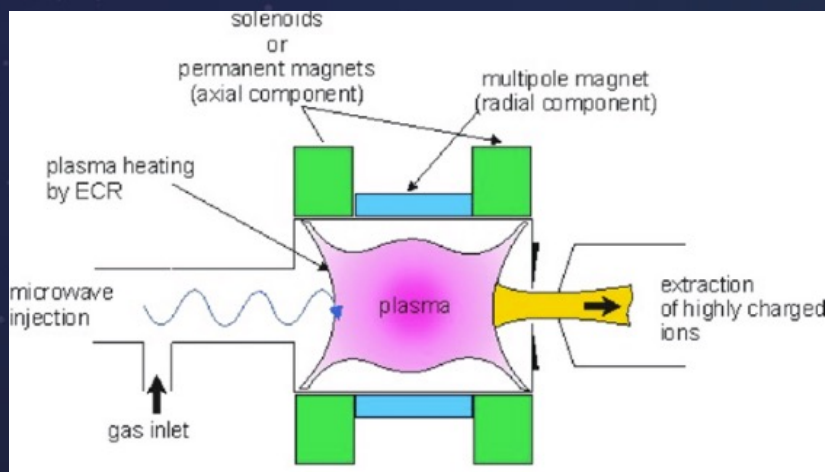
OSMOS X simulation to reach the Moon

# The Technology

None of the thrust solutions existing on the market can reach these features.

OSMOS X brings:

- A +30y technology from particle accelerators transformed into an Electro-plasmic thruster
- A reliable mean to produce high flux and high charge-state ions



Working principle of our Electro-plasmic thruster

## Technology key points:

- High-charge state ions -> More Thrust and ISP
- Versatile solution with tunable performances
- Suitable for all gases (Xe, Kr,...)
- Proven high reliability (Lifetime > 30 y) without maintenance

$$\text{Thrust} \propto E_{\text{ion}} \times Dm \quad \text{with} \quad E_{\text{ion}} = q \cdot V \quad \text{and} \quad Dm \propto 1/\text{ISP}$$

# Projects Roadmap



## TIPS (Tunable Ionization for Propulsion System)

- Small-scale thruster
- Qualification on our test bench (Kerionek)

Manufactured  
Q2-Q3 2025

## Araok

- In-orbit demonstrator propelled by TIPS
- Payload design ongoing
- Launch

Q4 2026

## MIST (Multi Ionized Space Thruster)

- Full scale Electro-plasmic thruster
- Design and manufacture ongoing
- First tests

Q4 2025

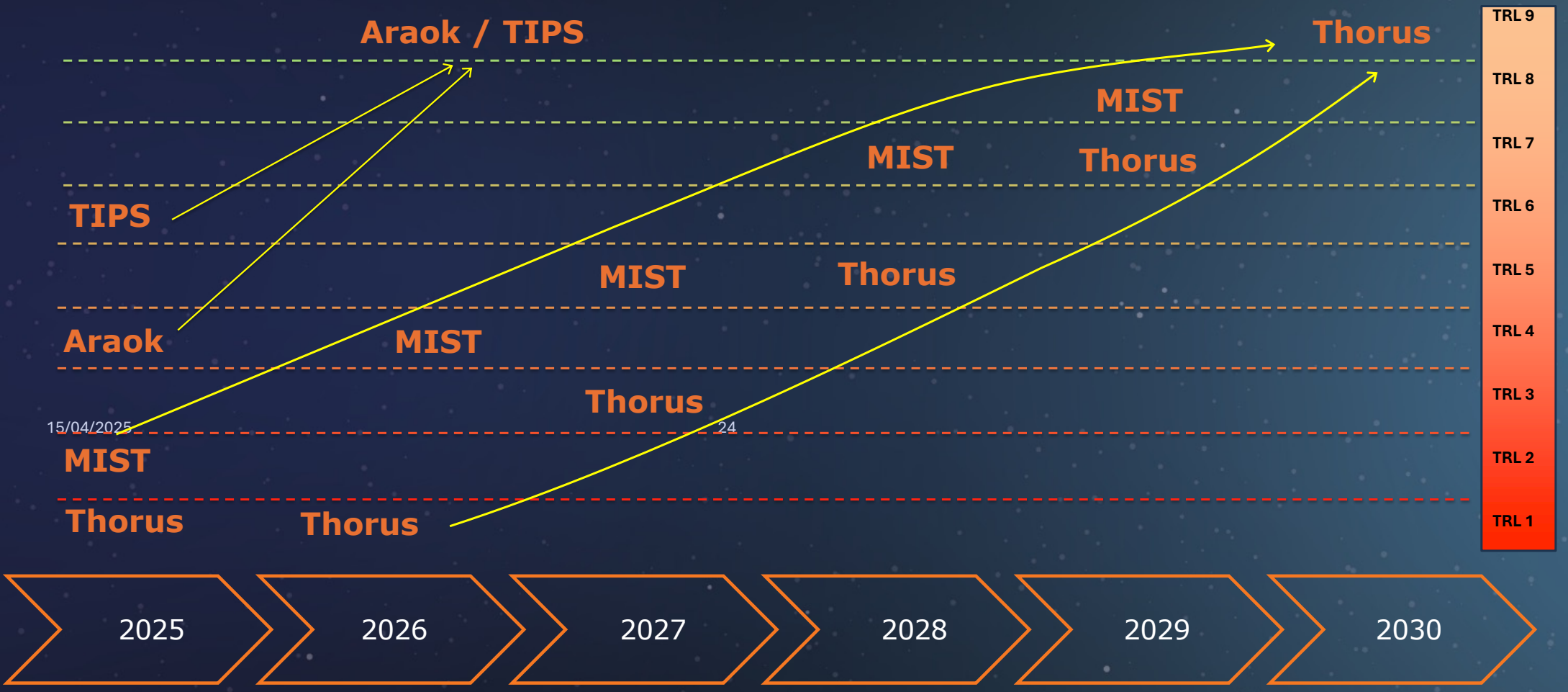
## Thorus

- OTV propelled by MIST
- In orbit and customer ready

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# Roadmap and TRL



# TIPS progress



- Thruster manufactured
- Preparation for tests ongoing
- Test bench (Kerionek) being assembled

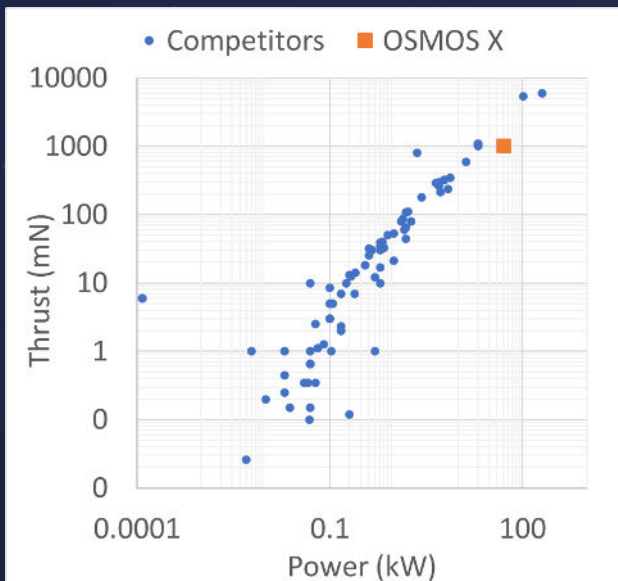


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# MIST expected features



	Thrust [N]	Isp [s]	Total impulse [MN.s]	Thrust / power [mN / kW]
Min	0.1	50 000	45	18
Max	1	150 000	140	33



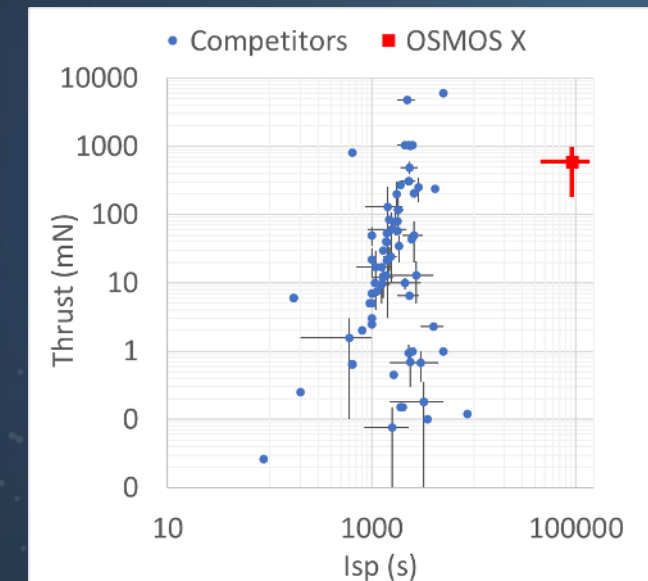
## Among the most powerful thrusters

- For faster operations
- Enabling change of inclination

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## Disruptive ISP

- For longer operations without refueling
- Lower total mass of spacecraft for extended lifetime



# Thorus Key Technologies



## SEVERAL KEY TECHNOLOGIES ARE REQUIRED FOR A COMPLETE REUSABLE OTV

### A large spacecraft platform

- With high power generation (solar cells) & Large batteries capacities



### Docking systems

- To mechanically connect with customer satellites (through the launch i/f ring)
- For in-orbit servicing of customer satellites and OTV's refueling



### Proximity operations system for space rendezvous maneuvers

- Cameras, sensors and dedicated thrusters
- Embedded algorithms



→ We already started to build industrial and research partnerships

# Market analysis



## Change in market in the next 10 years

- 2500 to 3500 sat launched / year
- IOS market grow by \$4.5 B

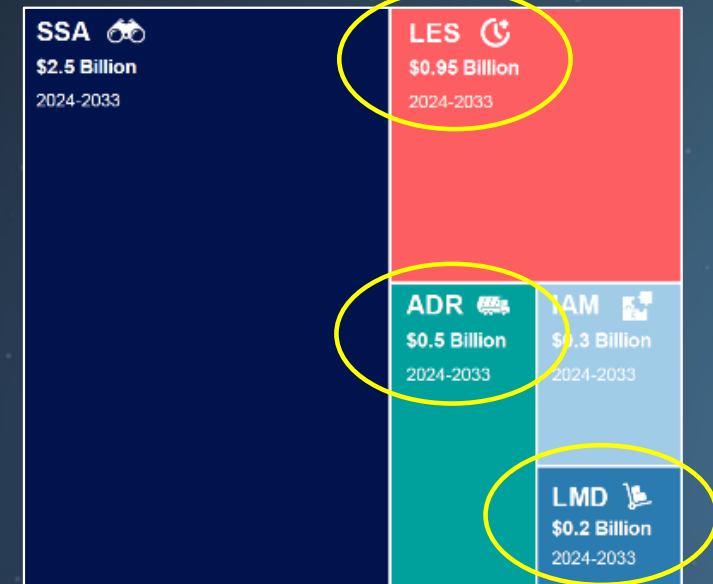
## OSMOS X estimated revenues : >200 M€

- **LMD - Last Mile Delivery :**
  - Orbit delivery, de-orbiting, orbit change
  - Transportation from LEO to GEO  
→ Enables 80% reduction in GEO sat mass

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- Other markets :
  - **Life Extension Service (LES) / Refueling**
  - **Active Debris removal (ADR)**
  - **Repositioning in LEO constellation**



Market by 2033. Source : Novaspac

# The Competition



	OSMOS-X	Argospace	Ad Astra Rocket	Atomospace	Blue Origin	Momentum Space	Firefly Aerospace	D-Orbit	Exotrail	Starfish Space
Country	FR/EU	US	US	US	US	US	US	IT/EU	FR	US
Mass Payload	10 tons	10 tons	400 tons	2 tons	3 tons	750 kg to 20 tons	1 to 16 tons	< 160 kg	< 400 kg	-
Propulsion technology	ECR ion sources	Microwave Electrothermal	Electrothermic-magnetic	Electric	Chemical + Electric	Microwave Electrothermal	Chemical	Chemical	Electric	Electric
Thrust	0.1-1 N	-	6 N	1N	-	0.8 N	-	-	0.12 N	-
Isp	50 000-150 000 s	-	2 000-30 000 s	2 000-3 000s	-	650-900 s	-	500 s	1 500 s	-
In-orbit transportation	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Deorbitation	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Deep space transportation	✓		✓	✓		✓				
Refueling	✓	✓	✓	✓	✓	✓	✓	✓		✓
Remote space cleaning	✓									✓

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- No other company matches OSMOS X proposed services
- No other European company targets mass payload >400 kg
- No other OTV reach our disruptive Isp