



Public – Private Collaborative Research

Corinne Mailhes,

Toulouse INP Professor, FRANCE

Head of TéSA, www.tesa.prd.fr



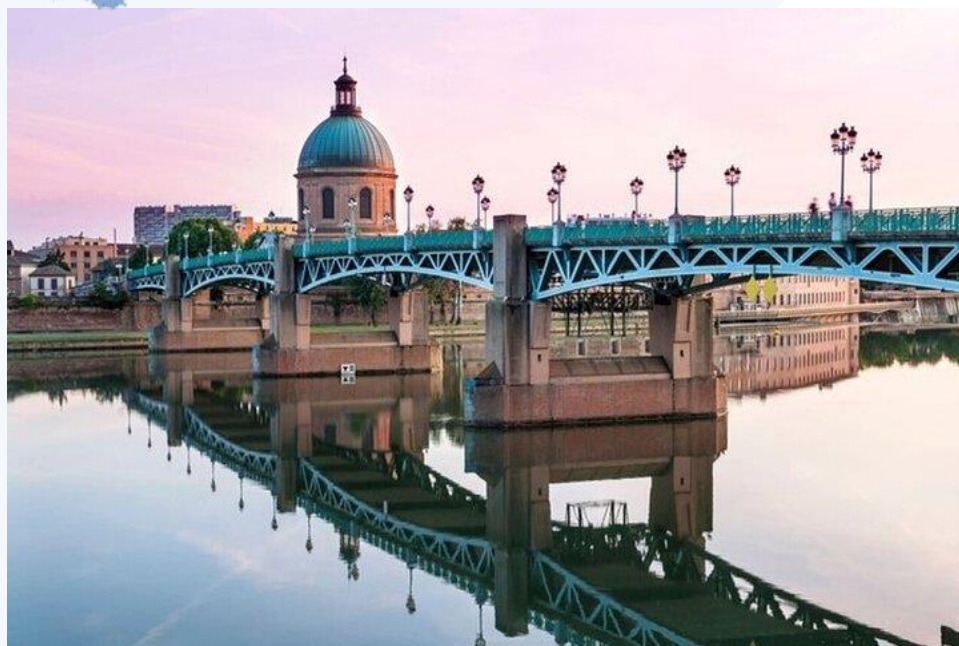


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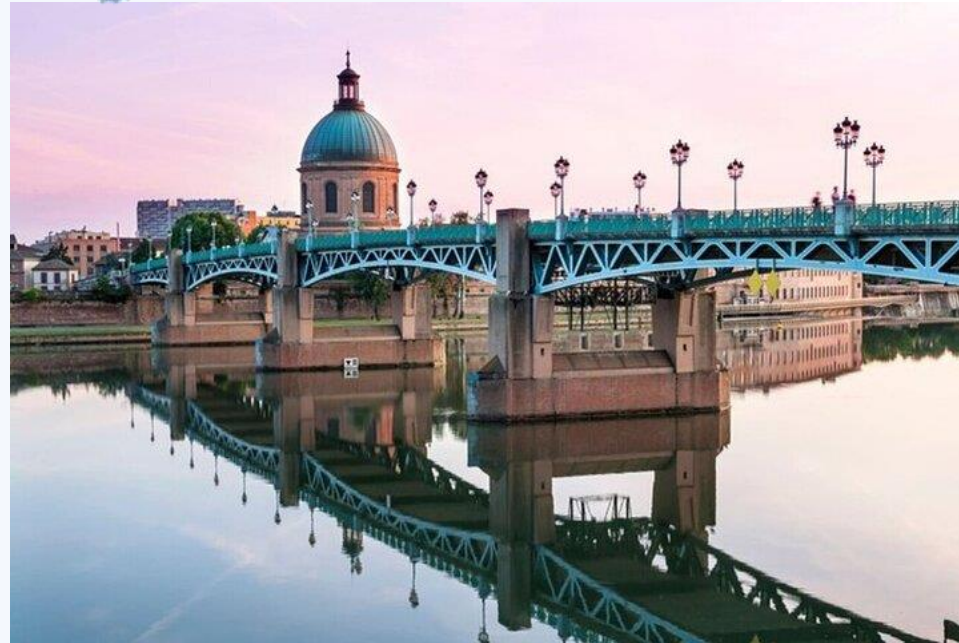
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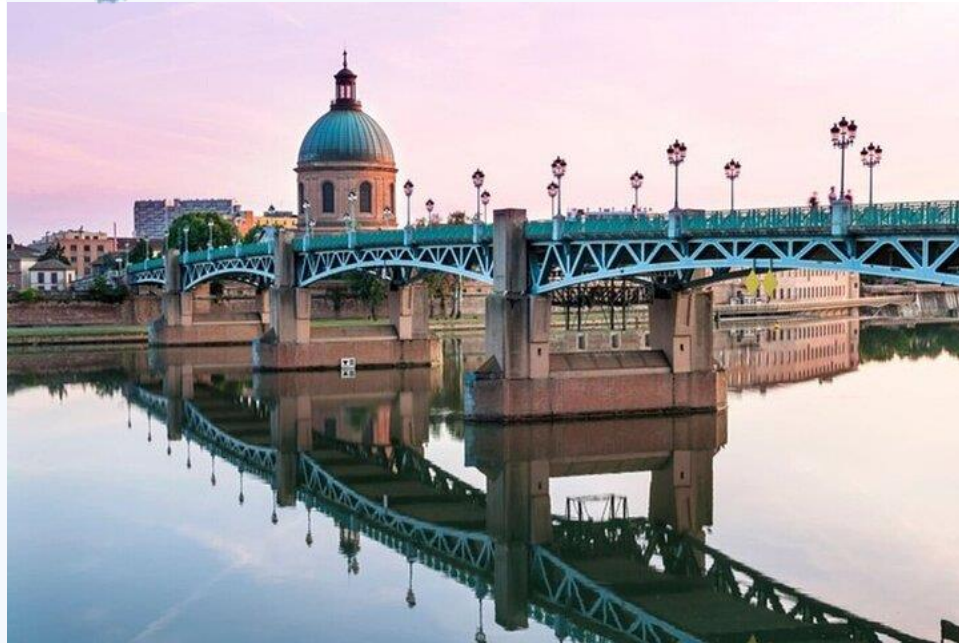


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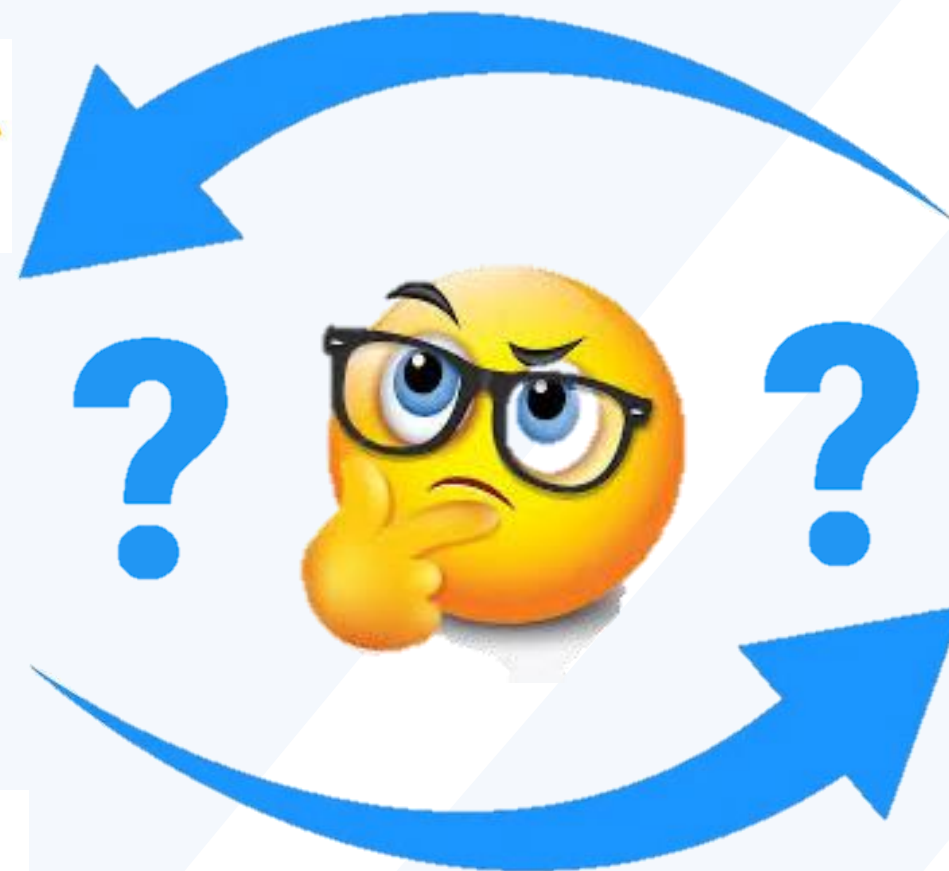
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TOULOUSE





/// TéSA: a successful example of a public-private partnership for research

1998: Birth of a cooperative lab

2004: TéSA becomes a non-profit organization



TéSA: a private research lab in Telecommunications for Space and Aeronautics

TéSA : a research lab as a non-profit organization



TéSA: the Scientific Committee

The Scientific Committee leads the scientific activity of TéSA

Approximately twenty members: all people involved in TéSA are represented.
Representatives of partner members, academics, research engineers, doctoral students,
Scientific experts



Available on
<https://www.tesa-prd.fr>

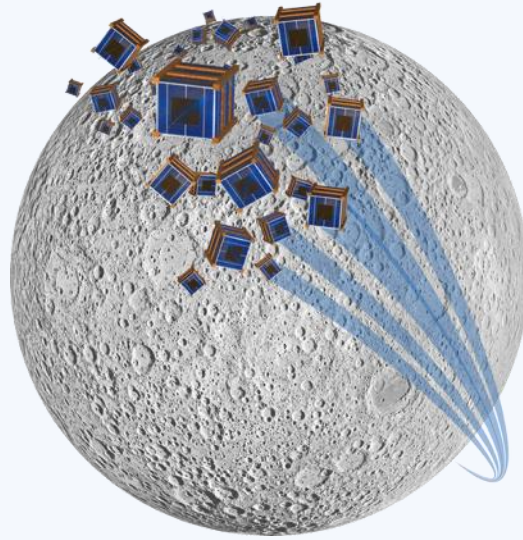
TéSA: domains of expertise: information processing

**Signal and Image
processing**

Digital communications

Networking

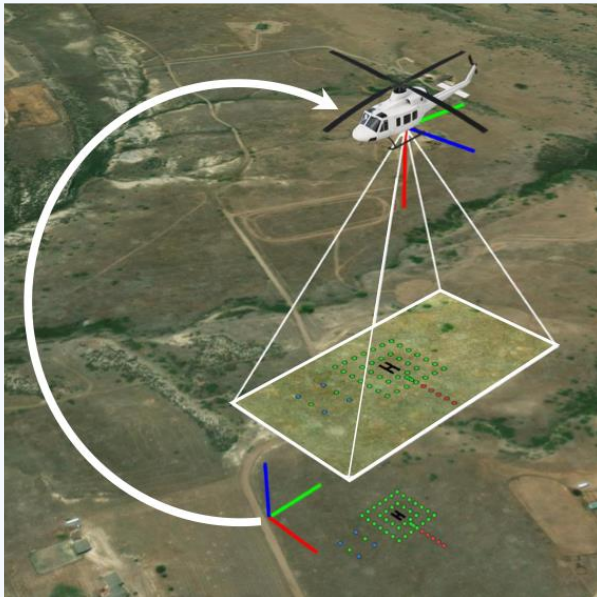
TéSA: application domains



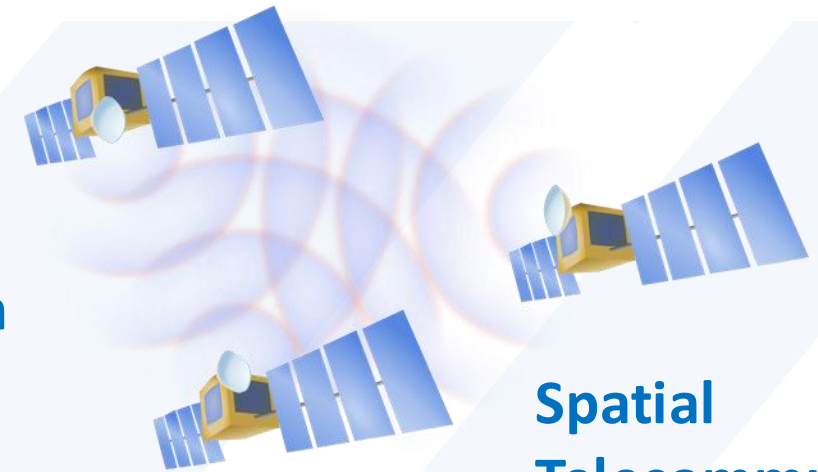
**Positioning
Navigation**



Earth Observation



**Aeronautical
Telecommunication
Systems**



**Spatial
Telecommunication
Systems**

TéSA: applied research in aeronautical and space telecommunications

Positioning, navigation and timing (PNT) ▼

PhDs and R&D studies

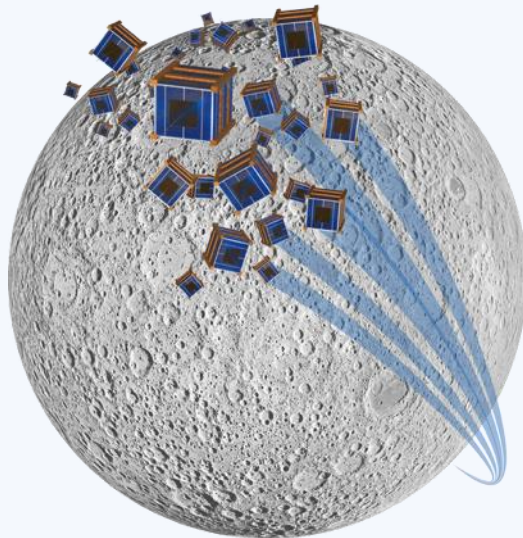
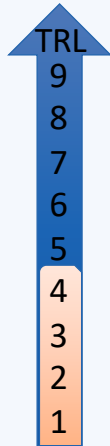


Studies on different GNSS problems: multipath, precise positioning, integrity, GNSS hybridization, indoor positioning etc.



Satellite positioning systems:

From GNSS to UWB signals, including 5G and ISL links

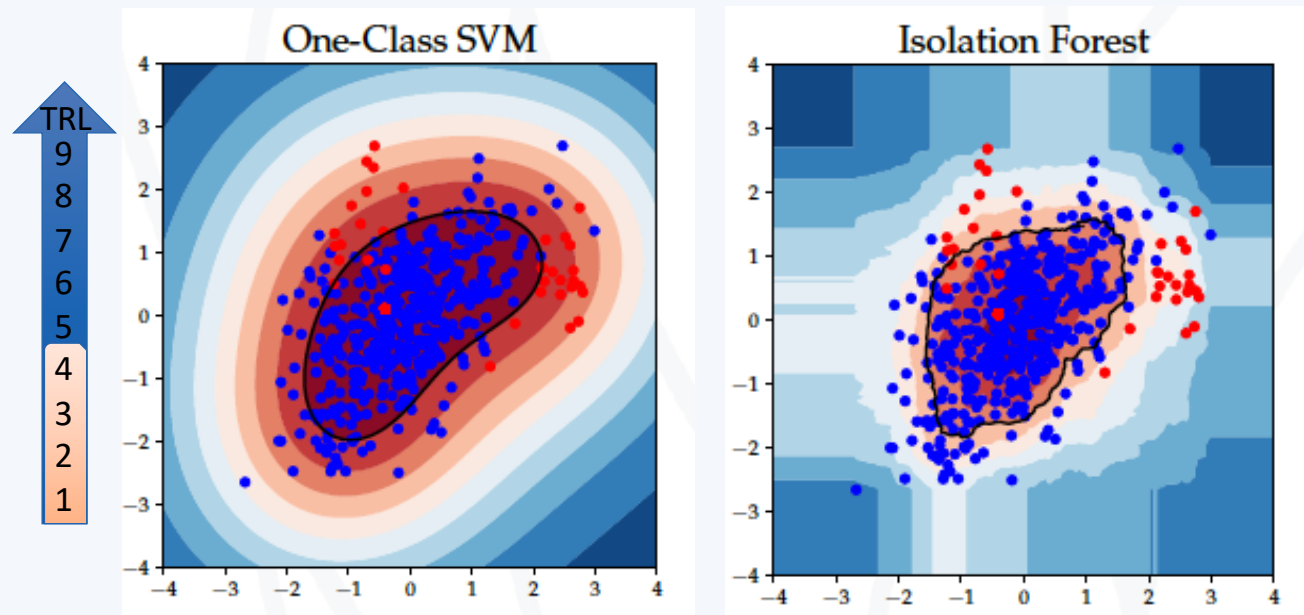


Kaleidoscope map of TéSA activities <https://www.tesa.prd.fr/tesa/>

TéSA: applied research in aeronautical and space telecommunications

Signal and image processing

PhDs and R&D studies



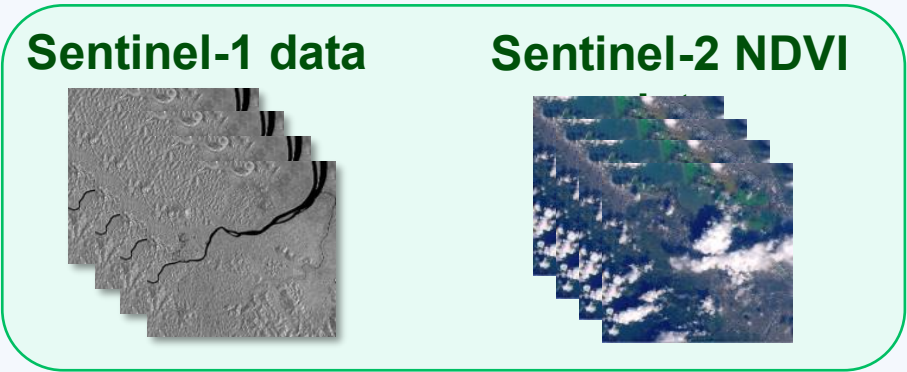
Machine learning Anomaly detection

Image processing
Radar processing
Fusion of sensors

Statistical Signal processing: estimation, detection, spectral analysis, multi-rate filter bank, ...

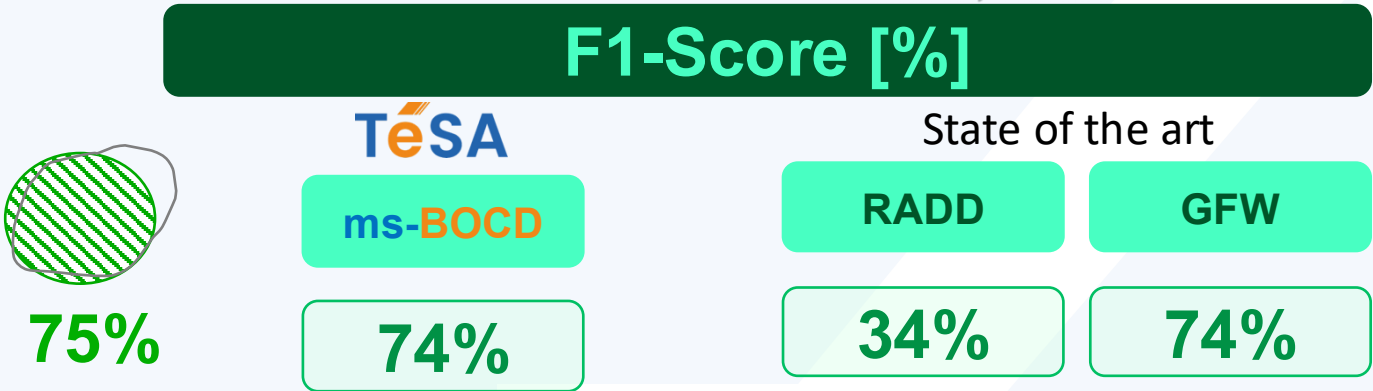
Kaleidoscope map of TéSA activities <https://www.tesa.prd.fr/tesa/>

TéSA: an example of expertise in Signal and Image Processing

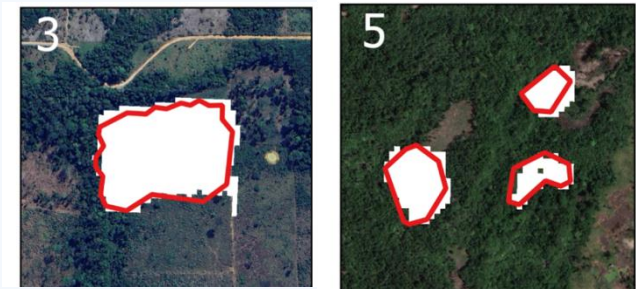


Results on Amazonia

Forest loss Monitoring



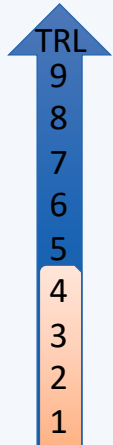
False Alarm rate
+ 13% compared to
ms-BOCD



TéSA: applied research in aeronautical and space telecommunications

Digital
communications

PhDs and R&D studies



Kaleidoscope map of TéSA activities <https://www.tesa.prd.fr/tesa/>

TéSA: an example of expertise in Digital Communications

AIS : Automatic Identification System

Advantages of satellite AIS:

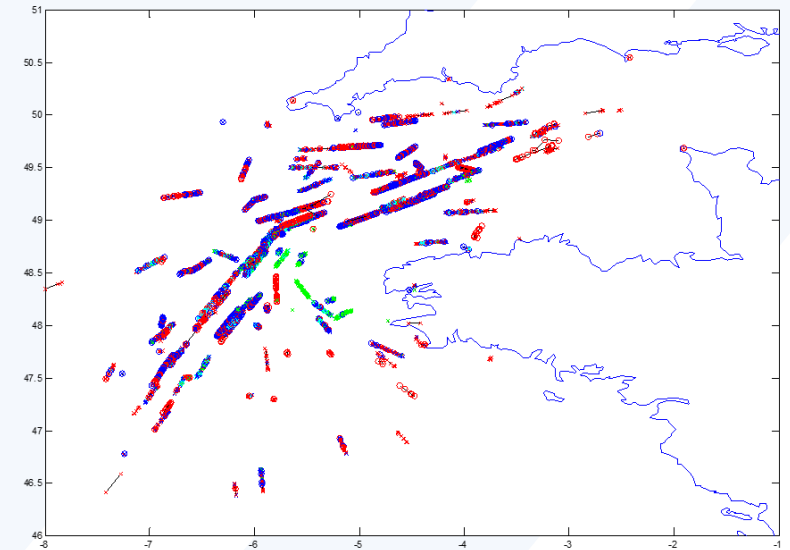
- Better, comprehensive maritime surveillance

Challenges in satellite AIS:

- Low signal to noise ratio (SNR),
- Need for a low error rate,
- Collisions between messages from different cells.

4 PhDs and several studies:

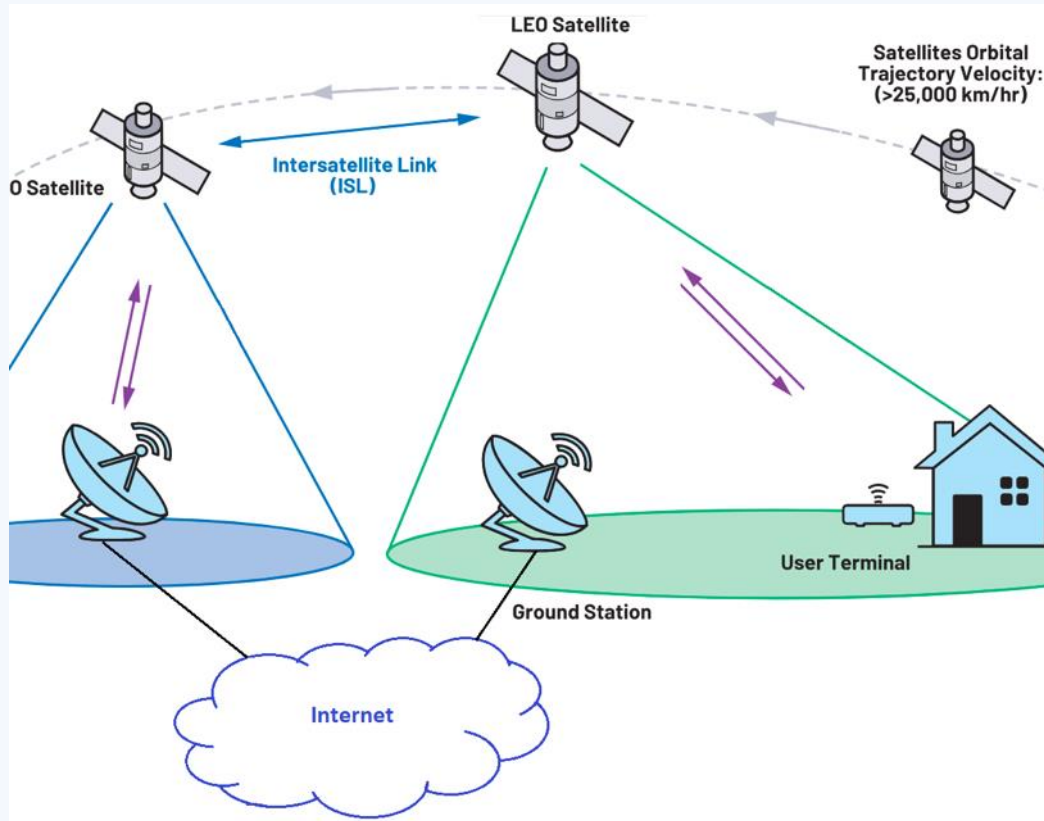
- Demodulation (CRC using)
- Interference cancellation (array processing)
- Probability of interferences,
- Multi-antenna processing
- Positioning boats using the parameters of the received signals (delays, Doppler effect)
- Conference papers, patents,
- Application to real signals.



TéSA: applied research in aeronautical and space telecommunications

Networking

PhDs and R&D studies



- Routing algorithms
- QoS mechanisms and security
- Impact on transport protocols
- Interconnection with terrestrial networks
- Performance metrics

Kaleidoscope map of TéSA activities <https://www.tesa.prd.fr/tesa/>

TéSA: who works?

Academics (~20)

from Toulouse INP, ISAE-SUPAERO,
ENAC, IMT Atlantique
and IPSA

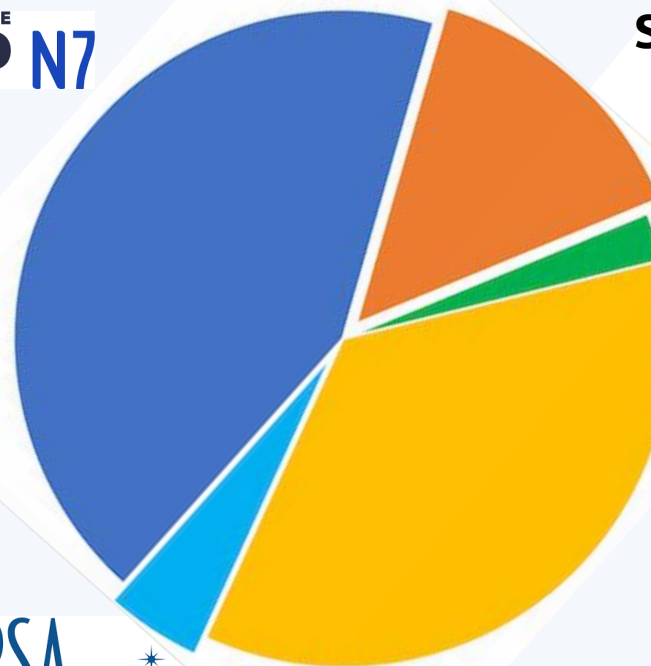


Research engineers (permanent position) and associated researchers (6)

Experts in
Navigation
Signal and Image Processing
Telecommunications
Satellite Systems

Administrative (1)

PhD students, post-docs :
between 15 and 20
with more than a half being
employed by TéSA



/// TéSA: how it works?



TéSA: how it works?

Framework agreement



TéSA with all members

General Agreement on Confidentiality, Publications and Intellectual Property

- For all TéSA members (partners and academics)
- PhD Industrial Property = fixed sharing
 - 50 % for the PhD funders
 - 40 % for academic members involved in the PhD advising
 - 10 % for TéSA

TéSA: how it works?

PhDs and R&D studies in TéSA



Since the beginning of TéSA in 2004, as of December 31, 2025,
85 PhDs have been defended (4 per year)



Scientific Committee of TéSA:

Organizes brainstorming sessions for PhD topics during scientific days

Topics proposed in response to the CNES call for PhD ideas, seeking co-funders

Meetings with potential PhD funders...

Why a PhD with TéSA ?

Co-advising is easy to organize,
with multiple academics member
and multiple areas of expertise.

Why research studies with TéSA?

Pooling of expertise : a team composed of
(assistant) professors + research engineers



TéSA: how it works?

TéSA PhDs

R&D applicants



TéSA



TéSA presentation



PhD student salary



Academic partners
PhD advising

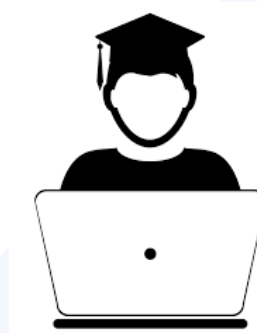
TéSA: how it works?

TéSA R&D studies

R&D applicants



TéSA



TéSA research engineers
Possible collaboration with academic partners



Academic partners
Scientific collaboration

/// TéSA: how it works?

R&D applicants

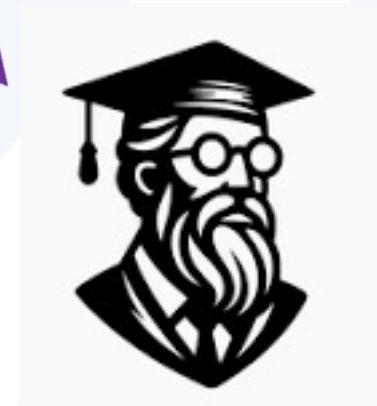
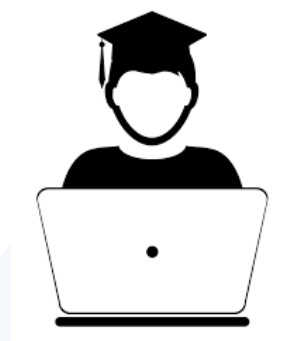


TéSA



Revenue alone
does not allow for
balance

Expenses
dedicated
to
research



TéSA: how it works?

Overall balance with the
« Crédit Impôt Recherche » (CIR)
 $\approx 30\%$ of the expenses

R&D applicants

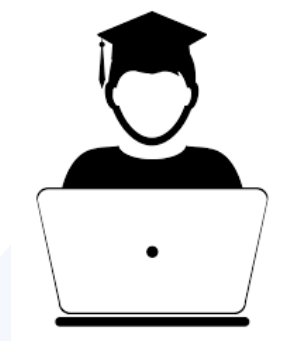


TéSA



Revenue alone
does not allow for
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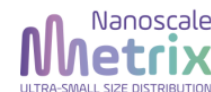
Expenses
dedicated
to
research



Overall balance
ensured
by the intensity
of research



TéSA: they trust us since more than 20 years...





A private research lab
in **Telecommunications for Space and Aeronautics**



A « **portal** » allowing industrials to benefit from the **academic expertise** of different labs.



A **pluridisciplinary expertise** in signal and image processing, in digital communications and in **networking**.



A **team** gathering **PhDs, post-docts, academic researchers** and **research engineers**, who work together.

**TéSA works
with partner and academic members
... and also with non-members!**

Questions?

