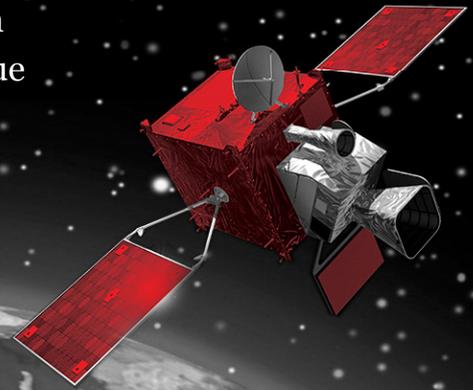




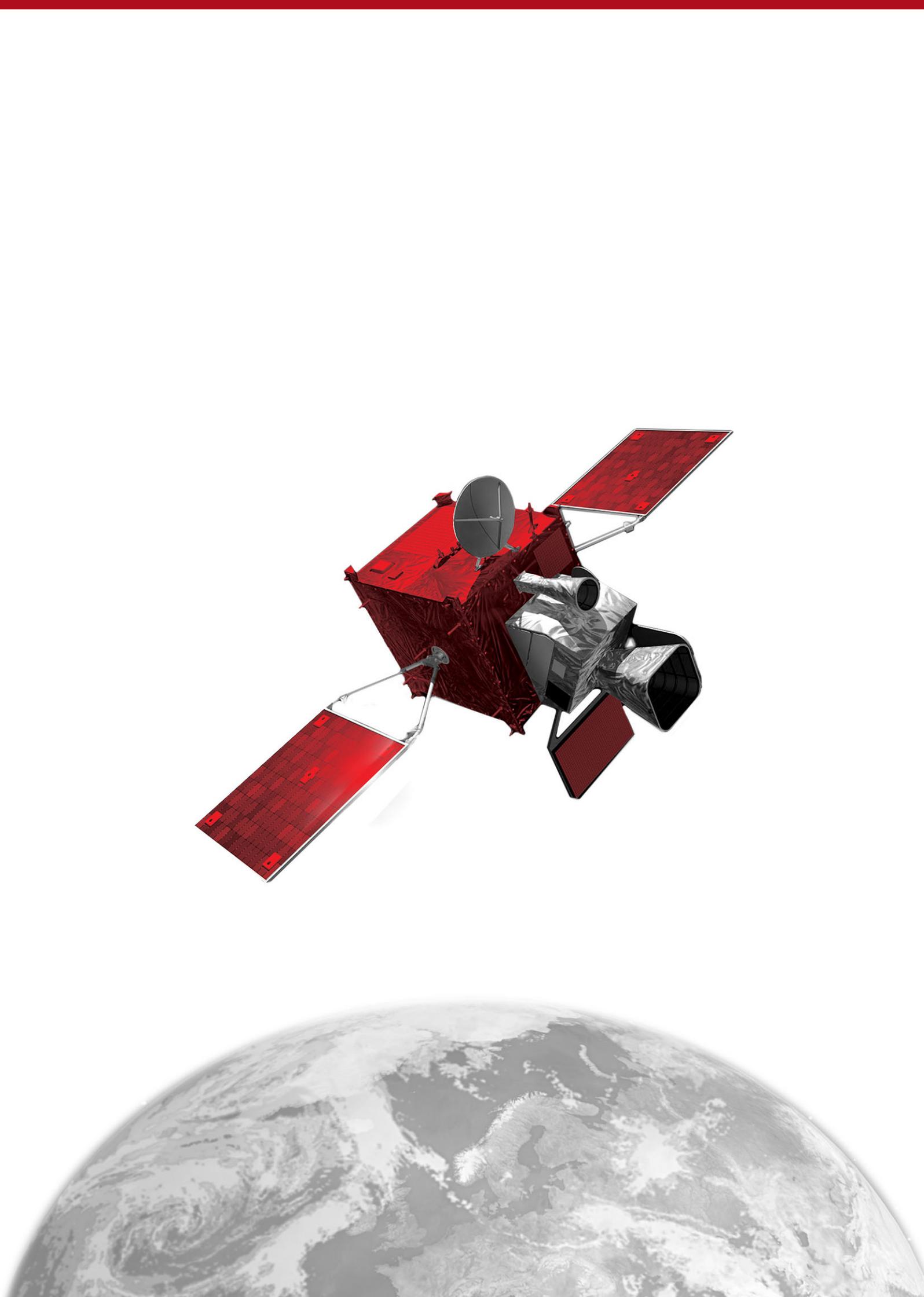
Press Kit - July 2014

Galileo: A Technological Revolution in the World of Search and Rescue

Two Galileo satellites to be launched from Kourou, French Guiana in July/August 2014 will include Search and Rescue payloads to help improve rescue times and save lives



www.mcmurdogroup.com



SUMMARY

Two Galileo Initial Operational Capability (IOC) satellites will soon be launched from Kourou, French Guiana (July/August 2014). While most people are aware that Galileo will provide a new sat-nav system, it will also offer a new breakthrough Search and Rescue (SAR) capability. This Press Kit explains how the European Union's Galileo satellite constellation, now in its early launch phase, Russia's GLONASS equivalent and the US military's next-generation GPS constellation will dramatically improve the speed and delivery of Search and Rescue services around the world, resulting in a safer environment for us all.

The McMurdo Group Press Team

1. GALILEO IS NOW A REALITY

The early services, with a breakthrough Search and Rescue capability

2. SEARCH AND RESCUE (SAR) ECOSYSTEM :

COSPAS-SARSAT, the free International Search and Rescue system

3. MEOSAR: The future SAR satellite system

A technological revolution for Search and Rescue

4. MCMURDO GROUP

The Global Leader in End-to-End COSPAS-SARSAT Search and Rescue Solutions

5. ANNEXES:

- Fact sheet 1 : Satellite Navigation Systems (Sat Nav)
- Fact sheet 2: Four Ways to Maximize Your Chance of Rescue Using Emergency Beacons
- Fact Sheet 3 : Return Link Service on Next-Generation COSPAS-SARSAT Beacons
- Fact sheet 4 : McMurdo Group's Techno Sciences, Inc. at a Glance
- Fact sheet 5 : McMurdo Group's TSI: Leading the US MEOLUT Program: The NOAA case

6. ACRONYMS, ABBREVIATIONS, CONTACTS

7. PHOTO GALLERY

1. GALILEO IS NOW A REALITY

The early services, with a breakthrough SAR capability

Galileo European Program

Galileo is a global navigation satellite system (GNSS) currently being built by the European Union (EU) and European Space Agency (ESA). Whereas GPS was initiated by the US military, Galileo is intended to be a civil system.

As we enter a new phase of the deployment of the system, the European Community takes over the leadership of the program from the ESA. In other words, the programme moves from a scientific phase to the commercial/operational phase.

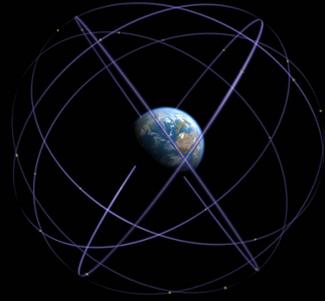
Galileo status & roadmap : coming soon !

With additional satellites in orbit, the availability and coverage of the signal will gradually improve, enabling stand-alone early Galileo positioning and SAR services to be made available in end of 2014/early 2015.

In July/August 2014, the first two Galileo Initial Operational Capability (IOC) satellites will launch from Kourou, French Guiana, heralding the operational phase of the Galileo project.

By end of 2014, two additional IOC satellites will be launched, followed by two others in early 2015.

GALILEO AT A GLANCE



- An European Commission and European Space Agency project
- Will work alongside US GPS and Russian GLONASS systems
- Promises real-time positioning accuracy about down to one meter
- Guaranteed under all but most extreme circumstances
- Suitable for safety-critical roles where lives depend on service



SAR transponders aboard Europe's Galileo constellation MEOSAR next-gen satellite



Search and Rescue Payload : New SAR radio transponders will be carried as part of the payload of next-generation navigation satellites of the European Union's Galileo constellation .

SatNav Payload : will provide Public Regulated Services (PRS) and Open Services (OS).

The Galileo satellite navigation system is now a reality : the early services

With a total of 10 satellites in operation, 4 from the In-Orbit Validation (IOV) and 6 from the Initial Operational Capability (IOC) programs, 8 of which carrying a SAR payload on board, Galileo will take another step forward and start offering early services by the end of this year or early 2015. These first early services will be:

SEARCH AND RESCUE

Search and Rescue (SAR) : The Galileo system is critical to the upgrade of the COSPAS-SARSAT international search and rescue program which has saved nearly 37,000 lives since its inception in 1982.

How will Galileo dramatically improve Search and Rescue?

Galileo will include a number of breakthrough innovations such as:

- **SAR Payload:** Next-gen SAR technology on board Galileo satellites will reduce the detection times of COSPAS-SARSAT distress beacons from hours/minutes to seconds, thereby expediting recovery and saving more lives.
- **Return Link Service :** A new feature of the Galileo SAR system is its ability to send messages back to beacons users confirming that their distress signal has been received (see fact sheet N° 3).

SAT NAV

Open Service (OS) : Galileo's freely accessible service for positioning, navigation and timing. It will be fully interoperable with GPS & Glonass and will be used for many mass-market applications such as in-car navigation and location-based mobile services.

Early Public Regulated Service (PRS) :

The PRS will be an encrypted service limited to government-authorized users. It is designed for greater robustness and increased availability. The signal will be resistant to unintentional interference, malicious jamming, spoofing and false interception/re-broadcast (meaconing).

2. SEARCH AND RESCUE ECOSYSTEM

COSPAS-SARSAT, the free International Search and Rescue system

Transmit a position to locate victims rapidly

Wherever an accident takes place, on a boat, in a plane or in the mountains, rescue teams are always confronted by the same problem: **how to locate potential victims quickly and accurately.**

COSPAS-SARSAT can help locate distress sites and thus rescue lives.



Challenging Search Areas

Photos courtesy of U.S. Air Force and Coast Guard

The COSPAS-SARSAT system: Alert rescue teams quickly



During the 1970s, the US, Canada, the USSR and France decided to set-up a global system for the gathering of information and the positioning of emergency operational situations. Called COSPAS-SARSAT, it greatly improved the efficiency of rescue operations and also allowed for permanent, passive or automatic localization of distress beacons, i.e. without human intervention. Relayed by satellite, analyzed by control centers on the ground, the COSPAS-SARSAT system distress signals allow for the detection and accurate location of the beacon's position and for the appropriate rescue authorities to be alerted quickly.

Transmit a position to locate victims rapidly

COSPAS-SARSAT is an international global satellite system that provides, free-of-charge, distress alert and location information to search and rescue authorities anywhere in the world for maritime, aviation and land users in distress. Where other technologies are out of range, COSPAS-SARSAT can locate people in danger. It's easy and safe and thanks to the system, about 5,9 people are rescued every day. A 406 MHz beacon* certified by the COSPAS-SARSAT organization does not require any monthly subscription fee.

By sending an automatic or manual signal to search and rescue teams via the COSPAS-SARSAT system, distress beacons streamline the rescue chain and increase the victims' chances of survival. To date, over 35,000 lives have been saved due to the distress beacons operating with the COSPAS-SARSAT satellite-aided Search and Rescue system.

**Refer to fact sheet N°2 : Four Ways to Maximize Your Chance of Rescue Using Emergency Beacons*

COSPAS-SARSAT

SEARCH & RESCUE

ECOSYSTEM



**24
HOURS
A DAY**

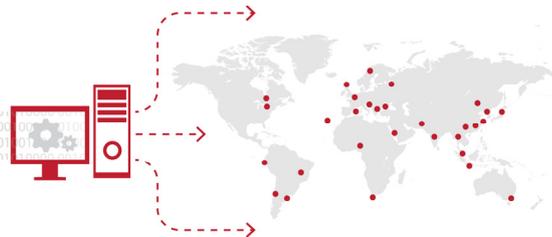
35,786
kilometers above earth
6 GEOSAR satellites are
currently in orbit.

1,000
kilometers above earth
6 LEOSAR satellites are
currently in orbit.

All listening for
406 MHz
distress signals.

31

Mission Control Centers supporting 236 SPOCs in
31 countries around the world, process and relay distress
alerts and location information.



1001000 01000
1000101 010011
1001100 0101000
1010000 0010000
0100000 0100101
1001000 0100011
1000101 0100111
1001100 0101000
1001000 0100011
1000101 0100111
1001100 0101000
1010000 0010000
0100000 0100101
1001000 01000101
1000101 01001100 01010000 01000110
1001100 01010000 00100000 01001100
1001000 01000101 01001100 01000110
1000101 0100111
1001100 0101000
0100000 0010000
0100000 0100101
1001000 0100011

COSPAS-SARSAT

LEOSAR - GEOSAR

The objective of the COSPAS-SARSAT system is to eliminate the “search” in search and rescue by reducing the time required to detect a distress and streamlining the process for SAR services.

As of today, the COSPAS SARSAT system has 6 Low-altitude Earth Orbit Search and Rescue (LEOSAR) Satellites and 6 Geostationary Earth Orbit Search and Rescue Satellites (GEOSAR).

Over 1.4 million 406MHz distress beacons are registered with COSPAS-SARSAT by boat owners, aircraft operators and outdoor enthusiasts.

Today, it can take up to 45 minutes for a beacon to be located by COSPAS-SARSAT. Whereas with the Medium-altitude Earth Orbit Search and Rescue (MEOSAR) Satellite technology such as Galileo, it will reduce detection times to seconds.

To learn more about the SAR ecosystem, McMurdo Group offers webinars to provide education and awareness to the SAR community. To view past webinars on both COSPAS-SARSAT and MEOSAR, please visit:

<http://www.mcmurdogroup.com/webinars/>

On average over the last four years, assisted rescues accounted for

5.9 rescues per day



3. MEOSAR

An upgrade of COSPAS-SARSAT's satellite system, a technological revolution for Search and Rescue

A revolution of the same significance as GPS

Real-time worldwide coverage

It takes only **a few seconds** to track air, land or sea emergency beacons

Return Link Service via the Galileo satellite/system

In the domain of Search & Rescue, the MEOSAR system represents a technological revolution similar to the impact of GPS in the world of radio-navigation in 1995.

MEOSAR brings several improvements to COSPAS-SARSAT including:

- A constellation of approximately 72 MEOSAR satellites (vs. 6 GEOSAR and 6 LEOSAR satellites with COSPAS-SARSAT today). This will provide **worldwide coverage every second of every day**. From anywhere in the world, a distress beacon signal can now be captured nearly instantaneously.
- When a distress radio beacon transmits its first signal (and then continues to transmit distress signals regularly for 24 to 48 hours minimum), the signal is received by at least three MEOSAR satellites which **locate the beacon within a few seconds** (compared to up to 45 minutes or more with traditional LEOSAR and GEOSAR satellites).
- The signal is relayed to multiple antennas on satellite ground stations or Local User Terminals (LUTs) on Earth where time-difference-of-arrival and frequency-difference-of-arrival positioning techniques can **calculate beacon locations more accurately**. The MEOSAR system works essentially according to the same principle as the GPS tracking system, but in reverse.
- The MEOSAR system's objective is to locate beacons within **100 metres, 95% of the time, and within five minutes**, even for beacons that are not equipped with a GPS receiver.
- The part of the MEOSAR system carried by Galileo satellites will have a **Return Link Service** which will allow rescue coordination centres to send acknowledgment and feedback to the beacon user indicating that help is on the way.

All MEOSAR simulations and initial results have demonstrated that this system will bring considerable improvements to the COSPAS-SARSAT system. Currently under testing and evaluation, the MEOSAR program will begin its operational phase in 2015, and will reach full capacity before 2020.

MEOSAR Key Benefits

- Better Accuracy, Timeliness and Reliability
- Global coverage and improved position calculation due to number and orbit patterns of satellites (more location data points)
- Near Instantaneous Beacon Signal Relay
- Faster response times – average 10 times faster
- Close to 100% Availability

ACRONYMS

LEOSAR and GEOSAR

Low-altitude Earth Orbiting Search And Rescue System and Geostationary Earth Orbiting Search And Rescue System. The existing COSPAS-SARSAT system has 6 of each satellite today.

MEOSAR (currently being deployed)

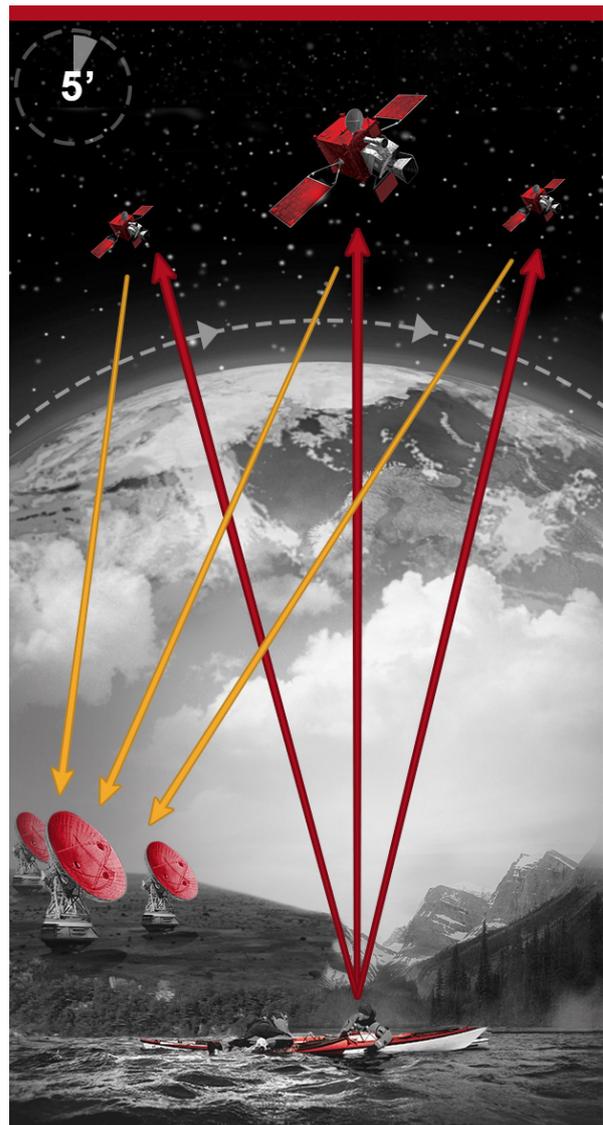
Medium-altitude Earth Orbiting Search And Rescue System. Will be launched by 2014/early 2015, with the European Union's Galileo constellation now in its early launch phase.

How will MEOSAR revolutionize the SAR world ?

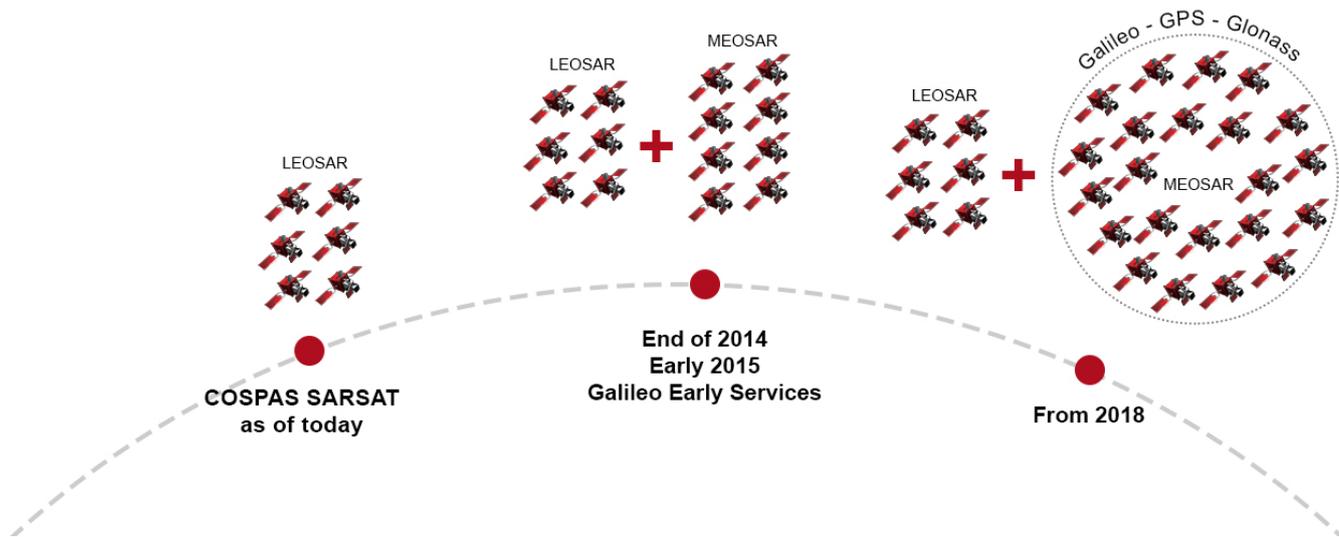
Global Satellite coverage will take 5 minutes with MEOSAR, compared to 45 minutes with the current COSPAS-SARSAT System.



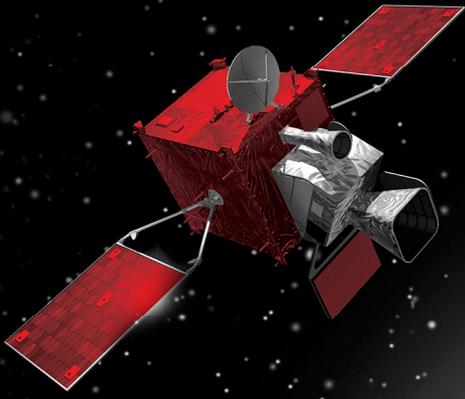
COSPAS SARSAT
AS OF TODAY



COSPAS SARSAT NEXT GEN WITH ME-
OSAR Starting end of 2014 / early 2015



| | COSPAS-SARSAT LEOSAR and GEOSAR | COSPAS-SARSAT MEOSAR NEXT GEN. SAR SATELLITES | COSPAS-SARSAT MEOSAR + 2ND GENERATION OF BEACON |
|--|---|--|---|
| Description | The current system contains 12 satellites 6 LEOSAR and 6 GEOSAR | Currently in D&E Phase 17 MEOSAR satellites installed 72 satellites planned for 2020 | Currently in D&E Phase 72 satellites planned to be in orbit by 2020 2nd generation beacons available from 2018 -2019 |
| Numbers of satellites | 12 satellites | From end of 2014, 8 Galileo satellites will enable a new era of early MEOSAR service | With 72 new medium orbit satellites to be launched and operational from 2020 (28 of which will be Galileo satellites). This upgrade will offer a much better location accuracy and detection time |
| Beacon Localisation Performance | <u>406MHz Beacon without GPS (GNSS)</u> o Typical 5km radius precision o 45min average detection time <u>406MHz Beacon with GPS (GNSS)</u> o +/- 60m radius (0.03 square mile area) o New updates every 20 minutes o Under 30 minutes to respond if within GEO footprint. | Determine independent beacon location within 5km, 95% of the time within 30 seconds of beacon activation 1km, 95% of the time within 5 minutes of beacon activation 100m, 95% of the time within 30 minutes of beacon activation | First burst transmission timeliness 3 seconds Determine independent beacon location within 100m, 95% of the time within 5 minutes of beacon activation |
| Return Link Service | | | Return Link Service confirms to person in distress that their alert message was received and their location identified |
| Optional features of the 2nd generation of beacons | | | Cancellation of false alerts |



TECHNO-SCIENCES

4. MCMURDO GROUP :

The Global Leader in End-to-End COSPAS-SARSAT Search and Rescue Solutions

With the recent acquisition of Techno-Sciences, Inc. (TSi), McMurdo Group becomes the world's first provider of a single vendor, end-to-end COSPAS-SARSAT ecosystem - from distress beacons to satellite ground station infrastructure to mission control and rescue coordination center software. McMurdo Group brings together 140 years of combined experience by consolidating proven search and rescue brands (McMurdo for maritime and personal distress beacons, Kannad for maritime and aviation beacons, Sarbe for military beacons and TSi for COSPAS-SARSAT and MEOSAR infrastructure) into the industry's most comprehensive portfolio of products that save time, costs and lives. McMurdo Group also provides a number of Maritime Domain Awareness (MDA) solutions for fleet management, coastal surveillance and intrusion detection.

McMurdo Group:



1st player to
master the entire
COSPAS-SARSAT
chain

Trendsetter
for
COSPAS-SARSAT
users

220
employees around
the world

McMurdo Group has been on a journey to become the global leaders in search and rescue (SAR) – to make a positive impact on the world through innovative positioning, tracking and monitoring products with safety and security at its core. Throughout this journey, McMurdo Group has helped to save thousands of lives for hundreds of companies, across multiple industries around the globe.

As a key player in the COSPAS-SARSAT satellite-aided search and rescue chain (a SAR system which has helped to save nearly 37,000 lives since 1982), McMurdo Group's vision to provide a single vendor, end-to-end COSPAS-SARSAT ecosystem became a reality with its latest acquisition of TSi.

TSi completes the McMurdo Group SAR portfolio with product innovations, technological advancements and industry expertise from COSPAS-SARSAT's inception up to the most recent advances in MEOSAR, the next generation COSPAS-SARSAT system.

In an industry known for its diverse players (beacon manufacturers, satellite ground station developers, control cen-

ter operators, rescue equipment providers, rescue teams, regulators and others), McMurdo Group brings leadership, expertise and stability to this fragmented industry.

With a unique, comprehensive view of the SAR industry and by understanding and owning the various elements of the SAR ecosystem, McMurdo Group expects to speed introduction of innovative SAR solutions, drive education and standardization industry-wide and create entirely new solutions that leverage joint partner development efforts.

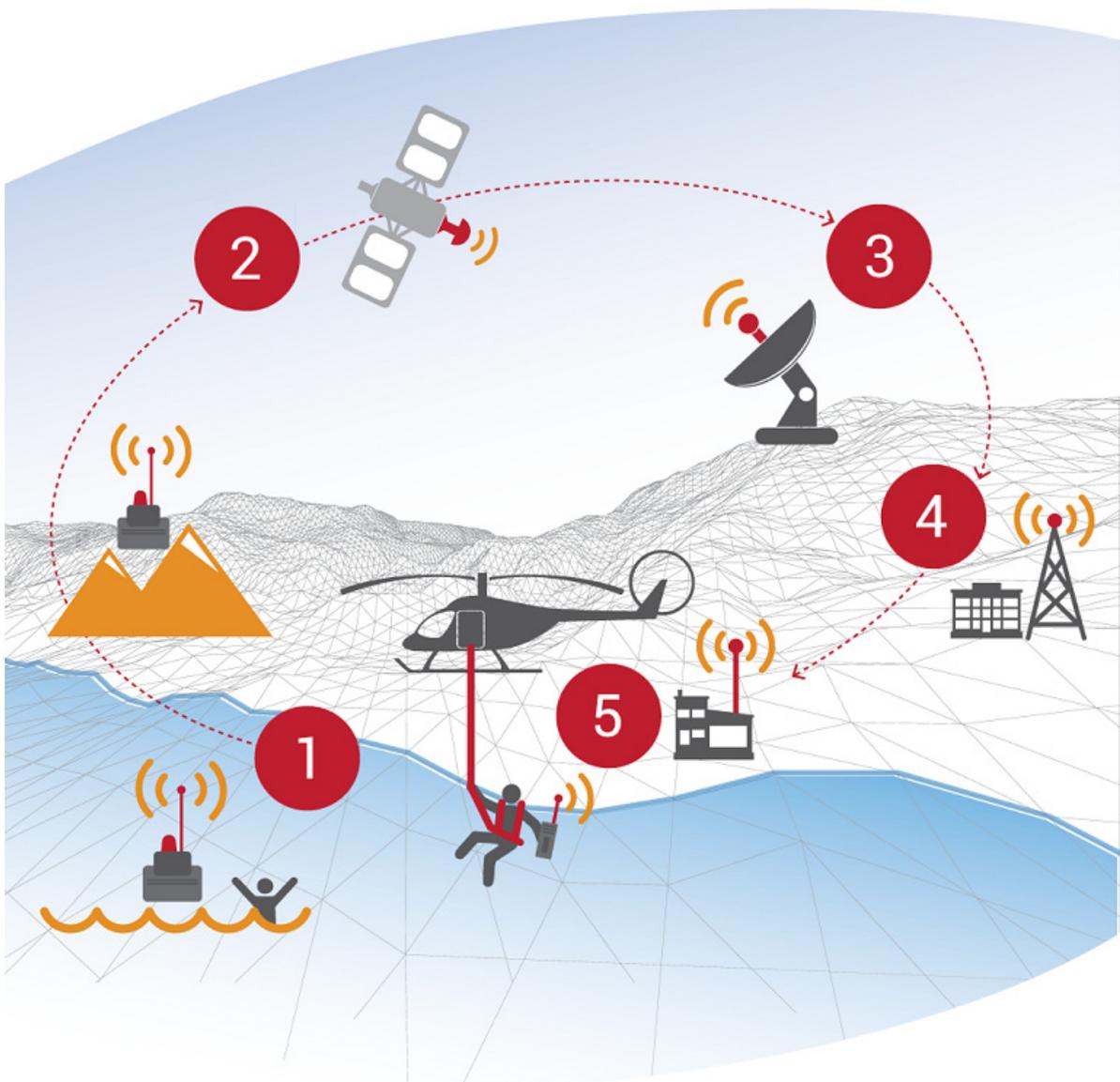
As a key provider of MEOSAR infrastructure, which is expected to revolutionize the SAR industry with enhancements such as reduced beacon detection time, improved location accuracy and enhanced services (e.g., Return Link Service), McMurdo Group is poised to save even more lives and to be a leading voice in the SAR community today and in the future.

McMurdo Group is a division of Orolia (NYSE Alternext Paris – FRO010501015 – ALORO).

[More information about the Acquisition of Techno-Sciences, Inc.](#)

“Thanks to the acquisition of TSI, the McMurdo Group becomes the unique player worldwide with the capability of mastering the whole range of technologies in the COSPAS-SARSAT system, from the distress beacons through to the control centers equipped with operational search and rescue software.”

Jean-Yves Courtois, CEO of McMurdo Group



When an emergency occurs, the 406MHz beacon is activated manually or automatically (1). The beacon's radio signal is relayed to the ground by a moving satellite within the constellation (2). One of the ground receiving stations (3) will locate the emergency situation and relay this position to the closest control centre which will in turn relay the information to the control centre with which the beacon has been pre-registered (4). This control center will receive the alert and forward the information to the rescue coordination centre that is closest to the emergency (5).

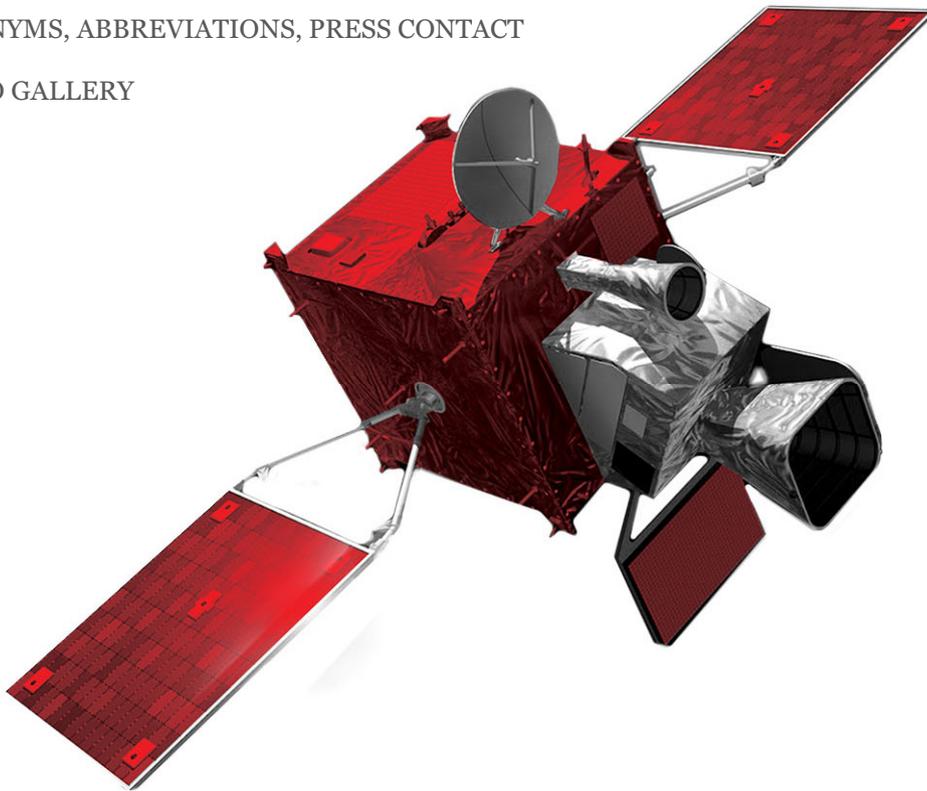
In this second part of the Press Kit, you will find several Fact Sheets which outline information on Galileo or COSPAS-SARSAT subjects that you might find useful.

5. ANNEXES:

- Fact sheet 1 : Satellite Navigation Systems (Sat-Nav)
- Fact sheet 2: 4 things to know to Maximize Your Chance of Rescue Using Emergency Beacons
- Fact Sheet 3: Return Link Service: Two Types of Acknowledgments
- Fact sheet 4: The MEOLUT in US : the NOAA case
- Fact sheet 5 : Techno Sciences at a glance

6. ACRONYMS, ABBREVIATIONS, PRESS CONTACT

7. PHOTO GALLERY



Fact Sheet 1 - Satellite Navigation Systems

How do Satellite Navigation Systems work ?

The principle of navigation by satellite is based on the transmission to the user of signals from at least four satellites. To reach a positioning accuracy in metres, these signals must be synchronised to a billionth of a second. The ultra precise time control on board each satellite, using space atomic clocks, is therefore the key condition for the performance of the navigation system. This is why each satellite has up to four on-board atomic clocks.

The on-board clocks in navigation satellites are 10 millions times more stable than a quartz watch so as not to deviate by more than a billionth of a second per day.



A RAFS (Rubidium Atomic Frequency Standard) atomic clocks are renowned in the field of satellite navigation for their stability, their low weight & their extreme reliability.

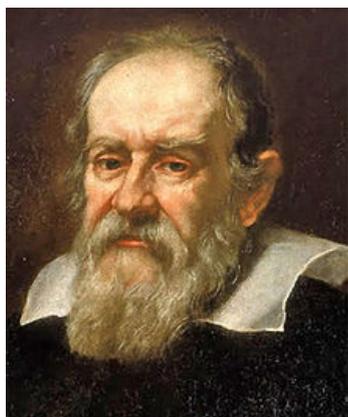
Orolia (the McMurdo Group Parent Company) is present in the largest satellite navigation systems. It provides atomic clocks to the Galileo system, through its Swiss subsidiary SpectraTime. Its technological know-how in this field has been already established by the In-Orbit Validation satellites of the Galileo European

Programme, with, as of today, the most accurate atomic clock ever placed in orbit. Its technological expertise has also allowed that the Group to be awarded contracts to provide atomic clocks for the IRNSS Project (Indian 'GPS') and to participate in the Beidou program (Chinese 'GPS');

Precise Timing, the cornerstone of Satellite Navigation Systems

Strategic supplier for the Galileo Programme, SpectraTime/Orolia's atomic clocks are present in the largest satellite navigation systems (INRSS, Beidou...).

Orolia, the parent company of McMurdo, is the only European company with the technology and know-how for satellite navigation applications, Earth observation or scientific missions



Where does the European Program name Galileo come from ?

From the astronomer Galileo Galilei (1564-1642), an Italian physicist, mathematician, engineer, astronomer, and philosopher who played a major role in the scientific revolution. Known as the "father of modern observational astronomy" for his main achievements, he was also condemned by the Church for having claimed that the Earth orbited around the Sun.

Fact Sheet 2 - Four Ways to Maximize Your Chance of Rescue Using Emergency Beacons

- 1 Choose the appropriate beacon so the COSPAS SARSAT ecosystem can best work for you. You should choose a 406 MHz beacon – which is required for many types of ships and aircraft but usually not mandated for leisure activity. There are 3 types of beacons :



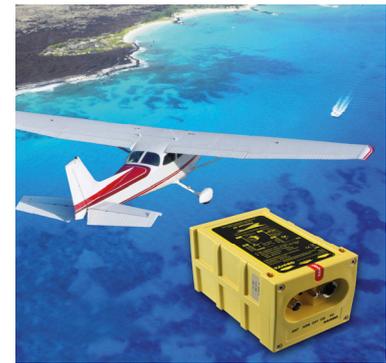
PLB

Personal Locator Beacon
(an outdoor beacon).



EPIRB

Emergency Position-Indicating Radio
Beacon (a maritime beacon).



ELT

Emergency Location Transmitter
(an aircraft beacon)

- 2 It is critical to register your beacon. Each beacon has a unique ID number which provides rescue authorities key personal information to accelerate the rescue process. Register online at www.406registration.com.
- 3 It's also important to self-test your beacon. It always better to self test in the first 5 minutes of the hour in order to reduce impact on real alerts. Manufacturer's instructions will vary by beacon, but the message here is to make sure your beacon is operational before you depart so that it is functional in the event of a distress situation.
- 4 Ready to go? Keep the Beacon **Within Reach or Set to "Auto"**
 - (a) installed in an easily accessible position;
 - (b) ready to be manually released and capable of being carried by one person into a survival craft;
 - (c) capable of being activated manually if required.

BEACON REGISTRATION

It is equally important to register your beacon and to keep your registration information current including location, trip details and 24 hour contact details before you depart. We are aware of one beacon owner who purchased and registered his beacon in the UK and then moved to Australia. He never updated his registration information so when he found himself in a life threatening situation in the outback, he activated his beacon and the rescue authorities were rightfully confused. They called the 24 hour contact who was aware that the owner had moved and confirmed that the distress signal was most likely valid. A rescue operation commenced and the individual was safely recovered.

Travel Safely and Enjoy !

Fact Sheet 3– Return Link Service on Next-Generation COSPAS- SARSAT Beacons

Another feature of the MEOSAR system will be the ability to send a Return Link Signal to the beacon. Today this feature is **only available through Galileo satellites** due to the design of that constellation’s control infrastructure. Essentially, the Mission Control Center will forward a message to the Galileo constellation operator who will then “place” a message in the Galileo navigation signal which will be transmitted and addressed to the specific distress beacon. This is the “return link” feature.

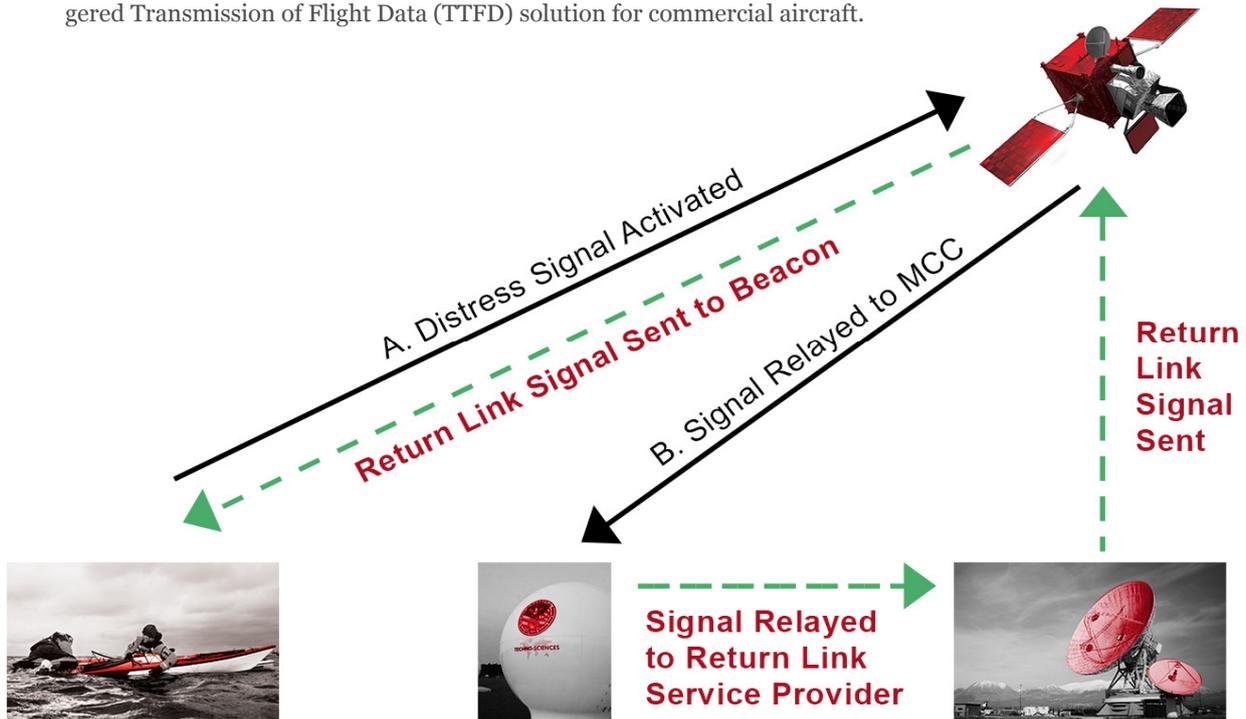


“With this functionality, great things are expected to improve the search and rescue process. We can send a confirmation message back to the beacon acknowledging that the emergency signal was received. We could possibly remotely activate a beacon, turn off a beacon transmission or even confirm if the emergency signal is an actual distress situation or a false alert.”

Neil Jordan, Engineering Manager at McMurdo Group and Director at RTCM (The Radio Technical Commission for Maritime Services)

This return link capability/functionality will require next-generation emergency beacons. The standards for next-generation 406MHz beacons are currently being defined. They will include some of the following requirements and features.

1. Compatible with both MEOSAR and the existing COSPAS-SARSAT systems.
2. Designed to increase performance and independent beacon location accuracy to within 100m, 95% of the time within 30 minutes of activation (1 km within 10 min) compared to today’s target of 5km, 95% of the time within 45 minutes. This is a huge improvement in performance.
3. Include return link service.
4. Futur aircraft beacons (called also ELTs) will have an automatic activation function on the indication of suspicious flight parameters as opposed to being impact activated today; this feature is part of the proposed Triggered Transmission of Flight Data (TTFD) solution for commercial aircraft.



Fact Sheet 4 - McMurdo Group's Techno-Sciences, Inc. (TSI) at a Glance:

McMurdo Group announced the closing of Techno-Sciences, Inc. acquisition in May 2014 to complete its end-to-end search and rescue ecosystem. TSI was founded in 1975 by a university professor and is located in Beltsville (Maryland), 30 minutes from Washington DC. TSI initiated the first developments in Search and Rescue (SAR) aided by US satellites, and for many years now has been one of the world's two providers of ground systems for the international search and rescue system COSPAS-SARSAT which enables government authorities worldwide to receive signals from distress beacons and to initiate rescue operations. Since 1982, nearly 37,000 people have been rescued by COSPAS-SARSAT.



40 employees

Leader in COSPAS-SARSAT ground systems and associated operating software



LUT

MCC



RCC

World's first MEOLUT prototype validated by NASA

Systems installed in **22** countries

TSI has been chosen for many years by NASA and NOAA (National Oceanic and Atmospheric Administration) in the US for their search and rescue systems.

TSI is a key player in COSPAS-SARSAT ground systems alongside its main competitor the Canadian company EMS which has now been acquired by Honeywell. TSI's products, ground systems and associated operating software are used to equip the distress signal receiver terminals and control centres of the international COSPAS-SARSAT system:

- The Local User Terminal (LUT) ground station receives distress beacon data relayed by satellite. LUT's have mobile antennas for satellite tracking and signal processing for the identification of a beacon and calculation of its position.
- The COSPAS-SARSAT Mission Control Centre (MCC) is a state-of-the-art system for data processing. It is the communications hub for distribution and sharing of data with other MCCs all over the

world. The MCCs also monitor the operation of the entire COSPAS-SARSAT system.

- The Rescue Coordination Centre (RCC) system is designed for the planning, management and coordination of rescue and recovery operations.

Today TSI is the world leader in the deployment of the next generation MEOSAR program for COSPAS-SARSAT. TSI's MEOLUT system, is the world's first prototype to have successfully passed NASA's validation tests (January 2009). This success gave TSI the opportunity to win the first contract to provide an operational MEOLUT to NOAA (Hawaii), and has led more recently to a second MEOLUT contract for NOAA's site in Florida that has been successfully installed (see page 17—fact sheet N° 5).

TSI's customers include governmental organizations such as NOAA, NASA, the US Navy and the US Army, as well as large customers in the US, Asia and Europe.

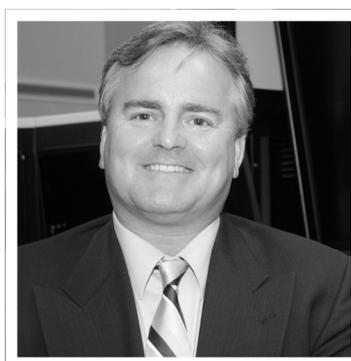


Fact Sheet 5 - McMurdo Group's TSi: Leading the MEOSAR Program in the US

TSi Completes Successful Installation of the Second MEOSAR Ground Station for the U.S. National Oceanic and Atmospheric Administration (NOAA)

In March 2014, Techno-Sciences, Inc. (TSi) announced the successful installation of the second COSPAS-SARSAT Medium Earth Orbit Search and Rescue (MEOSAR) satellite Ground Station for the U.S. National Oceanic and Atmospheric Administration (NOAA), the U.S. government agency responsible for the U.S. SARSAT program. After TSi's successful implementation of the world's first operationally ready six-antenna MEOSAR Local User Terminal (MEOLUT) in Hawaii in September 2011, the latest MEOLUT installation at the U.S. Coast Guard (USCG) COMSTATION facility in Miami, Florida, marked an important milestone for TSi and the US SARSAT Program.

Mickey Fitzmaurice, NOAA SARSAT Program's Lead Satellite Systems Testimonial - March 2014



"TSi should take great pride in their achievement of developing and building the first two operationally ready, six-

antenna ground stations for the U.S. SARSAT program," said Mickey Fitzmaurice, NOAA SARSAT Program's Lead Satellite Systems Engineer recognizing this achievement after completion of the site acceptance testing.

"With the international COSPAS-SARSAT program evolving towards using GPS, Galileo, and GLONASS satellites for worldwide distress alert detection, TSi's engineering expertise combined with their leadership in MEOSAR technology has been instrumental in this MEOLUT deployment. The project schedule was met at every milestone, and the performance has been exceptional. We look forward to our continued partnership with TSi as we roll out MEOSAR operations."



A TSI MEOLUT installed in Florida

The US SARSAT Program is a key participant of the international COSPAS-SARSAT Program which has helped to save over 35,000 lives since its inception in 1982. Managed by NOAA, the US SARSAT Program is a joint program with NASA, the US Air Force and the US Coast Guard.

6. Acronyms, Abbreviations, Contacts

Because acronyms abound in the world of SAR (Search and Rescue), we have gathered the most popular in one page. If for some reasons you have not found the one you were looking for us, please let us know.

Automatic Activation

A distress beacon that is activated when it comes in contact with water.

Automatic Deployment

A distress beacon that is automatically released from its housing when the integral hydrostatic unit is submerged in water

COSPAS-SARSAT

International satellite system for search and rescue. A joint operation between France, Canada, Russia and the USA who monitor the 406 MHz satellite system.

ELT

Emergency Location Transmitter (an aircraft beacon)

EPIRB

Emergency Position-Indicating Radio Beacon (a maritime beacon).

GEOSAR

Geostationary Search And Rescue system. Part of the COSPAS-SARSAT satellite system.

GMDSS

Global Maritime Distress and Safety System.

LEOSAR

Low-altitude Earth Orbiting Search And Rescue System.

LUT

Local User Terminal. A ground receiving station that picks up the initial distress signal and relays it to the Mission Control Center. Calculates the position from which the signal was transmitted.

MEOSAR

Medium-altitude Earth Orbiting Search And Rescue System.

PLB

Personal Locator Beacon. (used by outdoor enthusiasts)

SART

Search And Rescue Transponder.

What is SAR?

Search & Rescue (SAR) is the ability to supply tools to effectively connect, analyse data, track, plan, monitor and execute an appropriate response to potentially life threatening incidents which often take place in a remote and often harsh environment.

McMurdo Group Contact Information

General Information:

info@mcmurdogroup.com

Press Information

press@mcmurdogroup.com

European Press Contact

Elodie Cally, Communications Director
elodie.cally@orolia.com

USA Press Contact

Randel Maestre, VP Marketing
randel.maestre@mcmurdogroup.com

Key Locations:

Head Office—Sophia Antipolis, France

USA HQ—Washington DC, USA

Other Locations—Portsmouth, UK; Guidel, France; San Diego, CA, USA

7. Photo Gallery & Free Tutorials



Techno-Sciences © library Techno-Sciences

© McMURDO Group



mcmurdo © library mcmurdo

© McMURDO Group

www.mcmurdogroup.com



McMURDO

How will MEOSAR improve the SAR world?

Global Satellite coverage will take 5 minutes with MEOSAR, compared to 45 minutes with the current COSPAS-SARSAT System

45'

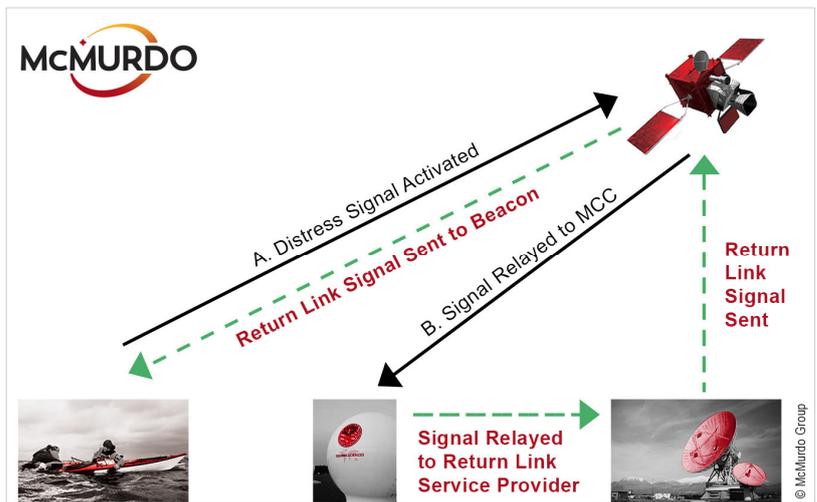
COSPAS SARSAT AS OF TODAY

5'

COSPAS SARSAT NEW GEN WITH MEOSAR Starting end of 2014 / early 2015

mcmurdo © library mcmurdo

© McMURDO Group



mcmurdo © library mcmurdo

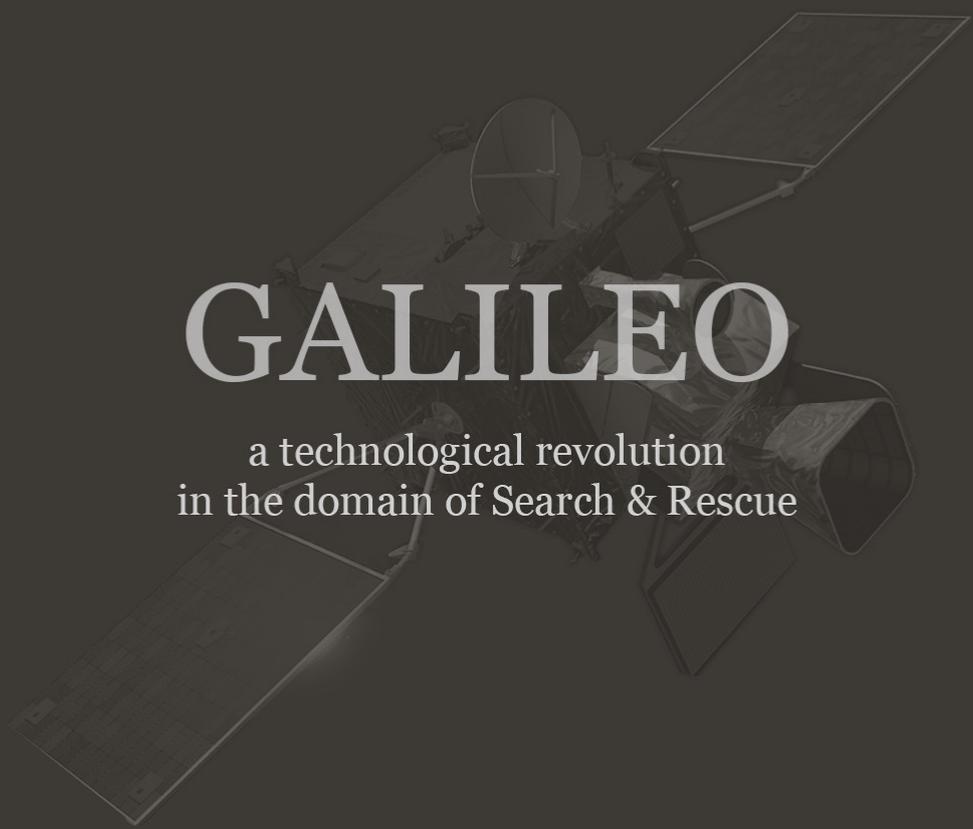
© McMURDO Group

Learn more ! Sign-up for our free webinar

McMurdo Group is pleased to offer webinars to provide education and awareness to the Search and Rescue communities. Join us on-line for thought provoking and insightful presentations from experts and leaders on a variety of relevant topics. You can view past presentations on demand and sign up for future events from this one convenient location.

<http://www.mcmurdogroup.com/webinars/>

McMurdo Group
Europe Head Office
2405 route des dolines
06 560 Sophia-Antipolis—France
www.mcmurdogroup.com



GALILEO

a technological revolution
in the domain of Search & Rescue

McMurdo Group is a division of Orolia
(NYSE Alternext Paris – FRO010501015 – ALORO)

www.orolia.com

Registered Office: 2405 route des dolines – 06 560 Sophia-Antipolis

S.A. - Capital 16 901 196 euros – Siret 492 370 622 RCS Evry