



**AMPHINICY**  
TECHNOLOGIES

# **COMPANY** **PROFILE**



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# Company Profile



I can clearly recommend Amphinicy Technologies as a partner when it comes to software development and IT projects specific to the problems related to satellite services and applications.

Alan Kuresevic, VP Engineering  
SES TechCom



I have worked with Amphinicy on multiple projects over the last six years. I can highly recommend Amphinicy as a strategic development partner; their people, skills, and dedication are all top-notch. These guys knock it out of the park!

Chris Burdick, Product Manager  
O3b Networks



It is unusual to find a software engineering shop with such deep experience in satellite industry!

Robert Bell, Executive Director  
World Teleport Association

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# About Us

## What?

Amphinicy Technologies is a leading provider of complex software solutions and all-round software support for the satellite and space industry.

## How & Where?

Building a turn-key software solution for your satellite business - that's Amphinicy's cup of tea!

The company operates from Luxembourg and Croatia, providing premium quality support to its clients, both in Europe and abroad.

Amphinicy Technologies has been on the market for more than 20 years. During this time, we have experienced an ever-growing demand for our services - both for tailor-made solutions for our clients, and for our own products.

Our customer base includes international space and humanitarian agencies, satellite operators, teleports and VSAT vendors, RF equipment manufacturers and other important industry stakeholders.



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## 5 important things about us:

- Unique company with excellence in software, satellite and space domain
- 20+ years on the market
- Offices in Luxembourg and Croatia
- Long-lasting collaboration with major industry stakeholders
- Continuously growing expertise in all segments

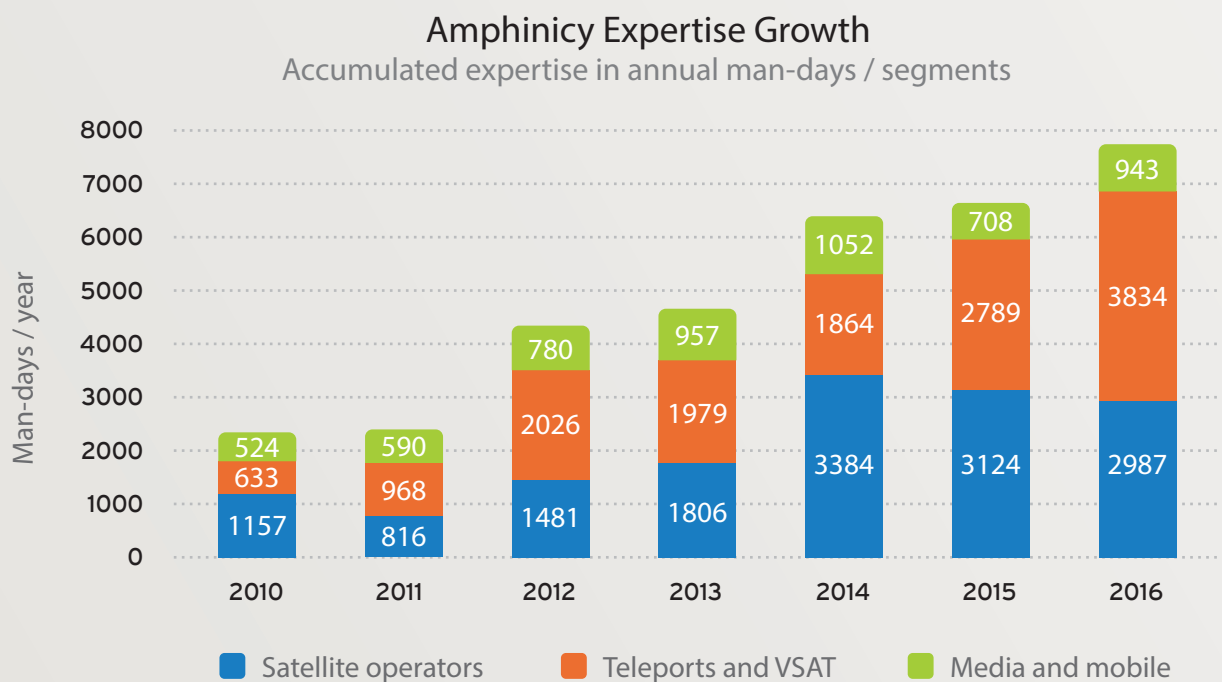
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# About Us

## Our Employees



Our employees are highly motivated for setting new benchmarks in applying modern software technologies and approaches in the satellite and space domain.

Amphinicy hires only highly educated and enthusiastic staff, thus maintaining our undisputable track record of successful projects.

It is no surprise that our customers have recognized this drive and have enjoyed professional collaboration with Amphinicy Technologies for years .

When it comes to software & space, it is clearly a one-horse race!

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# About Us

## Industry trends

The satellite industry, be it running satellite operations, teleport business or Earth observation, shows certain common trends.

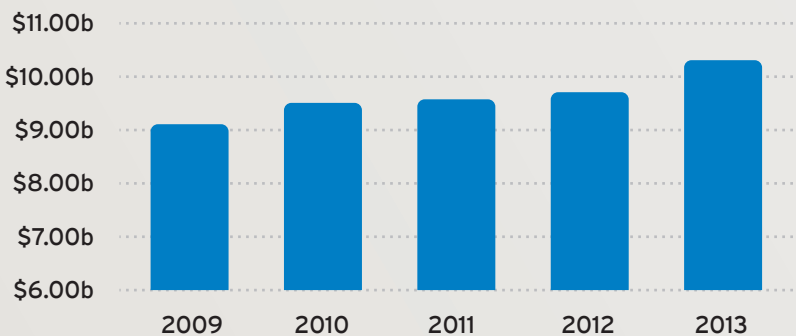
It is, as a whole, a growing industry. Research conducted by The World Teleport Association over the last decade shows a constant revenue increase in the satellite operation and satellite service provider business.

### TRENDS

- The satellite industry is a growing industry.
- New HTS and SmallSat concepts indicate a need for innovative applications and services.
- There is emerging hunger for EO data in real time all around the world.
- New applications are emerging on all vertical markets.

### Company Revenues

A growing satellite industry



It is important to recognize that nearly half of the total revenue comes from value-added services. The focus is now moving towards innovation in services and applications.

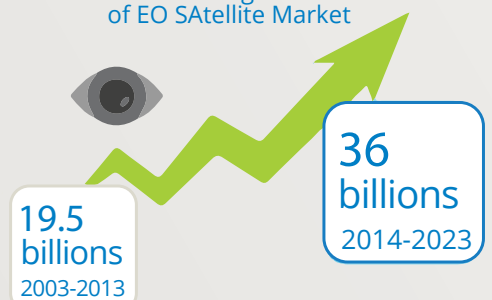
On the other hand, there is a whole new skyrocketing trend with small-sat launching and Earth observation missions. More and more startups, universities and space agencies are taking a turn towards these industries.

All vertical markets require new applications and solutions which were unimaginable only a few years ago. Oil rigs need more entertainment for the staff. Internet connectivity is getting widely adopted and affordable on cruisers, flights, and high-speed trains. Humanitarian projects like disaster recovery, satellite medicine or satellite-based e-learning are in full swing. The world is hungry for Earth observation data. And it wants it in real-time! Is your company ready to meet these challenges?

### Expected revenues of EO satellite market

(Courtesy of Euroconsult)

Manufacturing Revenues  
of EO Satellite Market



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## About Us

### How does Amphinicy fit in ?

Being on the market for more than two decades, Amphinicy Technologies has delivered more than a hundred successful international projects to its customers.

Our projects are present in all vertical markets through collaboration with our customers, with expertise oriented towards satellite operators, teleports, VSAT manufacturers, broadcasters and satellite service providers.



### WHY AMPHINICY?



- Most of the challenges you are facing have probably been tackled by our engineers at some point.
- 100+ successful international projects.
- Recognized as an innovative company through several EU programs.
- Our project managers are in constant contact with major players in the industry.
- Our projects are spread over all vertical markets, with growing expertise in EO.

### Our Engineers

Our engineers are carefully chosen to fit the company culture and are experienced in both software and satellite domains. We consider experience paramount, so most of our senior engineers have been with us for more than 7 years. The challenges you are facing have most probably already been tackled by our team.

### Our Project Managers

Our solution managers are in constant contact with major players in the industry - consulting them on defining, designing, developing, and delivering high quality solutions. One of our biggest competitive advantages, and a great asset of our managers, is the immense knowledge and expertise in processes and standards of collaboration with large European and global organizations like AIRBUS, SES, ESA, EU, UN, and others.

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## About Us

### How does Amphinicy fit in ?

#### Five main focuses:

- Monitor and Control of the ground segment
- Network Management Systems - development and customisation
- Earth observation real-time telemetry analysis
- Mobile applications for VSAT commissioning
- Humanitarian applications - disaster recovery, eLearning, eMedicine

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#### Our Quality

Amphinicy Technologies pays special care to deliver solutions of absolute quality. We use systems for automatic and continuous quality monitoring, and our customers can verify the shape of their development at any time.

This is one of the reasons why we are proud owners of the ISO 9001 certificate.

We are confident we can bring great added value to your business!



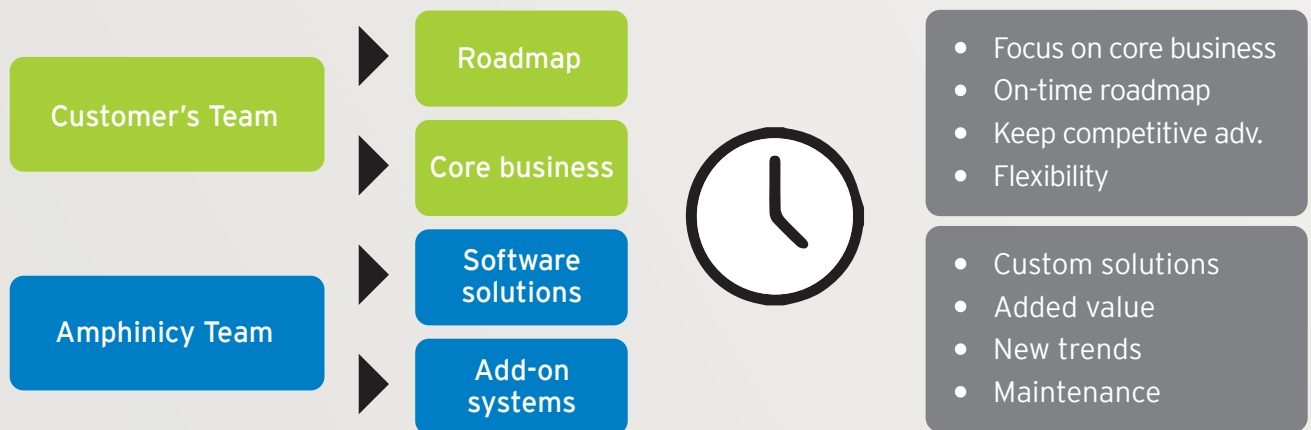
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# About Us

## Where is the benefit?

Amphinicy helps their customers to stay focused on their core business by taking full responsibility for what it does best - software solutions and support.



While you keep your roadmap on track and stay focused on your core business, Amphinicy takes care of smooth operation of your software solutions. Relax and enjoy the creative process, and we will take care of operations and day-to-day project management.

## References



ND SATCOM



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# 1 SPELL Based Solutions

SPELL is a free Open Source software package composed of an integrated environment for the development and execution of satellite automated procedures.

## How?

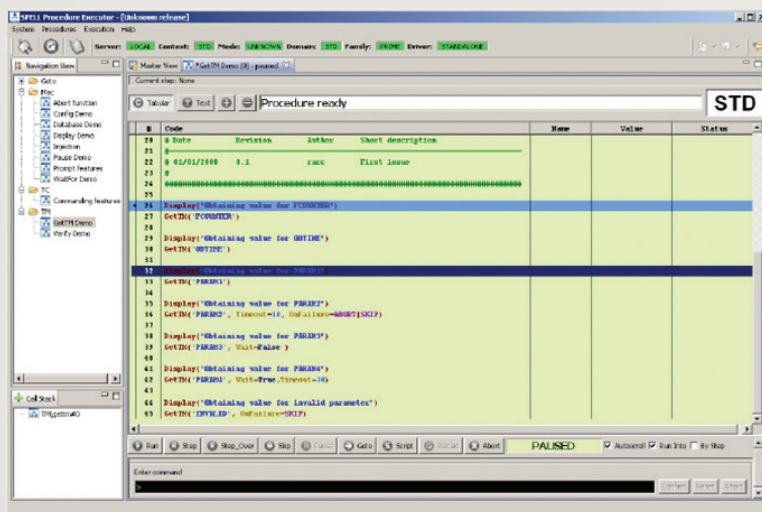
It is capable of running any procedure via different ground control systems and for any spacecraft. More information about SPELL can be found here:

<https://code.google.com/p/spell-sat/>

## Where?

Amphinicy is widely involved in providing solutions based on SPELL. There are two main domains where Amphinicy plays a key role: analyzing procedures, manually enhancing them for SPELL, and providing automated triple-grammar based translators. The solutions are often integrated with GMV's HiFly system and satellite platforms.

Amphinicy translation procedures cover most of the platforms, including SSL, Airbus, Orbital, OHB and Boeing 702HP.



Every satellite needs to be tested once it reaches its final orbit. A set of procedures, testing both the platform and the payload, needs to be performed.

In addition, such a framework needs to be flexible enough to support more than one ground station with associated RF and other devices.

This is why some of the biggest satellite operators have chosen Amphinicy to help their engineers in developing such a system.

## 3 Ground Segment Simulation

Amphinicy has profound knowledge and experience in developing solutions for simulations of complex ground segment systems. A decade-long experience in IOT simulations, ground station simulations, dynamic and runtime system reconfiguration, etc. placed our solutions at the heart of big satellite industry stakeholders' ground infrastructure.

### Why?

One example is IOT Ground Simulator. Every satellite needs to be tested once it reaches its final orbit. In order to have testing procedures ready for that moment, they need to be developed beforehand. Hence, these procedures require simulation of the satellite, ground segment and signal propagation before the actual launch.

### How?

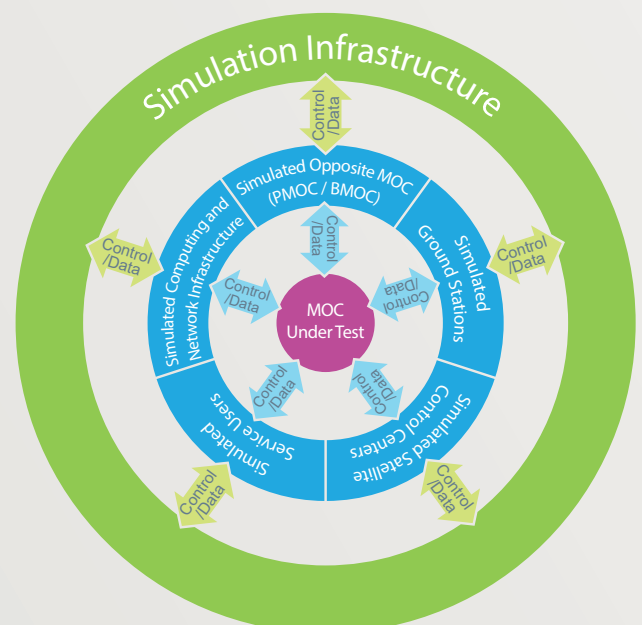
IOT Ground Simulator simulates the ground segment of an in-orbit satellite testing system (IOTS). The ground segment contains a number of RF instruments arranged into a specific RF schema. The system is completely runtime-configurable to suit a number of ground stations and is based on rules-engine technology and a wide range of open-source solutions.

Another example is the Mission Operation Center simulator, used to simulate MOCs of big European projects. By simulating the overall MOC environment, including subsystems and interconnections between them, stakeholders are able to validate their subsystems completely independently and, at a later stage, test integration with the rest of the MOC. Python scripts in combination with rule engine frameworks and new web based technologies make this simulator, extremely powerful and at the same time easy to use.

### Where?

There is a whole industry segment that is in need of simulator applications and many companies drive their businesses on their results.

Amphinicy's extensive knowledge and experience with system simulation can help customers get results on time and typically at a fraction of competing prices.



## 4 NMS Solutions

For almost a decade Amphinicy has been involved in leading and supporting NMS solutions development for major satellite VSAT vendors. Amphinicy helps customers in defining new feature sets, development, maintenance and customizations.

### What?

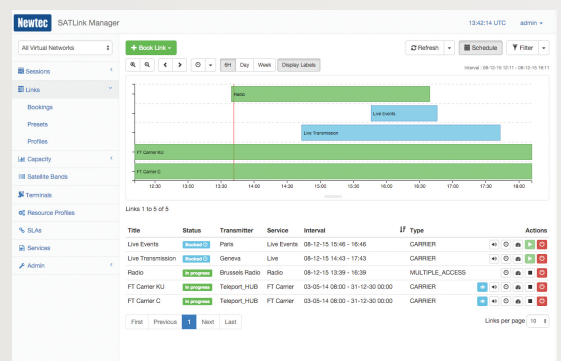
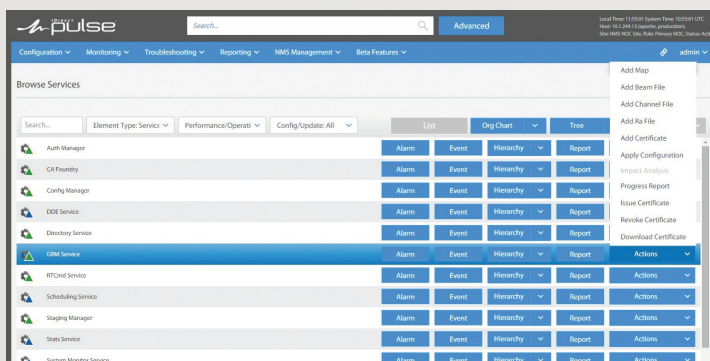
Our NMS experts work with renowned VSAT vendors on delivering state-of-the-art NMS systems to the market just in time, with the right feature sets!

Some of the worldwide known systems our engineers were involved with are SatManage and Pulse for iDirect, Dialog NMS for Newtec and SkyNMS for NDSatCom.

### What exactly?

Our NMS expertise include reporting, ticketing, satellite capacity management and scheduling, provisioning, line-up management, API and UX design, GUI optimization and overall system stress testing.

Based on this vast expertise our engineers and solution managers are involved from the very beginning of NMS life cycle - definition phase - all the way to acceptance testing and delivery. This is one of the domains where we really shine!



## 5 VSAT Certification Systems

As VSAT networks around the world grow, sometimes exceeding 100.000 terminals, the need for a solid commissioning and certification process is obvious more than ever!

### Why?

Major VSAT service providers are seeing the number of terminals grow continuously. Users are often installing them on their own, which can lead to significant interference and network performance deterioration.

### What?

A fully automated solution covering step by step antenna installation, antenna pointing and cross polarization measurement reduces the probability of a badly installed terminal. Using mobile applications, integrated with modems or ACU, is the first step in bringing the terminal on-line. Once the terminal is in the network, the certification management solution on the hub side takes over measuring cross-polarization, signal strength and providing recurring policies for regular recertification!

With this system in place, you can rest assured your network will remain properly configured.

Verification RUNS

VERIFICATION CONFIGURATION

TRENDING

LOGS AND ALARMS

SYSTEM CONFIGURATION

System Status

Language

Verification Runs

Verification

Verification

Domain

Period: Start date25/04/15End date25/04/15

FILTER

Advanced filtering

Verification

Domain

Terminal

Run status

Timestamp

Verification 1

Domain 1

Terminal 1

Scheduled

10.10.2015 13:45

Verification 1

Domain 1

Terminal 1

In progress

10.10.2015 13:45

Verification 1

Domain 1

Terminal 1

Aborted

10.10.2015 13:45

Verification 1

Domain 1

Terminal 1

Finished (PASSED)

10.10.2015 13:45

Results:

Status: Failed (a reason for a failure)

Measured FW Ex/NO: 20.3

Measured XPD: 40.4543

ODU Id: 12

Details

ODU

Id: 12

Name: ODU 12

Gain Rc: 20

Ref Frequency Rc: 200

Verification Configuration Details

Antenna Noise Temp: 160

Terminal Details

Lnb Noise Figure: 4

Verification 1

Domain 1

Terminal 1

Finished (FAILED)

10.10.2015 13:45

Verification 1

Domain 1

Terminal 1

Finished (unknown)

10.10.2015 13:45

Verification 1

Domain 1

Terminal 1

Scheduled

10.10.2015 13:45

1-13 of 54 items

Items per page

1-13 of 54 Items

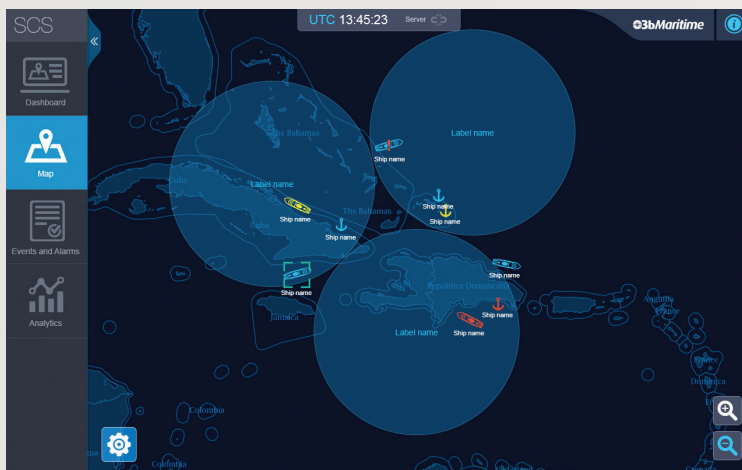
# 6 Beam Roaming

Maritime and in-flight communication has always been a perfect soil for satellite communication based services. We are witnessing a new constellation in MEO and LEO orbits picking up momentum, providing high capacity with low latency. On the other hand, smart roaming between smaller beams is the essence of business optimization for MEO and LEO satellite operators. O3b is a prime example!

## What?

Some seas and oceans areas are crowded with vessels: tankers, cruisers, big cargo ships. These areas are usually covered very well with satellite beams. Each of these vessels has different needs for satellite capacity - hence a smart system to efficiently allocate beams to ships is of real help!

This is where Amphinicy's expertise comes in!



## How?

A solution of this kind needs to have smart multi-agent back-end coordinating agents on vessels, gateways, SOC and NOC. All agents are coordinated by a set of rules deciding when to roam to another beam based on a number of parameters. On top of that, the operator-friendly GUI has to be smartly designed, following the trends of UX design principles.

Once everything is in place, working there is a win-win situation of everybody - the satellite service provider, the vessel company, and the end users.

# 7 Passive Satellite Ranging

Passive Satellite Ranging can be described as reverse GPS. It is formed by multiple ground stations, each containing complete RF chains, to range (locate) a satellite.

## What?

The main advantage of this system is in its passive ranging technique. Once all of the ground stations in the satellite footprint are tuned to the same signal from the satellite (e.g. a specific TV station signal), the system can range the satellite using correlation algorithms.

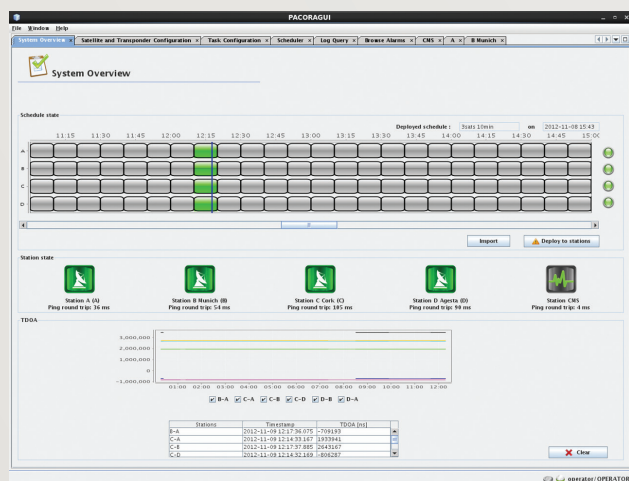
The role of the system is to manage the overall satellite ranging solution, including configuring stations to acquire a Radio Frequency (RF) signal, computing measurements and streaming the results to orbit determination systems.

## How?

The tracking system is composed of multiple hardware devices and subsystems. Each of them can be accessed on a different protocol (SNMP, ASCII-based, SOAP, etc.). Through these protocols, the provided system is able to monitor and control parameters of each device.

The user interface allows operators to configure the complete system to range a satellite, by mechanism of simple and quick measurements configuration. Once a measurement is configured, user intervention is no longer required as the system continuously collects data and provides them to the upper layer (i.e. external database).

The system is completely built on Service Oriented Architecture principles, i.e. fully modular and adaptive.



## 8 Monitor and Controls Systems

By delivering solutions to satellite markets for more than 20 years, we've been interfacing a wide range of devices in the ground segment. Synthesizers, up-down converters, servers, routers, antenna control units, switches, spectrum analyzers, modems, encoders and decoders are just a few of the devices that are successfully monitored and controlled by our software.

### Why?

A lot of big European missions have pieces of our software in the ground segment, and most of them in monitor and control applications. Over time, we decided to put this exhaustive knowledge and expertise into our own product which will enable us to build future projects on a proven, solid base. Today we have MONICA - our M&C product. It can be used as an out-of-the-box solution, or as a framework to build more complex solutions on top of. Its open technologies, APIs and protocols make it perfect for integration with your existing OSS and BSS solutions.

Find out more at [monica.amphinicy.com](http://monica.amphinicy.com).

### Monica features:

Out-of-the-box, Monica supports all that an M&C system needs:

- Tight Security and User management
- Powerful alarming based on user-friendly rules definition and device-related constraints
- Rich trending (charts) and reports
- Very flexible action scripting
- Task automation, via scheduler or alarm-driven events
- Extensive Logging mechanisms
- Easy drivers plug-in architecture
- High-availability (failover) mode
- Exceptionally functional, white-label and user-configurable web interface designed according to best UX methodologies



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## 9 Earth Observation Telemetry Analysis

Earth observations satellites are out of reach of ground stations' antennas most of the time. The payload data they quickly accumulate has to be retrieved in short intervals when the satellite is in line of sight and communication is possible. Therefore, communication has to be fast, robust and any potential problems should be detected as early as possible.

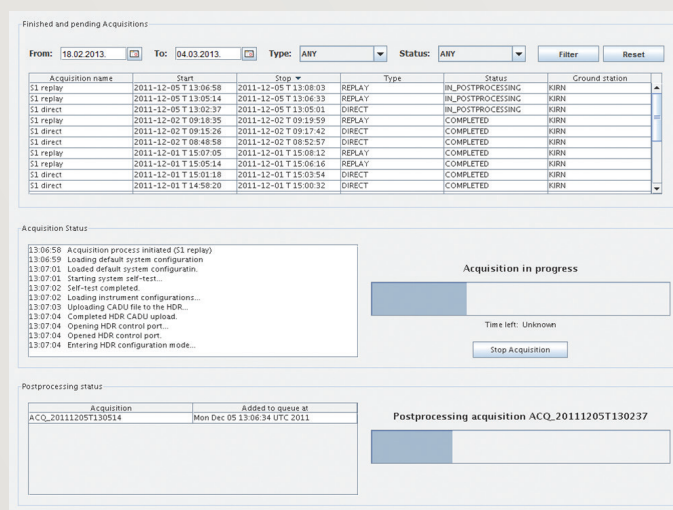
### Why?

The system makes it possible to check every last detail of a high-throughput data acquisition process: before the launch - in the assembly, integration and verification phase, after launching into orbit to check that it wasn't damaged during launch and for operational data acquisition.

### How?

The system can accept data on one or two channels (up to 1.3Gbit/s), work independently as long as sufficient storage space is available, retrieve and analyze CCSDS telemetry data - CADU, VCDU and ISP content, handle scrambled content and correct errors. It also provides tools for later analysis of recorded data, such as a frame and packet-level data explorer, a binary comparison tool and detailed information in the database and XML reports for ad hoc custom analysis.

The system provides a graphical user interface which is accessible remotely and includes M&C features like alarm management, system state overview, management and data acquisition preparation and progress overview components, among others.



Finished and pending Acquisitions

From: 18.02.2013 To: 04.03.2013 Type: ANY Status: ANY Filter Reset

Acquisition name	Start	Stop	Type	Status	Ground station
S1 replay	2011-12-05 T 13:06:58	2011-12-05 T 13:08:03	REPLAY	IN_POSTPROCESSING	KURN
S1 replay	2011-12-05 T 13:05:14	2011-12-05 T 13:06:33	REPLAY	IN_POSTPROCESSING	KURN
S1 direct	2011-12-05 T 13:03:37	2011-12-05 T 13:09:01	DIRECT	IN_POSTPROCESSING	KURN
S1 replay	2011-12-02 T 09:18:35	2011-12-02 T 09:19:59	REPLAY	COMPLETED	KURN
S1 direct	2011-12-02 T 09:15:26	2011-12-02 T 09:17:42	DIRECT	COMPLETED	KURN
S1 direct	2011-12-02 T 08:48:58	2011-12-02 T 08:52:57	DIRECT	COMPLETED	KURN
S1 replay	2011-12-01 T 15:07:05	2011-12-01 T 15:08:12	REPLAY	COMPLETED	KURN
S1 replay	2011-12-01 T 15:05:14	2011-12-01 T 15:06:16	REPLAY	COMPLETED	KURN
S1 direct	2011-12-01 T 15:01:18	2011-12-01 T 15:03:54	DIRECT	COMPLETED	KURN
S1 direct	2011-12-01 T 14:58:20	2011-12-01 T 15:00:32	DIRECT	COMPLETED	KURN

Acquisition Status

13:06:58 Acquisition process initiated (S1 replay)  
 13:06:59 Loading default system configuration  
 13:07:01 Loading default system configuration  
 13:07:01 Starting system self-test...  
 13:07:02 Self-test completed  
 13:07:02 Loading instrument configurations...  
 13:07:03 Uploading CADU file to the HDR...  
 13:07:04 Completed HDR CADU upload  
 13:07:04 Opening HDR control port...  
 13:07:04 Opening HDR control port...  
 13:07:04 Entering HDR configuration mode...

Acquisition in progress

Time left: Unknown

Stop Acquisition

Postprocessing status

Acquisition	Added to queue at
ACQ_20111205T130514	Mon Dec 05 13:06:34 UTC 2011

Postprocessing acquisition ACQ\_20111205T130237

Amphinicy is finalizing development of its ultra-fast CCSDS telemetry analyzer through the H2020 EU programme - code named BLINK! Being 20 times faster than a reference solution from NASA, BLINK is already in the driving seat as a full software solution for EO telemetry acquisition.

The high-concurrency processing capability built into the heart of its architecture makes BLINK a state-of-the-art product!

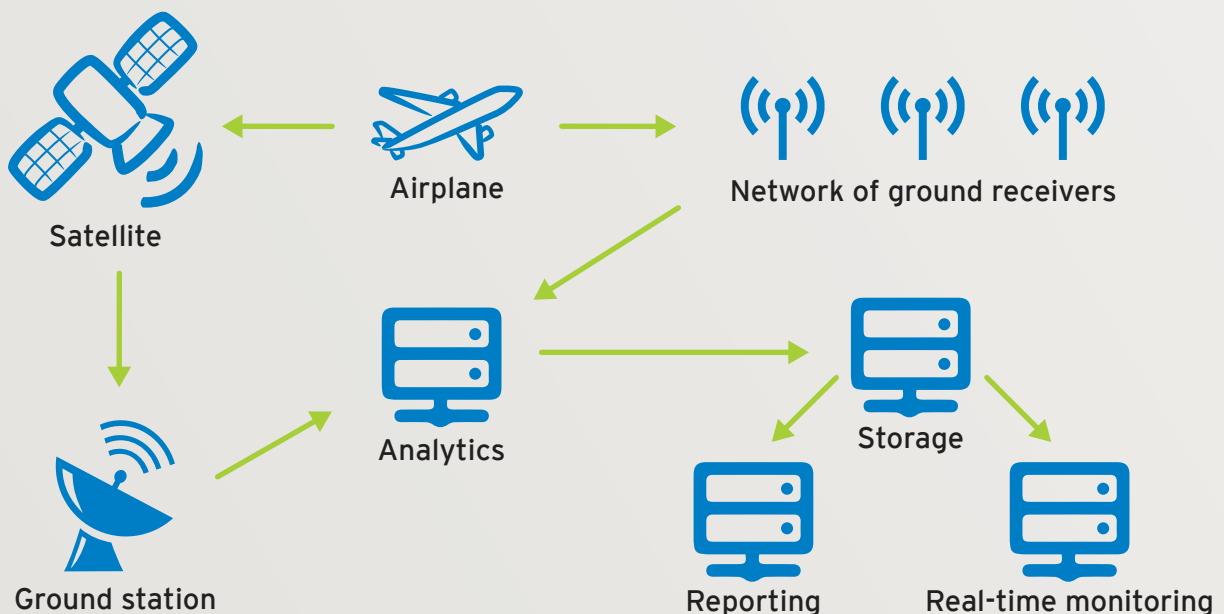
## 10 Aircraft Tracking via Satellite

To this day, aircrafts flying over non-radar airspace (NRA) have no systematic, frequent mechanism of reporting their position and flight status to ground control. The lack of such a mechanism caused the wreck of the infamous flight AF447 not to be found for almost 2 years. Unfortunately, we were also witnesses to a recent problem with tracking the Malaysian Airlines flight MH370.

### Why & How?

The purpose of this system, developed in the scope of an R&D project for the EU, was to assert the feasibility and performance of live aircraft tracking over satellites, potentially enabling real-time coverage of the entire surface of the Earth – a very desirable, yet so far unimplemented concept. The large volume of gathered data is used for generating reports on the performance and capabilities of a satellite receiver.

The system has been successfully deployed and is currently in operation, reporting highly promising results.





# 11

## Content Distribution Platform



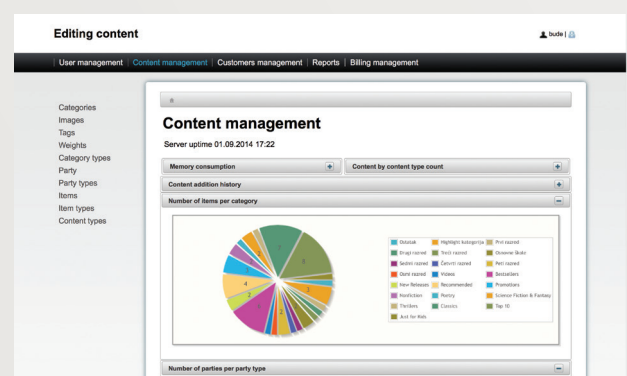
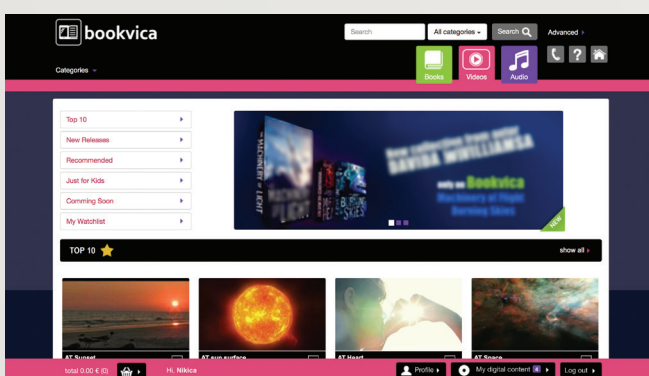
One of Amphinicy's unique products is a platform for digital content distribution. The platform is designed to allow distribution of any kind of digital content over different types of networks using various digital right management (DRM) systems.

### How?

Amphinicy Digital Content Distribution Platform supports management, lending and selling multiple kinds of digital content. The modular and cutting-edge technology platform enables easy integration in your environment, to match your business model.

The platform can be easily integrated with VSAT platforms and OTT VoD services can be offered in no time. The idea of the system is to easily adapt for VSAT networks usage and adapt the digital content prices in optimal way. Some of the examples are archiving of content for broadcasters, e-learning for humanitarian organizations, multicasting of multimedia to oil rigs or cruisers and much more!

For the time being, the system is in use in an e-learning pilot project in cooperation with the Croatian government - digital school books distribution in primary schools in Croatia.



## 12 Mobile Solutions

Hand in hand with our multimedia development, Amphinicy is constantly involved in the development of mobile solutions. The first few projects were directed to driving mobile development towards satellite multimedia user experience (iTV, 3DTV), but as smartphones became omnipresent, more and more solutions got oriented towards satellite technologies. This huge positive trend is especially visible in the area of automation in installing VSATs on the one hand, and dashboard-like monitoring on the other. Almost all smartphones today have an integrated GPS, a gyroscope and a compass, which opens the door to many opportunities.

### Where?

Amaphinicy was involved in various areas of development, and here are some examples of applications from our opus:

- Installer tools for VSAT line-up - a visually guided tool using sensors to point VSAT correctly, including polarization settings
- Client for remote commissioning systems (including X-pol measurement)
- Solar panel angle adjustment for VSAT networks in disaster-struck areas
- Android device as a 3D iTV remote controller
- Location-based advertising on mobile phones
- VoIP application for VSAT networks in disaster-struck areas (based on the G.729 coding algorithm)
- CMS for UN's core relief items management, and mobile procurement applications
- System for easy creation, publishing and synchronizing of documents on mobile devices (e.g. updating user manuals automatically in ePub format on smartphones)
- ePub readers for Android and iOS platforms

### Main challenges and responsibilities:

- Involved in providing mobile solutions for the satellite industry, in all phases of an app's lifecycle: design, implementation, deployment and maintenance
- Providing complete solutions for huge organizations (e.g. SES, UN...)
- Major platforms supported (iOS, Android)
- Experience with mobile platform-independent frameworks (PhoneGap, MoSync)





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