**SATELLITE OPERATORS**

An Organisation which owns and operates on or more satellites is called a Satellite Operator.

The satellites used for communications are all placed on the geostationary arc, which is above the equator at 36000 Km height.

At this specific arc, the satellites move around the Earth with the same angular velocity as the Earth moves around its axis and therefore are always above the same point on the equator.

They are called geostationary satellites and are used to provide telecommunications services.

A geostationary communications satellite has the ability to cover from a single point in the sky, a large geographical area, about one third of the Earth’s surface.

Three geostationary satellites are therefore needed to cover the entire surface of the Earth.

Satellites have been used since the early 1960s for a variety of communication services: voice, fax, Television.

Recently, with the addition of newer frequencies and advances in satellite technology, geostationary satellites are used to provide fast internet direct to home users

Lets look at a few Operators

Olympus satellites

<http://www.olympus-sat.com/index.php>

- Olympus Satellites Company has secured via the Republic of Cyprus and ITU 9 geostationary orbital locations

- Three (3) of these will be utilized in order to implement a world-wide satellite system covering all earth on land, sea and air.

- Each satellite will have two control stations, one prime and one redundant.

- These will be located in Cyprus as well as in other place(s) that will be required.

- Each satellite will have the appropriate antennas in order all signals from all antennas will be

 routed to the control stations.

- The control stations will be used to monitor all satellites on a 24 hour basis.

- Each satellite will download thousand of telemetry data, every few seconds, which will be analyzed

by special processors in real time and will serve about 5 Million of subscribers/users simultaneously

- The telecommunication services will be provided by specific spot beams from each satellite

 Each satellite will offer all types of satellite communications in Ka-Band, but it is anticipated that 95% will be utilized for Broadband (fast) Internet

- Olympus Satellites Company has secured via the Republic of Cyprus and ITU nine (9) geostationary orbital locations for the implementation / launching the Olympus system that will cover all Earth on land, sea and air by providing satellite communications and fast internet

- The Launch of all satellites will take place in Cape Canaveral in Florida or through “Proton Launcher” (ILS Company) in Kazakhstan in order to extent life of satellites two (2) or more years.

- System can be upgraded to 6 or 9 satellites, servicing double and triple subscribers thus up to 45 Million out of the today +/-3.5 Billion internet users

- The Satellite Operator of our system will be one of the first in the worldwide market that will have a global telecommunication cost effective system in Ka Band that will cover Earth, offering communication/internet services on land, sea and air”

- Our three Satellites main activities are to provide High Speed Internet (Send/Receive) in worldwide basis

servicing the entire world of real internet users (Today worldwide live users are more than 3.5 Billion

- The system of three satellites, covering the Earth with specific spot beams, offering two-way communications

services in broad band, upon successful launch of the three satellites, is estimated to be worth 4 times the

capital expenditure

- The High Speed Satellite Internet is the most profitable and no risk business worldwide, as internet

has become the most important tool to everyone in our daily life.

Olympus Founder

http://www.olympus-sat.com/founder.php

Olympus founder and Managing Director Dr. Christos Fellas (Spacecraft Engineering Consultant) has a vast performance and high experience in the design, procurement, monitoring and launching of various types of Satellites (Dr. Fellas has 23 successful satellites manufacture and launch up to date) where with pride we nominate the Hellenic/Cypriot telecommunication satellite HELLAS SAT that well manufactured and successful launched on May 2003.

Dr Christos Fellas, was overall responsible for the definition and the implementation of the Hellas-Sat Project. He was the main responsible for the procurement of the satellite, including the monitoring of the manufacture, integration and test of the satellite, the launch services and launch campaign (Spacecraft Mission Director), launch interfaces between spacecraft manufacturer and launch agency, Launch and LEOP operations as well as in-orbit tests.

Christakis N. Fellas CV

http://www.olympus-sat.com/catalogues/ChrisFellasCV.pdf

Consultant to Olympus Satellites Ltd since 2012.

"Conceptua"l Design of a Global three Satellite System in Ka-Band offering communication services in

Land, Sea and Air

Consultant to MEASAT from 2011-2012 Monitoring the manufacture, assembly Integration and test of all manufacturing activities associated with

MEASAT 3b satellite, at ASTRIUM, Toulouse, France.

Consultant to ARABSAT from 2009-2011

 duties in relation to Arabsat 5A, 5B and 5C include among others:

- Participation in design reviews PRD and CDR

- Monitoring all test activities at unit, subsystem and system level

- Participating selectively at MIPs

- Participating at Test Data Reviews

- Attending MRBs (on class 1 NCRs)

- Reporting to Arabsat Management on progress

- Validating IOT data and participating in TRBs (Test Review Boards)

Consultant, Planet Sky Orbital from 2007-2009

Conceptual design of a global Maritime and Aeronautical Broadband service utilizing the Ka-Band.

Defining the five orbital slots to be used for four satellites and one in-orbit spare and filing the necessary

orbital slots via the Republic of Cyprus.\*\*\*\*\*\*\*\*\*\*RISK Defense & Safety Company is based in Cyprus and is one of Olympus Satellites Business and Strategic partners\*\*\*\*\*\*\*\*\*\*\*\*\*

08/2006 to 01/2007: ESA RESIDENT

ESA Resident at Astrium Stevenage and Portsmouth monitoring the development, manufacture,

assembly integration and test of the HYLAS Spacecraft (by AVANTI Communications).

Monitoring six other ESA future payload development projects.

08/2003 to 08/2006: HELLAS-SAT SPACECRAFT MANAGER

Responsible for the proper operation of the Hellas-Sat Satellite System and the training of operators for

station keeping and payload configuration and re-configuration

03/2000 to 07/2003: HELLAS-SAT PROJECT MANAGER/MISSION DIRECTOR

Overall responsibility for the definition and the implementation of the Hellas-Sat Project.

Procurement of the satellite, including the monitoring of the manufacture, integration and test of the

satellite.

Procurement of the launch services and responsible for the launch campaign (Spacecraft Mission

Director).

Responsible for the launch interfaces between spacecraft manufacturer and launch agency. Responsible

for Launch and LEOP operations as well as in-orbit tests.

Other duties included participation in frequency co-ordination, preparation and approval of all technical

specifications relating to Hellas-Sat and approval of all waivers.

1996 to 2000: SATELLITE ENGINEERING CONSULTANT

2000: NILESAT 102

1997 to 1998: NILESAT 101 and ST1

Monitoring the manufacture and testing of payload units:

-TT&C transmitters, receivers

-TWTAs and Upconverters

-Troubleshooting of failures and approval of design changes

- Payload Integration and end to end tests

- Launch preparation activities

- In-Orbit tests

1990 to 1995: INTELSAT Spacecraft Engineering Consultant and PA Representative

Project Management of European operations on the INTELSAT VII & VIIA spacecraft

- Satellite Antenna Design

- Monitoring the manufacture and testing all units made in Europe:

• TT&C transmitters,

• Receivers, TWTAs and Upconverters

• Troubleshooting of failures and approval of design changes.

• Panel Integration activities at Alcatel Espace - MRBs & TestReviews -Data approval - Milestone

reviews

• Monitoring of qualification of new units – failure investigations.

 Design modifications approval.

• PA Representative (1993-1994) - MRB closures

1982 to 1990: BRITISH TELECOM INTERNATIONAL

- Preparation and approval of the RFP for the INMARSAT III Satellite procurement program

- Definition of the technical requirements of the Space sector.

- Evaluation of the technical part of the 5 proposals received by Inmarsat, on behalf of

 UK signatory.

- Inmarsat II satellite procurement - monitoring and reporting on the progress in the manufacture,

integration and test of 2nd generation Inmarsat spacecraft

- Navigation by satellite. Three satellite Global Navigational system – Conceptual Design

- CCIR XVIIth Plenary Assembly - member of UK Working Group 8D (Satellite Applications for Mobile

Services, Terrestrial and Aeronautical)

- Passive intermodulation at C-Band and L-Band

- Radiopaging via Satellite 1986 - 1988 - initial concept, design and manufacture of breadboard and

prototype Radiopaging Satellite Receiver.

- Inmarsat II Spacecraft, Tender Evaluation on behalf of the UK signatory

1984 to 1988: BRITISH TELECONSULT

Senior Consultant to INTELSAT responsible for monitoring the performance of the contracts for the

supply of spacecraft hardware in Europe destined for the INTELSAT VI spacecraft - monitoring the

production and testing of Receivers and Multiplexers manufactured at ATES in the Toulouse, and the

TWTs manufactured at Thomson-CSF Velizy.

1982 to 1984: UNISAT Project

- Assistance Spacecraft Manager Unisat project

- Conceptual definition of UK Direct Broadcasting Satellite - monitoring manufacture and testing of

spacecraft hardware.

1979 to 1982: BRITISH AEROSPACE, SPACE AND COMMUNICATIONS DIVISION

- EMC (Electromagnetic Compatibility) ECS, Marecs

- Electrostatic Discharge problem - Invented a new method for eliminating discharges caused by charge

built-up (See Publications Papers and Patents).

- Electrical interface engineer on the L-Sat project (Olympus).

1977 to 1979: GEC-MARCONI, SPACE AND DEFENCE SYSTEMS, STANMORE

- Electronic Warfare Systems and Devices.

- Microwave systems design and performance calculations for Early Warning Receivers.

- Microwave Equipment Design - designing microstrip and stripline devices: mixers, couplers, filters, etc.

Publications by Christakis N. Fellas

I. Xenon Induced Instability in Nuclear Reactors - M.Sc. Thesis, 1972, University of Aston, Birmingham, UK..

II. The Response of Scintillator to Very Heavy Irons - Ph.D. Thesis, 1977, University of Surrey, Guildford, Surrey, UK.

III. Publication number US4433201, A laminar plastics material sheet including a transparent, electrically conductive layer used to cover the front and/or rear surfaces of a spacecraft solar array to alleviate electrostatic charge build-up thereon due to electron bombardmen

Publications numbers 06374022, 374022, US 4433201 A, US 4433201A, US-A-4433201, US4433201 A, US4433201A

Papers by Christakis N. Fellas

a. The Response of CsI (TI) to Energy Degraded Fission Fragments - IEEE Transactions on Nuclear Science NS-22, 1975, P. 93-95 (C. N. Fellas, W.G. Gilboy and D.A. Ginger).

b. An Arc-Free Thermal Blanket for Spacecraft use - IEEE Transactions on Nuclear Science NS-27, 1980, p. 1802-1807.

c. The Design of an Arc-Free Thermal Blanket - NASA Proceedings of the 3rd Spacecraft Charging Technology Conference, November 1980, USAF Academy, Colorado Springs, USA. NASA Conference publication 2182, AFGL-TR81-0270, p. 261-266.

d. Improved Anti-Static Thermal Blankets - IEEE Annual Conference on Nuclear and Space Radiation Effects, July 1981, University of Washington, Seattle, USA.

IEEE Transactions on Nuclear Science NS-28, No. 6, December 1981. P. 4571-4575.

e. Internal Charging of Indium Oxide Coated Mirrors - IEEE Annual Conference on Nuclear and Space Radiation Effects. July 1981, University of Washington, Seattle, USA.

IEEE Transactions on Nuclear Science NS-28 No. 6, December 1981. p. 4523-4528.

(C.N. Fellas, S. Richardson).

f. A Solution to the Spacecraft Charging Problem - The Institute of Physics Symposium on

Electrostatics, April 1980, Journal of Electrostatics, 11 (1982) p. 281-296.

g. Anti-Static Coat, for Solar Arrays - Proceedings of 3rd European Symposium "Photovoltaic Generators in Space, Bath, May 1982 (ESA-SP-173 June 1982) p. 305-307.

h. Spacecraft Charging - How to make large Communications Satellite immune to Arcing - Proceedings of International Symposium on Spacecraft materials in Space Environment.

(June 1982) ESA Publication SP-178, p. 305-309.

i. Altering the Electrical Conductivity of Dielectrics - IEEE 1982 Annual Conference Electrical Insulation and Dielectric Phenomena. October 1982 (University of Massachusetts) p. 222-227.

Patents by Christakis N. Fellas

a. Thermal Control Materials for Satellites

UK Application No. 7938717 filed 8 November 1979

UK Application No. 8022867 filed 12 July 1980

UK Application No. 8028615 filed 4th September 1980

UK Application No. 8018037 filed 2nd June 1980

UK Application No. 8035523 filed 4th November 1980

Published by the Patents Office, London, on 20th May 1981 and given Official Serial Number 2 062 189A.

USA Appilcation No 4489906 filed 24th August 1983 (British Aerospace Company)

USA Filing Number 204, 703, filed on 6th November 1980

b. Anti-Static Coat for Spacecraft Solar Arrays

UK Application No. 8113615 filed on 1st May 1981

Dimitrios G. CHALAMPALIS CV

1986: Computer Scientist and Senior Project Manager

2004: Executive Management

Executive Protection

Risk Analysis

Risk Assessment

Risk Management

2005: Threat Management

Commanding techniques & Communication Skills

Human Resource Management

Security Plan

2006: Instructors course in security protection

Currently at

Defense Advisor at INTERNATIONAL ARMOUR Co. (www.armour.gr) \*\*\*\*\*\*\*INTERNATIONAL ARMOUR Co is aslo one of the Olympus Satellites Business and Strategic partners\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

INTERNATIONAL ARMOUR (Greece) is a NATO certified Company with NATO CAGE Code G2181,

is ICoC signatory Company, UN registered supplier, has obtained from the Hellenic Republic - Ministry

of Public Order / Ministry of Defense.

INTERNATIONAL ARMOUR has official certified branches in the Republic of Serbia, in the Republic

of Cyprus and in United Kingdom in order to serve its clients with accuracy and accountability

worldwide. \*\*\*\*\*\*\*\*\*\*\*\*\*again Cypres \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Advisor at RISK DEFENSE & SAFETY - Cyprus (www.risk-international.gr) \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*One of the Olympus Satellites Business and Strategic partners\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

RISK INTERNATIONAL is a Defense, Safety, Advanced Technology and Security Training Company

(ICoC Signatory) with worldwide interests, working and complying under the highest market standards.

Company cooperates in close with all affiliated companies of group and strategic partners in worldwide

basis established by expertise members of the international safety and defense industry

Consultant at AVISTA VENTURES (www.avista-ventures.com)

With an extensive experience in marine business, AVISTA VENTURES has been successful in servicing

a strong worldwide base of clients who commands quality products, services, consultants and turnkey

solutions on time and at the best market prices.

As a reputable company with officials with more than 25 years of experience in the International Marine

Business, AVISTA VENTURES is all the time able to meet the challenging demands of its clients

offering a wide range of services and products in all respective fields within the scope of its business.

Advisor at AVERSA LTD - Bulgaria (www.aversa-group.com)

AVERSA is an International Business Consultant Company, Security Risk Management expertise, high

technology, banking and commercial services providers and products suppliers, e-commerce and payment

solutions services Company.

Company’s main business is trusted intelligence, investigations and advisory services including security

risk management, cyber security, data recovery and payment gateway services to big and VIP merchants

by eliminated their electronic (e-commerce) business risks.

AVERSA's board of directors and personnel is constituted by expertise specialized in identifying,

remediating and monitoring risk across all our clients enterprises.

Systems Analyst at OLYMPUS SATELLITES (www.olympus-sat.com)

Olympus Satellites Company established in Cyprus and is legal Licensed as Satellite Operator.

The business scope of the company is to provide a global advanced state of design satellite system,

offering communication services on land, sea and air under a constellation of three to nine geostationary

satellites in Ka-Band.

Previous Position:

2012 - 2015: Security Consultant at POSEIDON GROUP

2012 - 2015: Security Consultant at POSEIDON MARSEC COMPANY

2003 - 2009: Training Consultant at RISK INTERNATIONAL P.S.I.

2003 - 2012: Security Consultant at RISK INTERNATIONAL SECURITY MANAGEMENT SA

2003 - 2007: Honorary President at IBA HELLAS

2003 - 2009: General Manager at RISK INTERNATIONAL DEFENCE

1989 - 2009 Director General at INFOMATIC SYSTEMS & TECHNOLOGY LIMITED

Business Summary & Activities:

- Founder of "AVERSA LTD" - Bulgaria (Est: 2013)

- Founder of "AVISTA VENTURES COMPANY" - Marshall Islands (Est: 2015)

- Founder of "INTERNATIONAL ARMOUR Co" - Greece (Est: 2008)

- Founder of "RISK DEFENSE & SAFETY (RDS)" - Cyprus (Est: 2012)

- Founder of "INTERARMOUR (CY)" - Cyprus (Est: 2015)

- Founder of "INTERNATIONAL ARMOUR" - United Kingdom (Est: 2015)

- Founder of "INTERNATIONAL ARMOUR" - Serbia (Est: 2015)

- Founder of "RISK INTERNATIONAL SECURITY MANAGEMENT SA", an Executive Security

Services Company (Est: 2004)

- Founder of "RISK INTERNATIONAL PROTECTION SCIENCES INSTITUTE Ltd", a Security and

Law Enforcement Training Institute (Est: 2004)

- Founder of "RISK INTERNATIONAL DEFENSE Ltd", a Defense and High Technology Security and

Safety Products and Services Company (Est: 2003)

- Founder of "INFOMATIC SYSTEMS & TECHNOLOGY Ltd", a High Technology Systems and

Software Company (Est: 1989)

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*founder of all the Olympus Satellites Business and Strategic partners"

Olympus Satellites Business and Strategic partners

Olympus Satellites has the full support and is officially cooperate as main business and strategic partner with International Armour Co in Greece, AVISTA VENTURES Company in Marshall Islands, AVERSA Company in Bulgaria, Vassili Group in Seycheles and RISK Defense & Safety Company in Cyprus.

All these Companies are fully support Olympus Satellites project as the people behind are expertise for many years in high technology telecommunication systems related to defense, security and safety (sea and land organizations)

Satellite Design

- MARECS

- ECS

- LSAT

Satellite Procurement

- UNISAT

- INMARSAT 2

- INMARSAT 3

- HELLAS SAT Monitoring - Assembly Integration - Test - Launch

- INTELSAT 6 (5 Satellites)

- INTELSAT 7 (5 Satellites)

- INTELSAT 7A (4 Satellites)

- NILESAT (2 Satellites)

- ST1

- HELLAS SAT

- HYLAS

- ARABSAT 5 (3 Satellites)

- MEASAT

Affiliate links on "the Founder" tab

AVISTA VENTURES MARINE SERVICES

http://www.avista-ventures.com/index.php

Partnered with KYPROSUN

Combining traditional person to person contact with the best appropriate, modern technology and a constant monitoring of the quality of products and the standards of services provided, AVISTA VENTURES serves the needs of all sectors of the International Maritime Market.

"We take pride in our experience. We are one of the oldest firms in maritime industry while the people behind the name have been in this business for many years servicing vessels and shipping companies in various positions complying and accomplish all their maritime needs"

Responsibility in the following major tasks:

 Port Agency

- Operators

- Maritime Security

- Ship Management

- Yacht Management

- Technical management

- ISM / ISPS management

- Crew management

- Ships / Yachts Chartering

- S&P (Ships / Yachts)

- Chartering Services

- Accounting & Financial management

- Insurance Arrangements.

- Legal Services & Consulting

- Claim handling

- Ship’s detention & arrest

- Arbitrations

- Marine casualty

- Salvage

- Flag registrations

Current projects

Olympus TeleCommunication Satellites Constellation

NEW MarSec floating armory

AVISTA Ventures and INTERNATIONAL ARMOUR are in the process to locate a new ocean going ship legal licensed to act as a Maritime Security Floating Armory in Gulf of Oman or in Red Sea (subject to the final decision of Companies marketing department research), in order to provide full accommodation, services and equipment storage to MARSEC Companies under Hotel Standards.

http://www.armour.gr/farmory.php

DEC 2015: Up to date, 84 MARSEC Companies declared their real written interest to use our forthcoming floating armory under special prices, terms, conditions and priorities.

Airline project

http://www.avista-ventures.com/projects.php

AVISTA Ventures and Cpt. Theodoros Kokmotos founder of CRONUS AIRLINES, GALAXY AIRWAYS and ALEXANDAIR are in the process of an investment in a new airline company that will connect countries of Africa with Europe but also some Asian countries.

Project will be start as soon as the relevant funds will be retained for the investment in small

as well as big size airplanes.

See the below PDF for Plane fleet details

http://avista-ventures.com/catalogues/airlinesproject.pdf

Affilaite links on site

INTERNATIONAL ARMOUR DEFENCE AND SAFETY

http://www.armour.gr/farmory.php

http://www.avista-ventures.com/projects.php

http://ats.com.jo/

INTERNATIONAL ARMOUR DEFENCE AND SAFETY

http://www.armour.gr/p03.php

MINISTRY OF PUBLIC ORDER CERTIFIED

MINISTRY OF DEFENSE CERTIFIED

ICoC SIGNATORY COMPANY

NATO CERTIFIED (NCAGE CODE G2181)

UNGM REGISTER COMPANY (400640)

We are ICoC signatory company, NATO certified Company, we have obtained from the Hellenic Government - Ministry of Public Order/MOD - all relevant commercial and services licenses and we have meet all the criteria and qualifications, under law, to provide defense and security products and services in all aspects of the safety industry.

We only legal trade with countries/companies that are not under any sanction by the UN and the EU

SECURITY TRAINING (VIP / GUARDING / PERSONNEL / MARITIME SECURITY)

In co-operation with RISK DEFENSE & SAFETY, RISK P.S.I. and AVANT GARDE

Cyprus, we offer high certified education programs in Executive Protection,

Counter Terrorism / Counter-Piracy Studies and Intelligence Operations

Management.

Projects

NEW MarSec floating armory with AVISTA Ventures

http://www.armour.gr/farmory.php

We only legal trade with countries/companies that are not under any sanction by the UN and the EU

Affiliates

http://alfasecuritygroup.com/

Alfa Security Group, is a private security company that provides an array of security services and technology-enabled solutions like consulting, threat and risk analysis, security management, technical design, security engineering, mobile and site security, logistics, intelligence, medical, IT & communications, training, camp construction, critical infrastructure protection, post-conflict reconstruction, operations and maintenance, humanitarian work and emerging market requirements. We are committed to legal, moral, ethical behaviour and support global initiatives including the International Code of Conduct for Private Security Companies, the United Nations Global Compact and Voluntary Principles on Security and Human Rights.

Vassili Group

http://www.vassili-group.com/

Services and solutions for green energy, development, light steel construction and infrastructure globally, focusing on turn-key services and turn-key bespoke services that are unique to each project and Coordination and Consulting services to the Energy, Construction and Infrastructure global markets.

PLEASE NOTE: The Vassili Group Ltd is registered with the United Nations-UNGM, however, any mention of any UN Agency, Government, Government Agency, European Commissions or European Union within our website is purely for the purpose of expressing their independent activities and are unrelated to the Vassili Group. The Vassili Group Ltd is not a Government Agency, UN Agency or European Commissions Agency.

http://www.vassili-group.com/space-satellites---internet.html

Providing a global satellite system, offering communication services on land, sea and air. In particular the Aeronautical service, which is only available over North America by the USA Air Force, will be available worldwide, when all three satellites are implemented.

Further all, today all shipping companies are ready to pay even more for bandwidth as long as the service is available, stable and above all it is working! Taking into account the market size and the rate of growth in demand for fast mobile internet, the new Satellite system proposed here, is utilizing the Ka-Band, which offers substantially more spectrum to users.

As a result from this investment of three (3) satellites, we expect the acquisition of market share in high speed satellite internet service, equal to 0.4% (as minimum) of today’s almost 3.5 billion worldwide internet real users, thus up to 13.5 million subscribers within 2 years. It is anticipated that this market penetration will continue for the rest of the Satellite’s life (15 years in total from the satellite launch date).

Cellular phones, streaming entertainment, data communications, civil and commercial providers; they are all placing incredible strains on available spectrum bandwidth. In the electromagnetic spectrum, many NASA missions use what is referred to as S-band, and commercial businesses are putting pressure on the government to free up other bands within the electromagnetic spectrum.

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NASA saw this trend years ago and started opening up a new part of the electromagnetic spectrum called Ka-band. With the need to speed up transmission of high-rate science data from space missions, Ka-band, at 26 GHz, is now considered the spectrum of the future for NASA communications. Compared with S-band, Ka-band has data transmission rates that are hundreds of times faster.

http://www.nasa.gov/mission\_pages/station/research/news/ka\_band

The Ka-Band offers frequency re-use by splitting the service area into cells, very much like the mobile telephony system GSM. This system based on a minimum of three geostationary satellites will offer high speed internet services to mobiles, aircraft, ships at sea as well as land based systems.

The KA-BAND INTERNET SPACE SATELLITE TECHNOLOGY PROJECT is Known as ELEFTHERIA 2629

Glenn Research Center won an R&D 100 Award for development of the NASA/Harris Ka-Band Software-Defined Radio.

This is the first fully reprogrammable space-qualified radio of its kind operating in the Ka-Band frequency range. By providing the ability to upload new software applications once deployed to space, this radio offers future space missions flexibility to recover from problems during development, while on orbit and even adapt to new science opportunities.

There seems to be little mention of satellites

The radio was integrated into the Space Communications and Navigation Testbed on the International Space Station on July 20, 2012, and is now fully operational. Experiments are currently underway, leveraging reprogrammability and the high data rate Ka-Band link from the space station through the Tracking and Data Relay Satellite System.

http://www.nasa.gov/press/2013/november/nasa-glenn-honored-with-rd-100-awards/#.VsSwpPl95ph

Now it did mention Tracking and Data Relay Satellite System (TDRS) but

"Band link from the space station through the Tracking and Data Relay Satellite System"

So it the earth based link system in this case.

SDR on the ISS and a ground station, not a satellite.

But below is the general information

The TDRS Project is building three space communications satellites that are part of a follow-on spacecraft fleet that will replenish NASA's Space Network. The TDRS Project Office at Goddard Space Flight Center manages the TDRS development effort. TDRS is the responsibility of the Space Communications and Navigation (SCaN) office within the Human Exploration and Operations (HEO) Mission Directorate at NASA Headquarters in Washington D.C. Operations of the network are the responsibility of the Space Network Project at Goddard.

In December 2007, NASA signed a contract for Boeing Space Systems to build two third generation TDRS spacecraft for launch in 2013 and 2014. An option for a third TDRS spacecraft was executed in 2011. Within the contract there were required modifications that would enable the White Sands Complex ground system to support the new spacecraft.

The January 30, 2013 launch of TDRS-K began the replenishment of the fleet through the development and deployment of the next generation spacecraft. Replenishment continued with TDRS-L, launched January 23, 2014. TDRS-M will be ready for launch in 2015. These satellites will ensure the Space Network's continuation of around-the-clock, high throughput communications services to NASA's missions; serving the scientific community and human spaceflight program for many years to come.

Space Craft??

http://tdrs.gsfc.nasa.gov/

History

http://tdrs.gsfc.nasa.gov/tdrs/114.html

http://tdrs.gsfc.nasa.gov/tdrs/118.html

SCAN Testbed experiment on baord the ISS

Again "software defined radios (SDRs), and the antennas, avionics and other subsystems"

The testbed's purpose is to allow for the development, testing and demonstration of cutting-edge communications, networking and navigation technologies in the challenging environment of space.

These advances will enable technology developers and mission planners to understand how NASA can use SDRs in future missions as well as develop new concepts, such as new algorithms for determining orbits using GPS.

The technology also can help advance similar communications tools here on Earth.

SDRs are a viable technology for ground based platforms and are already being used in smart phones and other terrestrial applications

So GPS can utilize this radio and its "already being used in smart phones and other terrestrial applications"

This is the first NASA use of communications at Ka-Band using the new constellation of relay satellites. The SCAN Testbed also hosts the first Global Positioning System (GPS) L5 frequency (i.e., a unique aeronautical navigation band) space receiver to study an improved orbit determination capability using multiple GPS frequencies.

http://www.nasa.gov/mission\_pages/station/research/experiments/162.html

SDR is also apparently on the rover Curiosity.

The SCaN Program Office in the Human Exploration and Operations Mission Directorate at NASA Headquarters in Washington manages, oversees and funds the testbed.

Space Telecommunications Radio Standard (STRS) is NASA's standard for common SDR interfaces radio and reconfiguration. The testbed's experiments will contribute SDR applications to the STRS repository, and will enable future hardware platforms to use common, reusable software modules to facilitate interoperability across platforms, and reduce development time and costs.

http://www.nasa.gov/mission\_pages/station/research/news/scan\_testbed\_communication.html

The SCaN Testbed Cooperative Agreement notice allows for academia to use the testbed. The first NASA-external users are expected to run experiments on the testbed by 2014.

https://spaceflightsystems.grc.nasa.gov/sopo/scsmo/scan-testbed/potential-experimenter-information/

The radios provide different and complimentary capabilities while having the ability to reconfigure their functions based in signal processing hardware (e.g., processors or field programmable gate arrays). The functions performed by the radios include communication with the Tracking and Data Relay Satellite (TDRS) system in both S-Band and Ka-Band, receive Global Positioning Satellite (GPS) signals, and enable proximity communications between the International Space Station (ISS) and approaching vehicles.

The hardware consists of a flight enclosure mounted on a Flight Releaseable Attachment Mechanism (FRAM). There are five main components of the payload: the avionics system, the software defined radios, the radio frequency (RF) subsystem, the antenna pointing system, and heaters. Except for the five externally mounted antennas, most of the subsystems are installed on the inside of the enclosure.

Space Applications

The SCAN Testbed offers different radio hardware providers and various software providers a chance to demonstrate their capability in space, and tests a new communications capability for future space missions. A flexible radio system would allow spacecraft crews and ground teams to recover from unpredicted errors or changes in the system. Using the same hardware platform for various missions, and only changing the software to meet specific mission needs, would also reduce costs and risks .

Earth Applications

Radio technology designed for use in space could also be used in ground-based platforms that have limited memory and processing capability. Studying a common, open, software architecture for use in space could spark the development of open technology standards for other radio uses on the ground, such as satellite radio.

Operations

Operational Requirements

SCAN Testbed requires a frequency assignment between the flight system on ISS and TDRS at S-Band and Ka-Band, as well as a command and control interface to/from the ground to the payload system to configure the radios and antenna systems. A data connection, separate from the ISS, provides a bi-directional connection between the radios and ground stations (e.g., White Sands). Individual SCAN Testbed experiments are conducted using the testbed on a regular basis, within operational constraints. Experiments are expected to be conducted on a weekly or bi-weekly basis, ranging from 60 minutes to several days in durations. In order to point antennas, the SCAN Testbed needs ISS position and attitude information.

Operational Protocols

SCAN Testbed is an external payload which requires no crew interaction. Commands are sent from the GRC Telescience Support Center (TSC) to configure and operate a radio for an experiment. A typical S-Band or Ka-Band experiment involves sending pseudorandom or network traffic experiment data to or from the on-board radios through the Space Network (SN) program satellites, the Near Earth Network (NEN) or various ground stations and the TSC. For GPS experiments, a radio is specifically configured to receive and process GPS signals. GPS data is collected on-board and sent to ground via telemetry. Various parameters and data quality measures are routinely manipulated and examined in order to determine the efficacy of the test software on the radios.

Related Publications

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Plane tracking

Alternitivce theories for KAL filight

<https://en.wikipedia.org/wiki/Korean_Air_Lines_Flight_007_alternative_theories>

Russian report – check this source as it sounds oddd

<http://www.rescue007.org/docs/ShifrinPressRelease1991-07-11.pdf>

## **Meaconing of KAL 007 and the attempt of assassination theory[[edit](https://en.wikipedia.org/w/index.php?title=Korean_Air_Lines_Flight_007_alternative_theories&action=edit&section=11" \o "Edit section: Meaconing of KAL 007 and the attempt of assassination theory)]**



KAL 007's increasingly deviated flight

[Meaconing](https://en.wikipedia.org/wiki/Meaconing) is the term to describe the interception and the rebroadcasting of [navigational signals](https://en.wikipedia.org/wiki/Radio_navigation) in order to confuse the sending aircraft as to its true location. (There is an assumption that the target does not have secondary navigational aids such as [INS](https://en.wikipedia.org/wiki/Inertial_navigation_system) or [radar](https://en.wikipedia.org/wiki/Radar_navigation)). This is a prelude to the deviation such as experienced by KAL 007 in its intended course from Anchorage Alaska to Seoul Korea. Meaconing had been used frequently during the Cold War. This theory often entails the following points which are shown to be true from the transcripts or assumed to be true by the holders of this theory:

* The pilots of KAL 007 clearly believed that they were on another course than that they were actually flying;
* Democratic Congressman [Larry McDonald](https://en.wikipedia.org/wiki/Larry_McDonald) was known to be aboard KAL 007 and he was considered the chief anti-Communist in Congress as well as the second head of the [John Birch Society](https://en.wikipedia.org/wiki/John_Birch_Society);
* Other anti-communist lawmakers were understood to have been with Larry McDonald aboard KAL 007 and were not known to have opted for another flight, KAL 015;
* These congressmen were North Carolina Sen. [Jesse Helms](https://en.wikipedia.org/wiki/Jesse_Helms), Idaho Sen. [Steven Symms](https://en.wikipedia.org/wiki/Steven_Symms), and Kentucky Rep. [Carroll Hubbard](https://en.wikipedia.org/wiki/Carroll_Hubbard). The intended destination and purpose of all these congressmen was ostensibly the Seoul celebration for the 30 year anniversary of the U.S. Korea Mutual Defense Treaty, but in actuality, the main purpose was for furthering the anti-Communist coalition, and activity.

It is sometimes suggested[[68]](https://en.wikipedia.org/wiki/Korean_Air_Lines_Flight_007_alternative_theories%22%20%5Cl%20%22cite_note-69) that the Soviet meaconing of KAL 007 was with the tacit approval or with the active participation and planning of leftist and socialist power centres in the U.S. Government;

Finally, in support of the meacon theory, this information that surfaced during the ICAO investigation and is considered indicative of purposeful intent to cause KAL 007 to go astray: At 28 minutes after takeoff, civilian radar at Kenai, on the eastern shore of Cook Inlet and 53 nautical miles (98 km) southwest of Anchorage, with a radar coverage of 175 miles (282 km) west of Anchorage, tracked KAL 007 more than six miles (10 km) north of its intended course. KAL 007, and all flights emanating from Anchorage, Alaska traveling along route J501 had to pass Cairne Mountain, which was the site of a nondirectional radio beacon (NDB). The NDB navigational aid operates by transmitting a continuous three-letter identification code which is picked up by the airborne receiver, the Automatic Direction Finder (ADF). Cairne Mountain was KAL 007’s first assigned navigational aid out of Anchorage Airport. That night, Douglas L. Porter was the controller at Air Route Traffic Control Center at Anchorage, assigned to monitor all flights in that sector and record their observed position in relation to the fix provided by the Cairne Mountain nondirectional beacon. Porter later testified that all had seemed normal to him.[[69]](https://en.wikipedia.org/wiki/Korean_Air_Lines_Flight_007_alternative_theories#cite_note-70) Yet he apparently failed to record,[[70]](https://en.wikipedia.org/wiki/Korean_Air_Lines_Flight_007_alternative_theories%22%20%5Cl%20%22cite_note-71) as required, the position of two flights that night: KAL 007 and KAL 015 which followed KAL 007 by several minutes. Had he done so, it would have provided an opportunity to warn KAL 007 of its deviation, resulting in the necessary correction for the rest of the flight. To holders of the meaconing theory, the above seem curious, ominous, and ancillary to their theory.

Ebook for KAL flight 007

https://books.google.com.au/books?id=Uj0\_CQAAQBAJ&pg=PT110&source=gbs\_toc\_r&cad=4#v=onepage&q&f=false

Find info on flight MH370

http://www.planesafe.org/books/desiredtrack.shtml/

GPS

CALCM new gen GPS for Missiles, RGM/UGM 109 for tomohawks

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United nations ICG – International committee on Global Navigation Satellite systems

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EISCAT

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Project Thunder struck – Radio systems archive looks like no sat

<https://www.google.com.au/url?sa=i&rct=j&q=&esrc=s&source=images&cd=&cad=rja&uact=8&ved=&url=http%3A%2F%2Fprojectthunderstruck.org%2Ftag%2Fradio-systems%2F&bvm=bv.114733917,d.dGY&psig=AFQjCNFNIEku2AeGwKRbkZpKTnjo-bhKtg&ust=1456067510744174>

Hand held GPS with WASS

<https://www.google.com.au/url?sa=i&rct=j&q=&esrc=s&source=images&cd=&cad=rja&uact=8&ved=&url=http%3A%2F%2Faviationmentor.blogspot.com%2F2006_12_01_archive.html&bvm=bv.114733917,d.dGY&psig=AFQjCNFNIEku2AeGwKRbkZpKTnjo-bhKtg&ust=1456067510744174>

Looks like no sat

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says No ILS, VOE/DME

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VDOR

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High Frequency VLBI

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ADSB WITH NO SAT REQUIRED IF IN MODE “S”OR SECONDARY SURVAILANCE RADAR (SSR)

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GROUND BASED COMMON SENSOR (GBCS) FOR AN/MLQ-38

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FM 34-25-1 :JOINYT STARS GSM

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Planes flying with dishes on them
<https://www.google.com.au/url?sa=i&rct=j&q=&esrc=s&source=images&cd=&cad=rja&uact=8&ved=&url=https%3A%2F%2Fwww.quora.com%2FWhy-are-US-Navy-planes-with-large-satellite-dishes-on-top-often-flying-around-the-airport-in-Charlottesville-VA&bvm=bv.114733917,d.dGY&psig=AFQjCNES26wsxdefF3CUaMz0K8g1jV5lKQ&ust=1456071242626223>

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**Geo-referencing radio position determination systems using co-located antennas
US 6218984 B1**

|  |  |
| --- | --- |
| **Inventors** | [Harold Lewis Longaker](http://www.google.com/search?tbo=p&tbm=pts&hl=en&q=ininventor:%22Harold+Lewis+Longaker%22), [Leonid Sheynblat](http://www.google.com/search?tbo=p&tbm=pts&hl=en&q=ininventor:%22Leonid+Sheynblat%22),[Nancy Nelson](http://www.google.com/search?tbo=p&tbm=pts&hl=en&q=ininventor:%22Nancy+Nelson%22) |
| **Original Assignee** | [Trimble Navigation Limited](http://www.google.com/search?tbo=p&tbm=pts&hl=en&q=inassignee:%22Trimble+Navigation+Limited%22) |
| **Export Citation** | [BiBTeX](http://www.google.com/patents/US6218984.bibtex), [EndNote](http://www.google.com/patents/US6218984.enw), [RefMan](http://www.google.com/patents/US6218984.ris) |
| [Patent Citations](http://www.google.com/patents/US6218984#backward-citations) (4), [Referenced by](http://www.google.com/patents/US6218984#forward-citations) (6), [Classifications](http://www.google.com/patents/US6218984#classifications) (12),[Legal Events](http://www.google.com/patents/US6218984#legal-events) (4) |
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**ABSTRACT**

The present invention is a method and apparatus for establishing a common datum georeferenced position of the phase centers of the antennas used by a system. The system includes a GPS receiver and an auxiliary transmitter. An auxiliary antenna of the auxiliary transmitter is co-located with a GPS antenna of the GPS receiver. The auxiliary antenna is at a known spatial relationship with the GPS antenna. An auxiliary position of the auxiliary antenna is determined based on the known spatial relationship.

BACKGROUND

1. Field of the Invention

This invention relates to radio position determination systems. In particular, the invention relates to geo-referencing the phase centers of antennas of different radio positioning systems that are being concurrently used.

2. Description of Related Art

The Global Positioning System (GPS) is a type of radio position determination system. The GPS is designed to provide users with position solutions on a worldwide, 24-hour-per day basis. However, there are occasions when the GPS by itself is not sufficient for a given task. For example, when the user's view of the sky is limited due to trees or other objects, the user may not be able to see a sufficient number of satellites for obtaining a position solution. For these and other reasons, it is desirable to augment the GPS with auxiliary positioning signals that use radio determination principles.

**PATENT CITATIONS**

| **Cited Patent** | **Filing date** | **Publication date** | **Applicant** | **Title** |
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| [US5935196](http://www.google.com/patents/US5935196) \* | Jun 11, 1997 | Aug 10, 1999 | Itt Manufacturing Enterprises | Technique for the use of GPS for high orbiting satellites |
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http://www.google.com/patents/US6218984

**System for sensing aircraft and other objects
US 8373591 B2**

**ABSTRACT**

http://www.google.com/patents/US8373591

A system for sensing aircraft and other objects uses bistatic radar with spread-spectrum signals transmitted from remotely located sources such as aircraft flying at very high altitudes or from a satellite constellation. A bistatic spread spectrum radar system using a satellite constellation can be integrated with a communications system and/or with a system using long baseline radar interferometry to validate the digital terrain elevation database. The reliability and safety of TCAS and ADS-B are improved by using the signals transmitted from a TCAS or ADS-B unit as a radar transmitter with a receiver used to receive reflections. Aircraft and other objects using spread spectrum radar are detected by using two separate receiving systems. Cross-Correlation between the outputs of the two receiving systems reveals whether a noise signal is produced by the receiving systems themselves or is coming from the outside.

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| **Also published as** | [US8643534](http://www.google.com/patents/US8643534), [US20110169684](http://www.google.com/patents/US20110169684),[US20130176163](http://www.google.com/patents/US20130176163) |
| **Inventors** | [Jed Margolin](http://www.google.com/search?tbo=p&tbm=pts&hl=en&q=ininventor:%22Jed+Margolin%22) |
| **Original Assignee** | [Jed Margolin](http://www.google.com/search?tbo=p&tbm=pts&hl=en&q=inassignee:%22Jed+Margolin%22) |
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| [Patent Citations](http://www.google.com/patents/US8373591#backward-citations) (26), [Non-Patent Citations](http://www.google.com/patents/US8373591#npl-citations) (22), [Referenced by](http://www.google.com/patents/US8373591#forward-citations) (2),[Classifications](http://www.google.com/patents/US8373591#classifications) (9) |
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| **External Links:**[USPTO](http://www.google.com/url?id=Kd_DBwABERAJ&q=http://patft.uspto.gov/netacgi/nph-Parser%3FSect2%3DPTO1%26Sect2%3DHITOFF%26p%3D1%26u%3D/netahtml/PTO/search-bool.html%26r%3D1%26f%3DG%26l%3D50%26d%3DPALL%26RefSrch%3Dyes%26Query%3DPN/8373591&usg=AFQjCNHZLk43ofQwPjxndSWLCI88jt2n1g), [USPTO Assignment](http://www.google.com/url?id=Kd_DBwABERAJ&q=http://assignment.uspto.gov/&usg=AFQjCNHoPWssUj8g7I7ZvJp8SPCTncwUEQ#/search?q=8373591), [Espacenet](http://www.google.com/url?id=Kd_DBwABERAJ&q=http://worldwide.espacenet.com/publicationDetails/biblio%3FCC%3DUS%26NR%3D8373591B2%26KC%3DB2%26FT%3DD&usg=AFQjCNFXi3EmpEaZloIRU2pCNtOEZDRvxA) |

GPS Radar Using a Phased Sensor Array by Alison Brown and Ben Mathews, NAVSYS Corporation. [IDS Cite 8]

As previously discussed, any entity that radiates an electromagnetic signal stands a good chance of being detected and possibly located, even if spread spectrum signals are used. The use of bistatic radar avoids this problem. Systems have been proposed using “unintentional radiators” such as FM broadcast stations, TV broadcast stations, and cell phone base stations. However, these sources cannot be relied upon to always be transmitting, and in a combat zone they are prime targets for anti-radiation missiles and other attacks. Because of the likelihood that any radiator can be detected and probably tracked, the solution is to make the transmitter difficult to attack.

One or more high-flying aircraft can be used as the transmitting source(s) for a bistatic radar system. One disadvantage of this method is that the technology race between aircraft and anti-aircraft missiles (and directed energy weapons) favors anti-aircraft missiles and directed energy weapons. An example of a directed energy weapon is taught by U.S. Pat. No. 6,377,436 Microwave Transmission Using a Laser-Generated Plasma Beam Waveguide issued Apr. 23, 2002 to Margolin (the present inventor). [IDS Cite 25] Another disadvantage of using high-flying aircraft is that it requires the close coordination of multiple assets.

The solution is to go higher and use a permanently orbiting constellation of satellites. It can be called the Global Radar System (GRS). Although this might resemble the method taught in U.S. Pat. No. 5,187,485 Passive ranging through global positioning system the purpose of the satellites is different and can be optimized to the mission.

* 1. GRS satellites will use higher power than GPS.
* The GPS constellation is in orbital planes approximately 20,200 km above the Earth (Medium Earth Orbit or MEO). The GRS constellation should be in Low Earth Orbit (LEO) in the range of 160 km-2,000 km.
One of the reasons for using LEO is that it is desirable to keep the existence of GRS a secret and it would be difficult to secretly launch and operate a constellation of satellites. Therefore, the GRS function should be hidden in a satellite constellation that has a non-secret mission. A prime candidate is a new satellite system for providing communications with UAVs around the world. For various reasons, communications with UAVs should have low latency, and a LEO system will have lower latency than a MEO system. The military's increasing use of UAVs and need for dedicated low-latency bandwidth justifies a dedicated satellite system using spread spectrum communications. The function of also providing a spread-spectrum signal for bistatic radar does not have to be publicly revealed. The need to have these “communication” satellites always transmitting can be explained as “continuous monitoring of system health.” Indeed, there is value for a User to know that the communications system is working and that a channel is available. It reduces POI by avoiding unnecessary transmissions. POI can also be reduced by using a directional antenna for transmitting and aiming it at an available satellite with the lowest POI. For example, the satellite most directly overhead may have the lowest POI in many situations. This presents the opportunity to provide an integrated bistatic spread spectrum radar system using a satellite constellation for the radar function as well as for communications.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| [US5181041](http://www.google.com/patents/US5181041) \* | Jul 2, 1991 | Jan 19, 1993 | Hughes Aircraft Company | Accurate location system using transponded and correlated LORAN signals |
| [US5724041](http://www.google.com/patents/US5724041) | Nov 22, 1995 | Mar 3, 1998 | The Furukawa Electric Co., Ltd. | Spread spectrum radar device using pseudorandom noise signal for detection of an object |
| [US6377436](http://www.google.com/patents/US6377436) | Apr 5, 2000 | Apr 23, 2002 | Jed Margolin | Microwave transmission using a laser-generated plasma beam waveguide |
| [US6650694](http://www.google.com/patents/US6650694) \* | Jun 30, 2000 | Nov 18, 2003 | Texas Instruments Incorporated | Correlator co-processor for CDMA RAKE receiver operations |
| [US6744408](http://www.google.com/patents/US6744408) \* | Mar 4, 2003 | Jun 1, 2004 | Rockwell Collins | Enhancements for GPS based bi-static radar |
| [US7292663](http://www.google.com/patents/US7292663) \* | Dec 1, 2004 | Nov 6, 2007 | L-3 Communications Corporation | Efficient space-time adaptive processing (STAP) filter for global positioning system (GPS) receivers |
| [US7737878](http://www.google.com/patents/US7737878) | Jul 8, 2008 | Jun 15, 2010 | Eads Deutschland Gmbh | Collision and conflict avoidance system for autonomous unmanned air vehicles (UAVs) |
| [US20090167607](http://www.google.com/patents/US20090167607) \* | Jul 26, 2006 | Jul 2, 2009 | Propogation Research Associates, Inc. | Methods, apparatuses and systems for locating non-cooperative objects |
| [US20100246547](http://www.google.com/patents/US20100246547) \* |  | Sep 30, 2010 | Samsung Electronics Co., Ltd. | Antenna selecting apparatus and method in wireless communication system |
| [US8744395](http://www.google.com/patents/US8744395) \* | Aug 11, 2010 | Jun 3, 2014 | Rockwell Collins, Inc. | System and method for mitigating radio frequency interferences |
| [US8952841](http://www.google.com/patents/US8952841) \* | Jan 13, 2012 | Feb 10, 2015 | Rockwell Collins, Inc. | System and method for TCAS based navigation |

Radar Conferance 2009 publications

<http://ieeexplore.ieee.org/xpl/tocresult.jsp?sortType%3Dasc_p_Sequence%26filter%3DAND(p_IS_Number%3A4976913)%26rowsPerPage%3D50&pageNumber=3>

# Design and implementation of Long Range Radar service life extension

http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=4977016&sortType%3Dasc\_p\_Sequence%26filter%3DAND%28p\_IS\_Number%3A4976913%29%26pageNumber%3D3%26rowsPerPage%3D50

# Wideband OFDM system for radar and communications

<http://ieeexplore.ieee.org/xpl/abstractKeywords.jsp?arnumber=4977024&sortType%3Dasc_p_Sequence%26filter%3DAND%28p_IS_Number%3A4976913%29%26pageNumber%3D3%26rowsPerPage%3D50>

# The CP140 Imaging Radar System AN/APS-508: Architecture and early flight test results

http://ieeexplore.ieee.org/xpl/abstractKeywords.jsp?arnumber=4977034&sortType%3Dasc\_p\_Sequence%26filter%3DAND%28p\_IS\_Number%3A4976913%29%26pageNumber%3D3%26rowsPerPage%3D50

# Improving the radar detection ange of low flying aircraft in clutter with ultra-widband short pulses and active side lobe reduction

http://ieeexplore.ieee.org/xpl/abstractKeywords.jsp?arnumber=4977035&sortType%3Dasc\_p\_Sequence%26filter%3DAND%28p\_IS\_Number%3A4976913%29%26pageNumber%3D3%26rowsPerPage%3D50

Images of ground satellite segments (pintrest)    <http://www.stylepinner.com/ground-satellite-segment/Z3JvdW5kLXNhdGVsbGl0ZS1zZWdtZW50/>

Google to launch 180 Satellites which are only 500 miles above earth when usual satellites are 22,000 miles above the earth and also purchased a drone making company called "titan Aerospace" which is expected to replace "project loon"

  <http://arstechnica.com/information-technology/2014/06/google-to-deploy-180-low-orbit-satellites-that-provide-internet-access/>

<http://arstechnica.com/information-technology/2014/04/google-buys-atmospheric-satellite-builder-titan-aerospace/>

Next Generaation satellites called JPSS will be a collaborative effort between **NOAA** and NASA.  The First launch of 5 satellites was on 28th October 2011 with the next one launching in 2017.

<http://www.jpss.noaa.gov/program.html>

## **Bandwidth Crunch Will Force Australian Broadband Project To Ration Capacity**

<http://spacenews.com/40503bandwidth-crunch-will-force-australian-broadband-project-to-ration/>

In a May 7th 2014 report on what remains the most ambitious broadband rollout of any of the world’s large nations, NBN Co. said it will incur substantial new costs as it moves customers scheduled for satellite service onto terrestrial wireless technologies and prepares to fund the additional terrestrial towers.

The “Fixed Wireless and Satellite Review,” compiled at the request of the Australian government and conducted with the Boston Consulting Group, highlights a phenomenon well known to the two U.S. satellite broadband providers, ViaSat Inc. of Carlsbad, California, and Hughes Network Systems of Germantown, Maryland.

ViaSat and Hughes are commercial enterprises. NBN Co., on the other hand, is under a government mandate to provide broadband connections to every Australian by 2021.

Most Australians will be served by NBN’s rollout of terrestrial fiber. But 3.5 billion Australian dollars ($3.2 billion) was reserved for fixed wireless and satellite technologies between 2012 and 2021. Given what it is finding out about demand for the services, the company has concluded it will need another 1.3 billion Australian dollars to complete the work.

NBN has contracted with Space Systems/Loral of Palo Alto, California, to build two large Ka-band high-throughput satellites for delivery in 2015 in a deal valued at 620 million Australian dollars and signed in February 2012. Each satellite will have 101 spot beams — 75 for highly populated areas and 26 larger beams for rural regions.

Europe’s Arianespace consortium will launch both on Ariane 5 heavy-lift rockets under a separate contract.

ViaSat is providing the ground network and consumer premises equipment.

The two satellites were scheduled to be launched within six months of each other, but NBN is now concerned that six months will be insufficient time to test the satellite system and correct any issues on the second. The company is likely to ask that the second launch occur a year after the first

The most recent assessment follows the experience of NBN’s Interim Satellite Service, provided by Optus Satellite of Australia and Thailand’s Thaicom IPStar Ku-band satellite. Gilat Satellite Networks of Israel is providing the ground terminals for that service.

ViaSat officials have reported the same issue in the United States, saying retailers have on occasion oversold the satellite service.

The company has tentatively decided to install fixed wireless towers in areas that up to now had been identified as satellite-service regions to take pressure off the beams most likely to be crowded. NBN said it is also likely to extend the Interim Satellite Service well beyond the arrival of its own satellites.

One of the complexities of the NBN project is that it has assigned geographic zones a given technology. Some will get fiber, others fixed wireless and others a satellite service. But for reasons of local geography, this results in a hodgepodge in which satellite, terrestrial wireless and fiber customers will live a few hundred meters from one another.

One effect of this finely tuned distribution of technologies by geographic location is that 6,000 of the 44,000 Interim Satellite Service subscribers are in areas where they will not be offered NBN’s satellite service. One reason for extending the interim service to 2017, and perhaps longer, is to give NBN time to transition these customers to fixed wireless.

## **BBC and ITV satellite moves cut off expat viewers**

<https://recombu.com/digital/article/bbc-and-itv-satellite-moves-cut-off-expat-viewers_M12792.html>

Tens of thousands of British TV viewers around Europe have lost touch with the BBC and ITV as broadcasters moved onto new satellites.

BBC channels began moving onto Astra 2E and Astra 2F on February 6th 2014 with ITV, Channel 4 and Channel 5 also moving over the next few days.

The new satellites delivers higher power over the UK and Ireland, but their tightly-focused beams drop in strength very rapidly beyond France, Belgium and The Netherlands.

Satellite operator SES publicised the swap in advance, with satellite enthusiasts, Anglophiles and expats across Europe tuned in through the early hours as the channels moved.

As with previous spot-beam reception, unexpected patterns appeared across Europe creating hotspots and notspots in fringe areas.

For instance, the official footprint of the two satellites doesn’t include the hotspot which seems to have emerged again over the Costa Brava, although even large dishes seem out of luck further south and west.

Ross Lockley, aka Analoguesat on the [satellites.co.uk](http://www.satellites.co.uk/forums/sky-freesat-fringe-reception.409/) forum, has mapped members’ reports onto Google Maps, creating a guide of dish sizes which might work.

Astra 2E and Astra 2F were launched in late 2013 and completed their in-orbit testing before Christmas, but couldn’t be put into action until SES and its European rival, Eutelsat, had reached an agreement over disputed frequencies.

In January, the satellite operators ended their dispute, which had run since both launched satellites to the 28 degrees East orbital position in the late 1990s.

An interim agreement had allowed both operators to use the position, but this expired last year as Astra prepared a new generation of satellites for 28E.

While early satellite TV signals blanketed the entire continent, the introduction of spot beams has allowed satellite operators to reuse valuable frequencies by targeting different areas from the same piece of orbital real estate.

TV satellites use a special orbit called the Clarke Belt (identified by the late science and science fiction writer Arthur C Clarke), 36,000km above the Earth’s equator.

At this distance - and nowhere else - satellites orbit the Earth at the same speed the planet rotates, so they appear to be stationary from the ground and satellite dishes don’t need a motor to follow them across the sky.

Spots in this geostationary orbit are allocated equally to every country, and usually leased out to commercial satellite operators like Astra.

EMAIL

Sat3

Are Satellites a hoax?

This might seem far fetched but lets have a look.

Did you kniw that a balloon was our first Communication "Satellite"

<http://www.space.com/8973-1st-communication-satellite-giant-space-balloon-50-years.html>

The Military even use balloons called Aerostats for Boarder protection.

This type of Balloon is referred to as a "Persistent threat detection system" and is primarily used for a missile defense system.
<http://www.lockheedmartin.com.au/us/products/lighter-than-air-vehicles/ptds.html>

<http://www.army-technology.com/projects/persistent-threat-detection-system-us/>

It remains teatherd to a ground cable and actually got loose once.
<http://www.dailymail.co.uk/news/article-3293852/Fighter-jets-track-military-blimp-drifting-Pennsylvania.html>

<http://www.foxnews.com/politics/2015/10/30/surveillance-balloon-program.html>

This thing is what is NORAD uses to monitor for incoming missile attacks. Isn't that weird?

The aerostats are also used for on ground communications with troops in areas where comms are limited like Afghanistan.

I guess after spending $2B on a run away balloon they can't afford satellite  phones to communicate with, I don't know, ALL THE SATELLITES THEY HAVE ALL ORBITING THE EARTH.

This article talks about how they couldn't use balloons or planes to relay signals which they usually do.
Now If the military can't get a satellite signal do you really think your phone or sports watch gets one?
And why are there black spots?

<http://www.afcea.org/content/?q=troops-afghanistan-bridge-communications-gap-0>

There is a long history of balloons in the military for communications.
Why do they have to use balloons like the tactical aerostats.?

[http://m.military.com/NewContent/0%2c13190%2cDefensewatch\_072105\_Helms%2c00.html](http://m.military.com/NewContent/0%2C13190%2CDefensewatch_072105_Helms%2C00.html)

[http://www.tcomlp.com](http://www.tcomlp.com/)

And why use things like spy planes and drones to take images?
Why not just take a picture with a satellite which give even civilians the detail on things like Google Earth?

Aerostats were originally teatherd to the ground

<http://fas.org/nuke/guide/usa/airdef/tars.htm>

But are now being developed into a HALE-D so it will hover untethered at 70k ft and "will be used in conjunction with low flying aircraft" for comms and monitoring.

The Balloons are not being phased out by satellites either.

Lockheed Martin are assisting Google
with a fleet to get Internet access to remote areas in a program called "Google loon"
<http://www.google.com/loon/>

Facebook are planning on  using drones for the same purpose.

Mark can't afford a satellite????

<https://www.inverse.com/article/9851-mark-zuckerberg-says-solar-powered-internet-drones-coming-later-in-2016?utm_source=facebook&utm_medium=inverse&utm_campaign=organic>

i think its odd that in 2016 companies as large as Google and Facebook would   Consider using a balloon or drone when we already have all these satellites in orbit or could easily have their own.

How many Satellites are in orbit?
Appatently there are so many in Geostationary orbit that countries are fighting over orbital slots.
Disputes like this are addressed through the International Telecommunication Union's (ITU) allocation mechanism.
<http://www.itu.int/net/newsroom/wrc/2012/features/satellite_regulations.aspx>

This organization is owned by the U.N and has basically been trying to censor the Internet for years.

around every 3 years ITU have a meeting to discuss regulations for Telecommunications.

In 2012 The U.S voted out regulations proposed at  WCIT-12 to prevent Internet control by ITU.
89 of 152 countries did sign the proposed regulations.

<https://en.m.wikipedia.org/wiki/Geostationary_orbit>

<https://en.m.wikipedia.org/wiki/International_Telecommunication_Union>

2012 doc
<https://www.google.com.au/url?sa=t&source=web&rct=j&url=http://www.acma.gov.au/~/media/Spectrum%2520Engineering/Information/Word%2520Document/RALI%2520MS%252038%2520docx.docx&ved=0ahUKEwjWmqaqwPrKAhXJnJQKHU43D4sQFggdMAE&usg=AFQjCNHc5rA6AbIfPTNaRxK2GAayXNaSKQ&sig2=KVKB9VghQ3pnr5rU1_yI4A>

In 2015 the ITU documemts had comments like this

"Navigation and safety at sea and in the air will feature in September and will include ITU's work in radar and satellite navigation as well as flight tracking in real time. On 24 September 2015, ITU will mark World Maritime Day to showcase the ITU Radiocommunication Sector's contributions to the world of shipping."

And

"The Conference will review and revise the Radio Regulations, the international treaty governing the use of radio-frequency spectrum and satellite orbits to ensure reliable radio services are available everywhere and at any time enabling people to live and travel safely while enjoying high performance radiocommunications."

<http://www.itu.int/en/newsroom/Pages/2015inauguration.aspx>

[http://wcitleaks.org](http://wcitleaks.org/)

The document seem to highlight a lot of control over the orbital slots and the use of new satellites.
https://www.google.com.au/search?q=wcr2015&oq=wcr2015&aqs=chrome..69i57j0l3.6922j0j4&client=ms-android-telstra-au&sourceid=chrome-mobile&ie=UTF-8#q=itu+wcr+2015

This is because our geostationary zone is very contested.

So are there any slots left for new satellites?
http://www.satellitetoday.com/publications/via-satellite-magazine/features/2008/03/01/hot-orbital-slots-is-there-anything-left/

So in the future what are we to do?
Could GPS work with land based infrastructure?

Any evidence to support this?

Here is something interesting from the BEAR 1 balloon launch.
https://en.m.wikipedia.org/wiki/Balloon\_Experiments\_with\_Amateur\_Radio

"On May 27, 2000, this helium-filled balloon with a payload of .977 kg, was launched from the Bremner airport, and reached an altitude of 31,762 meters (104,206 feet).[4] This first flight was a test of the GPS receiver used, to ensure that the unit successfully reported location information above the 60,000 foot limit imposed upon manufacturers"

Why would GPS have a 60,000 ft limit if the satellite is above it?

Also look into plane tracking.
The same ITU document
https://www.google.com.au/url?sa=t&source=web&rct=j&url=https://www.itu.int/dms\_pub/itu-r/oth/12/01/R12010000014A01PDFE.pdf&ved=0ahUKEwj30K-gtfrKAhUGipQKHeqUBW4QFgglMAI&usg=AFQjCNHOTGJN4pKv1WAIrI87E6yvK6VDoA&sig2=EWQMKuaJv\_pdqW9imP6a8w
Page 41 talked asks for priority installation of MLS.
https://en.m.wikipedia.org/wiki/Microwave\_landing\_system

Now Although some MLS systems became operational in the 1990s But waa a DOD project in the 80s.
widespread deployment never became a reality as supposedly GPS-based systems, notably WAAS (in north america) which is a ground based assistance for GPS were being implemented in North America.
Without WAAS, ionospheric disturbances create too much error and uncertainty in the GPS signal to meet the requirements for a precision approach, interesting that so much goes wrong with GPS signal simply by the signal going through the ionosphere, which it must do every second and is constantly "unavailable" without ground based assistance.
WAAS is monitored by Lockheed Martin.

https://en.m.wikipedia.org/wiki/Wide\_Area\_Augmentation\_System

The wiki article talks about MLS being removed in 2008 in the US but also states MLS is more accurate than GPS.

Europe were expected to take up MLS but have published a GBAS approach for the future which is another ground assistance system.
WAAS could not be implemented everywhere due to "satellites unavailable"
https://en.m.wikipedia.org/wiki/GNSS\_augmentation#Ground-based\_augmentation\_system

So why would ITU recommend MLS?
It appears that the GPS signal is bounced off the ionosphere and not sent from a satellite and ground based assistance is required.
ITU control the GOES orbital slots and will prevent any developing countries launching "satellites".
So priority must be given to ground based infrastructure.

MLS was designed to relpce ILS which was used since 1941. ILS was supposed to remain in service till 2010 when MLS would take over.
https://en.m.wikipedia.org/wiki/Instrument\_landing\_system

it appears in many places ILS did remain in service.
1940s tech still in use.
If ILS is unavailable TLS is used in conjunction.

TLS is based on all avaliable planes transponder multilateration and trilateration and consequently tracks all aircraft that respond to the interrogations. Omnidirectional antenna surveillance coverage of the TLS extends to 60 nautical miles.

https://en.m.wikipedia.org/wiki/Transponder\_landing\_system

Europe stuck with ILS and have plans for a "satellite based system" called EGNOS between 2011 and 2030.
https://en.m.wikipedia.org/wiki/European\_Geostationary\_Navigation\_Overlay\_Service

Alternatives for GBAS which are land based
https://en.m.wikipedia.org/wiki/Local\_Area\_Augmentation\_System

https://en.m.wikipedia.org/wiki/Joint\_Precision\_Approach\_and\_Landing\_System

https://en.m.wikipedia.org/wiki/Differential\_GPS

This one even mentions ionosphere study. All systems have ionosphere errors.
https://en.m.wikipedia.org/wiki/GPS\_Aided\_GEO\_Augmented\_Navigation

Global ground correction.
https://en.m.wikipedia.org/wiki/StarFire\_(navigation\_system)

Fully land based system alternatives.

VOR is the standard worldwide system used for aircraft navigation since the 1940s.
It's line of site based radio so lots of stations are required, over 3000.
By 2020 the US plans on having decommissioned half of the stations.
https://en.m.wikipedia.org/wiki/VHF\_omnidirectional\_range

LORAN
https://en.m.wikipedia.org/wiki/LORAN#eLORAN

DECCA.
Or Delrac for airport comms
Or Dectra for aviation navigation.
https://en.m.wikipedia.org/wiki/Decca\_Navigator\_System

Non directional beacons.
https://en.m.wikipedia.org/wiki/Non-directional\_beacon

TECAN
is a navigation system used by military aircraft. It provides the user with bearing and distance to a ground or ship-borne station.
It is a more accurate version of the VOR/DME system
its future......
"Like all other forms of ground-based aircraft radio navigation currently used, it is LIKELY....... that TACAN will EVENTUALLY..... be replaced by some form of space based navigational system such as GPS"
https://en.m.wikipedia.org/wiki/Tactical\_air\_navigation\_system

LightSquared has a land based 4G network with GPS after they were refused satellite infrastructure .
https://en.m.wikipedia.org/wiki/LightSquared
Their LTE network signal was tested as being 1 billion times stronger than it "satellite" counterpart.
They eventually claimed bankruptcy after a drawn out fight with GPS as their network was causing interference with the satellites.
http://www.pcworld.com/article/236501/article.html

I hear all the time "planes are definitely tracked by GPS satellies"
what do you think?

Listen to this.
https://youtu.be/dBkCtaW2pxM

One way only?

http://www.bbc.com/news/world-asia-pacific-26544554

Another example.
http://www.cnbc.com/2014/12/29/why-we-still-cant-track-an-airplane.html

Can we track them?
Surely.......it's 2016 and it looks like we uses 1940s tech to land planes and it's more accurate than satellite.

https://www.technologyreview.com/s/533871/could-passenger-planes-be-tracked-more-closely/

https://en.m.wikipedia.org/wiki/GPS\_aircraft\_tracking

The next generation tracking system for US air traffic is due for installation between 2012 and 2025.
It clearly says in the article
" NextGen proposes to transform America’s air traffic control system from a radar-based system with radio communication to a satellite-based one. GPS technology will be used to shorten routes"

and again a joint project from DOD, NASA and Lockheed Martin.

https://en.m.wikipedia.org/wiki/Next\_Generation\_Air\_Transportation\_System

Amazing considering the idea for the requirement to GPS track planes came  After Korean Air Lines Flight 007, a Boeing 747 carrying 269 people, was shot down in 1983 after straying into the USSR's prohibited airspace.
President Ronald Reagan issued a directive making GPS freely available for civilian use, once it was sufficiently developed, as a common good.

2016 and still no satellite based GPS as far as I can tell.

ADS-B is Still not in use.
https://en.m.wikipedia.org/wiki/Automatic\_dependent\_surveillance\_–\_broadcast

Look into the MOUS-4 for ocean navigation.
http://www.lockheedmartin.com.au/us/news/press-releases/2015/september/space-muos-4-launch.html

https://en.m.wikipedia.org/wiki/Mobile\_User\_Objective\_System

it replaced the UFO system

https://en.m.wikipedia.org/wiki/UHF\_Follow-On\_System

which was the replacement for the FLTSATCOM
https://en.m.wikipedia.org/wiki/Fleet\_Satellite\_Communications\_System

The idea of satellite communication was proposed by Aurther C Clarke who actually wrote science fiction novels.
https://en.m.wikipedia.org/wiki/Arthur\_C.\_Clarke

He first described this in a letter to the editor of Wireless World in February 1945 and elaborated on this concept in a paper titled Extra-Terrestrial Relays – Can Rocket Stations Give Worldwide Radio Coverage?, published in Wireless World in October 1945. The geostationary orbit is now sometimes known as the Clarke Orbit or the Clarke Belt in his honour.

Although there is also mention of earlier ideas from others about communication satellites but they did name the orbit belt after him.

This makes sense to me.
We have a "congested space" in geostationary orbit.
Some satellites, like the ones owned by Echostar, have to move orbital slots by firing small thrusters, while dodging all the other satellites and micro meteors
and you never hear of any being damaged.

I thought it all sounds a bit scifi

https://en.m.wikipedia.org/wiki/Geostationary\_transfer\_orbit

https://en.m.wikipedia.org/wiki/Orbital\_station-keeping

https://en.m.wikipedia.org/wiki/EchoStar

The GPS patent

http://www.google.ca/patents/US5093800

and finally

corrosion in space.
Satellites couldn't survive

https://drive.google.com/file/d/0B3blzK7zrNRzVF9Oc1RyVHVHWWc/view

GLOBAL POSITIONING SYSTEM SATELLITE SIGNAL SIMULATOR\_UNITED STATES PATENT

<http://www.google.ca/patents/US5093800>

why they build sky scrapers

[VIDEO](https://youtu.be/ML_sJopZucY)

<https://youtu.be/ML_sJopZucY>

Facebook 2

SATELLITES ARE FAKE
GPS Uses Ground Based Technology Not Satellites.
GPS uses older ground based military technology (they have since the beginning, LORAN and the DECCA NAVIGATOR ), ground based GPS is fast and reliable, with over 2.2 million towers to cover most of the USA you will never get lost.

It All Works From Towers Triangulating Your Position!! 1. The first tower judges the distance to the caller who could be anywhere along the circle.

2 Distance from the second tower narrows the choice to two points.

3. The third tower pinpoints the location.

I do not believe there are any satellites in space, there is not one video or picture of any of these 20,000 satellites in space, look for yourself and good luck.
👓
Video from SS52 YouTube
[https://www.youtube.com/watch?v=RNHnU48E-MI](https://web.facebook.com/l.php?u=https%3A%2F%2Fwww.youtube.com%2Fwatch%3Fv%3DRNHnU48E-MI&h=nAQH-YF2MAQGpLk-ra1bZRF6-OkGB0LxiNydPh4oOFHoYBg&enc=AZPRnSQYfF7A8GusOsz90IoMHMpI2KdQAG1tBniPZGQlJObI8IN5b3R0K12eYc_VMiHO785Pi9C8P9J6eBhh6oNHcTG1LJAE1mA0ga6erEUe6Op_ojP23NwzoZeDI4Bmw9Sb3XW-HwleSd4F2EuHn2MsU0Fc8Wzm_XA2LBcKzIRkpaPg6UvvVACgMcuuxSoqhis5mi1hRiCsSzcsHRfq-P_a&s=1)
💻
Satellites are purely science-fiction. All supposed images of satellites in orbit show fake CGI “satellites” orbiting a fake CGI “ball-Earth.” First conceived by Freemason science-fiction writer Arthur C. Clarke in 1945, they claim satellites became science-fact soon after. This is impossible for many reasons outlined in the following video, however, including the fact the melting points of the metals used in satellites are far lower than the temperature in the “thermosphere” where satellites supposedly are., space stations, the  telescope and space travel in general are absolutely the biggest hoaxes of the century, and NASA the most successful organization in .

[http://www.timetounite.com/fake-satellites-and-nasa-cgi-pla…](http://www.timetounite.com/fake-satellites-and-nasa-cgi-planets)

Antarctica and GPS

"Nations are also pressing ahead with space research and satellite projects to expand their global navigation abilities.

Building on a Soviet-era foothold, Russia is expanding its monitoring stations for Glonass, its version of the Global Positioning System. At least three Russian stations are already operating in Antarctica, part of its effort to challenge the dominance of the American GPS, and new stations are planned for sites like the Russian base, in the shadow of the Orthodox Church of the Holy Trinity"

So why would they need land to improve global positioning and navigation if we have all these satellites in space?
They wouldn't unless it's ground based.

<https://en.m.wikipedia.org/wiki/GLONASS>

[http://beebom.com/…/what-is-glonass-and-how-it-is-different…](http://beebom.com/2015/05/what-is-glonass-and-how-it-is-different-from-gps)

" when you are in a place where GPS signals are stuck like between huge buildings or subways, you will be tracked by GLONASS satellites accurately"

Still mentions A-GPS for phones

Under sea cables

[https://www.telegeography.com/telecom-…/submarine-cable-map/](https://www.telegeography.com/telecom-resources/submarine-cable-map/)

[http://www.submarinecablemap.com](https://web.facebook.com/l.php?u=http%3A%2F%2Fwww.submarinecablemap.com%2F&h=nAQH-YF2MAQEg0LlB-vhdpX95fE9on78gE5XUtzKdE2-WGQ&enc=AZPlf5mGlyPGMF7Po0e1NZzmrTZ4KOXS9Mvj09hVNtAEMB7d2I24gtVV-1IeoM-az6kRhfu2wPpr5f7aE3PSuTqkqB_MDELjjumgX2_17GR9dzxz9a-B_BzthUUPBUKMRoYgGq9LIayznWr3ZfNmNC78UlIABwi41gdLSm5ccGxQHD9WyxsB1UXHSrL81pI4JfYFAMHj3XmOMDTZ4S3W3LAG&s=1)
Simply click on the cable and the info is show including the distance.

Facebook

Satellites are used as an argument for the Globe and a huge issue for Flat Earthers to debate.

I've still got a lot of research to do but I always find enough to question the claims of satellites and it could easily be explained by Land based communication.

There is always ground based infrastructure mentioned.

Satellite TV.
I've looked specifically into one sat tv company called Dish Network.

Dish network was spun off from a company called echostar in 2008.

Echostar was producing "satellite television equipment" in 1980 .
The company began using Dish Network as its consumer brand in March 1996, after the successful launch of its first satellite, EchoStar I, in December 1995.

So was distributing sat TV equipment 15 years before it had a satellite.

EchoStar has since supposedly launched numerous satellites, with nine owned and leased satellites in its fleet as of January 2013. EchoStar continues to be the primary technology partner to Dish Network.

Now the receiver (dish)

A few types
-Tail gater
-Hopper
-Hopper with sling

Each is only compatible with certain satellites in designated orbital slots.

A satellite dish does not point to a satellite. They are mounted at a low angle of less than 45 degrees.
[https://www.google.com.au/search…](https://web.facebook.com/l.php?u=https%3A%2F%2Fwww.google.com.au%2Fsearch%3Fq%3Dpictures%2Bof%2Bsatellite%2Bdishes%26client%3Dms-android-telstra-au%26prmd%3Disnv%26source%3Dlnms%26tbm%3Disch%26sa%3DX%26ved%3D0ahUKEwjplYOFwKjKAhWEGKYKHeypDPwQ_AUIBygB%23tbm%3Disch%26q%3Dpictures%2Bof%2Bdish%2Bnetwork%2Bsatellite%2Bdishes&h=NAQEElh1MAQHTzRK0olbGPyJGNU8EPxrEpkhZ6z2KtIivwQ&enc=AZOFmBb8eZAKO2bAcW2o_Py0EwIycSMHMUkHkr3BghV5-k2xsjdGzlQzHjjn3Y4QpfkdiSMXKec6n89tTVK9pmhNpWYH6500w5JinGDO6SLaDen_-SfjHkTFt1R367M_c0TDx7roKa3bvOSxHl-ZJmJlkPQpSPVdGuzuRMpf-ZmtMjDiwC9An9Gw8hQRvpi0zYvnEkpSIgIks6sKh03vfFLg&s=1)

EchoStar have 16 satellites on a list
"Most of the satellites used by Dish Network are owned and operated by EchoStar. Since EchoStar frequently moves satellites among its many orbiting slots this list may not be immediately accurate"

Move satellites?
[http://www.satsig.net/orbit-res…/geo-orbit-repositioning.htm](https://web.facebook.com/l.php?u=http%3A%2F%2Fwww.satsig.net%2Forbit-research%2Fgeo-orbit-repositioning.htm&h=fAQF4HFXhAQEVFrVgsjIAhTn__I270gUvSUoM2hQBIKWIEw&enc=AZNtpVl8X1rtC7mFvT2DN4Zft4rDbF865CUPhdfu90_d_zIelAsnvTLSAXLlms-t90_HLwUVqyJ-cmlHx5236AJ8EY3K2RFsxjGKOonq9oUZqaHEnliallIgJFamND_R5iM6_Wyr0DKBiK6RW2CbSALXzDx_m9-ANaG_0ap5nsOYiwsRMPwlnL9YXzoHRMP7dZw1ZmB8EuzBRvcaon3agZ9v&s=1)

Satellites in geostationary orbit must all occupy a single ring above the Equator. The requirement to space these satellites apart to avoid harmful radio-frequency interference during operations means that there are a limited number of orbital "slots" available, thus only a limited number of satellites can be operated in geostationary orbit. This has led to conflict between different countries wishing access to the same orbital slots (countries near the same longitude but differing latitudes) and radio frequencies. These disputes are addressed through the International Telecommunication Union's allocation mechanism.

[https://en.m.wikipedia.org/wiki/Geostationary\_orbit](https://web.facebook.com/l.php?u=https%3A%2F%2Fen.m.wikipedia.org%2Fwiki%2FGeostationary_orbit&h=fAQF4HFXhAQHlPMB-AEsBe8wqAHlzumK7DXMhM48DhZxAxQ&enc=AZOQfti8U0cSURGECXEHS3X5M3zsoX0VibMpPhcBxkVDuLnVKVLSz4HSpNw-RVoe8dqmL57lqv2jJekcRVyNHz4WZD0U2jH46zUQ_pCCDQrskgWEXo0JM5YDfu3KG7pkssX_JpM8ws2oz0zpPU4It2dt12JwGvvmZO05vhhMiZBXb5LxHJ1m-GJk4FQ7m6WJv4wU5N6MdUxTW2ohte1iyCge&s=1)

So are there any slots left for new satellites?
[http://www.satellitetoday.com/…/hot-orbital-slots-is-there…/](https://web.facebook.com/l.php?u=http%3A%2F%2Fwww.satellitetoday.com%2Fpublications%2Fvia-satellite-magazine%2Ffeatures%2F2008%2F03%2F01%2Fhot-orbital-slots-is-there-anything-left%2F&h=cAQFAIhVWAQG9OMyBylOyckP21lYaPqF0c3v1hwdZzQ9zJA&enc=AZNfZWX-EyaMV31NO-UIiQFT6mp25cMu0E3Yx0T6UcyeEs5bWKDTw_8rdLgdoFR3CSmEYpTGsoQK7FCuhsY25LjzFCiU53TPz1wQ6yMXC8gaDyVI8SEfj23o9VExQSHMmVe0fyoLYZ28xZ_dkXUVDe27TSCFj-ZW3li2RZNUHsDH6pEtggL55vB12ykFMd2TqoMxRLyxlMjaOPhY4Ck318m-&s=1)

Now FEs get accused of this all the time but I have to ask.
Does any of that make sense to you?
I mean I understand what they are saying but all these satellites in "congested space" all burning thrusters to move about their orbital slots while avoiding micro meteorites and never a collision.
Does it sound a bit Scifi to you?

Yes?
That's interesting because the idea of satellite communication was proposed by Aurther C Clarke who actually wrote science fiction novels.

[https://en.m.wikipedia.org/wiki/Arthur\_C.\_Clarke](https://web.facebook.com/l.php?u=https%3A%2F%2Fen.m.wikipedia.org%2Fwiki%2FArthur_C._Clarke&h=8AQEh3uMsAQG57Hk-UBajCkNrMUpveXkKyxylUpmpoZLkFw&enc=AZMOVX5_becNAXn6eAC2U2didc688MMFpBI8epT3nn6hhrMcDuesf4pumRc8tTiw2ZfOx0JYDnfrWSRzEZieMWZ3O2DgOJNvZzIZ3ES9G292BXb1VjuEfTQTR4Mbjduv1Fqmpdla5a5nqdTQHrig03LhYLoHPXB9pUIP-As1HAqFVU1Nn7ilyMSrI1cHcwCWjjWqjUOKfxq3WES6wrSByYS0&s=1)

He first described this in a letter to the editor of Wireless World in February 1945 and elaborated on this concept in a paper titled Extra-Terrestrial Relays – Can Rocket Stations Give Worldwide Radio Coverage?, published in Wireless World in October 1945. The geostationary orbit is now sometimes known as the Clarke Orbit or the Clarke Belt in his honour.
Although there is also mention of earlier ideas from others about communication satellites but they did name the orbit belt after him.

[Aurther C Clarke](https://en.m.wikipedia.org/wiki/Arthur_C._Clarke) was the first to describe Geostationary Satellites  in a letter to the editor of [Wireless World Magazine](https://en.wikipedia.org/wiki/Electronics_World) in February 1945 and  further elaborated on this concept in a paper titled [Extra-Terrestrial Relays – Can Rocket Stations Give Worldwide Radio Coverage](http://www.coit.es/foro/pub/ficheros/extra_terrestrial_relays._clarke.wirelessworld._octubre_1945_6cf53078.pdf)?, published in Wireless World in October 1945 which can be found below

They talk about transponders at the orbital locations.
Each type of dish has a LNB module fitted (low noise block)

[https://en.m.wikipedia.org/wi…/Low-noise\_block\_downconverter](https://web.facebook.com/l.php?u=https%3A%2F%2Fen.m.wikipedia.org%2Fwiki%2FLow-noise_block_downconverter&h=gAQG_E5OiAQF5Et1IJ1DXRu2aBRsU5yxMoOjvUbK1qihkGg&enc=AZOwApY8cqwrL3yRwZlpR4puiQ1baL0qkEvqh3H33A7nhifxvccqNWYhPXWZipFLrnjmUI7HawdM9FEMgMW0906k0PTPeObbhCq9gMhoRWezF-pq8PhVJKyqW6WCujEB7UqEFvfQmQc3OFl7xXLUvjJlw6mQVvgxGk6yjJsBBFx_U8Q0CA2QpKvz3zz38IDvOrwky-gityVGuTQldj8S_JlK&s=1)

A corresponding component, called a block upconverter (BUC), is used at the satellite earth station (uplink) dish to convert the band of television channels to the microwave uplink frequency.

BUC (block up converter)
[https://en.m.wikipedia.org/wiki/Block\_upconverter](https://web.facebook.com/l.php?u=https%3A%2F%2Fen.m.wikipedia.org%2Fwiki%2FBlock_upconverter&h=tAQFZXC6bAQGwqEwMnIv0WLerab6SeMTiYhqenPP9NP2pdA&enc=AZPacdOxMy6zaydSSYmVk1_WQUps1jQDyASep23iC2M-TK-u-5Syb7fqBbKzm4kls9NKb7d_91HC860J--Rbze5M2gHHmW6UD8wXhdsNQTw4zAWzHZxFKFaJM0n2VA3CV_TFGvi0kE3_bYXvBBSW8vfwWL5S3GhlXvRVuMILISQyiyXs6LwfJNXxBbczjhHXF5LD0MUqEE-2fR9sykX0vnm7&s=1)

[https://en.m.wikipedia.org/wiki/Satellite\_earth\_station](https://web.facebook.com/l.php?u=https%3A%2F%2Fen.m.wikipedia.org%2Fwiki%2FSatellite_earth_station&h=qAQEzMBsDAQGw_vSlj4kErnTjjPVHHwOKkPJmh5qGFjVZ9Q&enc=AZPPqYsd8mCLESwdqk3pKUr--86dmGQxx_dAmHfzYng7GCMr3QhXryvVIUX7n2Q1EIGDLwQ3qtz0qB6voXwY2hPkK6kRdU0r5GUKSlAvxmpAWxCNDrVKmogdRa9VTlzfTUhvtNjKQR8-rRbyXAgwVJ2tcK4y8zOCzK0P-XNW8y_w34NXAkG5t8iMZv3O_FF8J5SkI_90_fdLIxNUBtE_c-tr&s=1)

So is that Land based microwave?

Now to be fair it does say that the earth station receives radio waves from the satellite.

Buuutttt.
Not so fast.
Is there another way to get signals from the sky?
Is there any evidence to suggest they might use alternatives in our upper atmosphere?

there is a few articles I read about troops in Afghanistan not being able to have remote communication and on ground comms had to be line of sight.

couldn't the military afford a few sat phones?

I could only find 1link below but I read a few.

This one talks about how they couldn't use balloons or planes to relay signals which they usually do.

[http://www.afcea.org/content/…](https://web.facebook.com/l.php?u=http%3A%2F%2Fwww.afcea.org%2Fcontent%2F%3Fq%3Dtroops-afghanistan-bridge-communications-gap-0&h=BAQFHBIMPAQGfaRBaMpF-GGyBJIDZnroRHUUUG4ZYDQYemw&enc=AZNOJ4XTB0QkWf0ltS9A36VFrKQg2HfsTQ4qZAS2No3cI9zconFuIVFKX6Fyp3NT5fbVHXdE19AGup0NrFOlacdgCZH5dwNEueTkGg-ZBic0Koexv8UqmG3kOuy6yq0kLeVw53sS0OMdsxS95s4DJvN0y4uE8mcfb6u6ADwEq_yBB4_Qt9ipdtxsrIx3m9WgusYy4e2ZggEvMqmXErIcEInS&s=1)

There is a long history of balloons in the military for comms.
why do they have to use balloons all the time?
like the "tactical aerostats"
[http://m.military.com/…/0,13190,Defensewatch\_072105\_Helms,0…](https://web.facebook.com/l.php?u=http%3A%2F%2Fm.military.com%2FNewContent%2F0%2C13190%2CDefensewatch_072105_Helms%2C00.html&h=SAQHt6ObeAQFqkqXZ45TDXrjkDm4zEpzb8TWjswKBMp7VKw&enc=AZMkKv4HsLNnu1jSeQZrQNB2mL-WTyG8o4YYMgT-Ufc1LbhoRgcLM_cVTJesfygRD_jkEmXgE3j1Schy984_QlKw0HhQhDTAh5TZC1LNTxT0052lW_gSGkT7I6_ngD306u_yJHAw3QPC8c2hLUx7g1WwWfN9OFB-mgn-3M_oV5tNqUvzsqa3Oc1F3H-Q1fqCC8ZGCvOVqxZK6dVM2jxNhQSD&s=1)

[http://www.tcomlp.com](https://web.facebook.com/l.php?u=http%3A%2F%2Fwww.tcomlp.com%2F&h=PAQGku6lPAQE2IgPtS8pTKx3p0dUWEW1WNCjplPXycULr2w&enc=AZO5O_USSps_B9ECDEXTPokPo6dPrHUeUawysn3y641Qi6tXOZ5Lf-RRBSEeplhK36PcRH0DmlO9OygXPVJpl99WuZvWwwBVRxLZ7_XO40ZayPDgywFt3ZXUrH0SjZxgAHF9M4MKeeMIp8JTIR0vWpCIqCwBIjMuP_EsFDD6-zoxcF2FbxOcQYOFt_VXgv2sY9Pkxo7bEO2BVSflUxk1p1Uv&s=1)

Or spy planes to take images?
Why not just take a picture with a satellite?

Now if the military can't get a satellite signal do you think you do?

Have you heard of "Google loon"
[http://www.google.com/loon/](https://web.facebook.com/l.php?u=http%3A%2F%2Fwww.google.com%2Floon%2F&h=8AQEh3uMsAQGYJUFw3c_Hp4e7cAGK9F-oS2mA6Y_j0FC48w&enc=AZNI8IxgCzR8_-vCfXvrKuzJvmGSucVI8Ic8sj_emLCsaBsKhDF3O0y9Vkqf2JOs8WqBUsFrOx9KUcMYfyMem3yIyANHGEf2I5GwYg-oPtZwd25suEPYm7SngNq735qP6O2BaCzrKwgI2CLo2mArSC5fKPwyrbQ_1PUekoAw3s2qcaoGDnOVFbfSs5ryoQQteUOywwC1RUaGqpQyDEa8gVn5&s=1)

So that covers the sky but can it be done land based?

LORAN was a ground based GPS system used by the US military, deemed operational in 1943.

[https://en.m.wikipedia.org/wiki/LORAN](https://web.facebook.com/l.php?u=https%3A%2F%2Fen.m.wikipedia.org%2Fwiki%2FLORAN&h=TAQGmrvd6AQGzthlsr2-yrCp_kMVHzmx7YkUey2V4NDW2nA&enc=AZOyxfEo8eXfXUKpmJKeuBG5OuY45_jQ5YmJMKSiW8X1NRfvl6ymht3DzCze2UM-EvAG2sPQclfY8DR21O871vW-BluU48mG1IDtI6YQM0GK7tt025lVixNu-GPlbM-C43fsh0uVnhlCu9YGX7_-B5OYxomCdtblqbH5IK_rNqgewi2wYlZNn3ALZ4n1Eyys6mtcVr2LcGyh1NI8c58_OEaT&s=1)

So GPS could be a land based system.
Any evidence to support this?

Here is something interesting from the BEAR 1 balloon launch.
[https://en.m.wikipedia.org/…/Balloon\_Experiments\_with\_Amate…](https://web.facebook.com/l.php?u=https%3A%2F%2Fen.m.wikipedia.org%2Fwiki%2FBalloon_Experiments_with_Amateur_Radio&h=uAQEFCW24AQG2PZzpKlJBYx2AAqDnF5dSIj0p-2iGpSQzAg&enc=AZPlx9bYq3WYhTHuD-yiernF4KHFJ9hhwXfLIFNQD_WOeUgkouQLm94TwceddWFMsd_2c7zcZi0H73Q91Gooog7X4kqpby4_lrPpGURWniIT3od80_Iw3BentNitkzcIQDp_D6AcBPs4P1fKXNW7lV28wFBoNmdUNETTuKXAcbOYW3pi2Fzeh-ANfsy1tMvcvWXermvd8oxNYpE1IjlhItOd&s=1)

"On May 27, 2000, this helium-filled balloon with a payload of .977 kg, was launched from the Bremner airport, and reached an altitude of 31,762 meters (104,206 feet).[4] This first flight was a test of the GPS receiver used, to ensure that the unit successfully reported location information above the 60,000 foot limit imposed upon manufacturers"

Why would GPS have a 60,000 ft limit if the satellite is above it?

It seems every time I look into a subject on satellites there is a lot of ground based infrastructure involved.

I haven't researched this in detail but the MUOS is a militaryComms satellite arrangement.
It always seems that the satellites are talking to a ground station and the ground station talks to the user.

I guess this is due to Geostationary orbit but wouldn't you get a far better ground coverage from orbit height?.

I'll have to read up on the earth coverage beam which seems to be antennas used to provide "global coverage from a synchronous satellite"

This makes me question further because wouldn't the curvature effect line of site to the ship etc?

I'm certainly no expert and need to do a lot of reading on this but I can question it. especially when it mentions the use of WCDMA which is land based cell towers but in this case the satellites supposedly replaces the towers.

And of course run by Lockheed Martin who have a shady history.

I'd also like to plot the locations to see what area is covered.

[https://en.m.wikipedia.org/wiki/Mobile\_User\_Objective\_System](https://web.facebook.com/l.php?u=https%3A%2F%2Fen.m.wikipedia.org%2Fwiki%2FMobile_User_Objective_System&h=bAQF2ulocAQH8M6ckueFgopNGf9rCRuwMnmAU9QYbNT09iA&enc=AZPKWSIemY_HuZKeIvCFuOBNd3bEJQJVYzoVI68SvMsnBwSy0HAT3r6Wqjwspo_CG6cEn5BjjoaEp9cp8eJfMRNlw8rpb9yOvXe544IsGnBlp6XRfJA-JrW-SPw00O--hEntC1vNIEPnnPLnWf9X3-BtQ_u0cnQ9u6BdXRVJgzgN3Qu41y_5SaVK0NN_-5Qxxq-1ALz2ztdoG6ParxQPLhlo&s=1)

it replaced the UFO system
[https://en.m.wikipedia.org/wiki/UHF\_Follow-On\_System](https://web.facebook.com/l.php?u=https%3A%2F%2Fen.m.wikipedia.org%2Fwiki%2FUHF_Follow-On_System&h=bAQF2ulocAQEFsKu2qJfyqYjA92UwIzOG-ZzX4AY99dYntg&enc=AZMg53MgVdLoUfei4NExDYHn13JD780cJ-dvMgcK29lLKFibFogo3P0QHKi4nCrCeYRk_ektf-qeoPLjYGe7iF3hqy0Z867pAUoyNMAwk7X81GYKvc5xhPFo_FyWQCcVEvHr5g-VEEEkLh6OaYME176IbHHIQbqb7RK1iDPtEhe1ETX59tnBPZZJ3TGoZeTFQSu5W1CZIStHMGllf5N8smnf&s=1)

which was the replacement for the FLTSATCOM [https://en.m.wikipedia.org/…/Fleet\_Satellite\_Communications…](https://en.m.wikipedia.org/wiki/Fleet_Satellite_Communications_System)

Periscopes

<http://www.ussnautilus.org/education/pdf/stemlessons/LessonPlanUpPeriscope.pdf>

The satellites used for communications are all placed on the geostationary arc, which is above the equator at 36000 Km height.

At this specific arc, the satellites move around the Earth with the same angular velocity as the Earth moves around its axis and therefore are always above the same point on the equator.

They are called geostationary satellites and are used to provide telecommunications services.

A geostationary communications satellite has the ability to cover from a single point in the sky, a large geographical area, about one third of the Earth’s surface.

Three geostationary satellites are therefore needed to cover the entire surface of the Earth.

Satellites have been used since the early 1960s for a variety of communication services: voice, fax, Television.

Recently, with the addition of newer frequencies and advances in satellite technology, geostationary satellites are used to provide fast internet direct to home users

Lets look at a few Satellite Operators

Olympus Satellites

http://www.olympus-sat.com/index.php

- Olympus Satellites Company has secured via the Republic of Cyprus and ITU 9 geostationary orbital locations

- Three (3) of these will be utilized in order to implement a world-wide satellite system covering all earth on land, sea and air.

- Each satellite will have two control stations, one prime and one redundant.

- These will be located in Cyprus as well as in other place(s) that will be required.

- Each satellite will have the appropriate antennas in order all signals from all antennas will be

 routed to the control stations.

- The control stations will be used to monitor all satellites on a 24 hour basis.

- Each satellite will download thousand of telemetry data, every few seconds, which will be analyzed

by special processors in real time and will serve about 5 Million of subscribers/users simultaneously

- The telecommunication services will be provided by specific spot beams from each satellite

 Each satellite will offer all types of satellite communications in Ka-Band, but it is anticipated that 95% will be utilized for Broadband (fast) Internet

- Olympus Satellites Company has secured via the Republic of Cyprus and ITU nine (9) geostationary orbital locations for the implementation / launching the Olympus system that will cover all Earth on land, sea and air by providing satellite communications and fast internet

- The Launch of all satellites will take place in Cape Canaveral in Florida or through “Proton Launcher” (ILS Company) in Kazakhstan in order to extent life of satellites two (2) or more years.

- System can be upgraded to 6 or 9 satellites, servicing double and triple subscribers thus up to 45 Million out of the today +/-3.5 Billion internet users

- The Satellite Operator of our system will be one of the first in the worldwide market that will have a global telecommunication cost effective system in Ka Band that will cover Earth, offering communication/internet services on land, sea and air”

- Our three Satellites main activities are to provide High Speed Internet (Send/Receive) in worldwide basis

servicing the entire world of real internet users (Today worldwide live users are more than 3.5 Billion

- The system of three satellites, covering the Earth with specific spot beams, offering two-way communications

services in broad band, upon successful launch of the three satellites, is estimated to be worth 4 times the

capital expenditure

- The High Speed Satellite Internet is the most profitable and no risk business worldwide, as internet

has become the most important tool to everyone in our daily life.

Olympus Founder

http://www.olympus-sat.com/founder.php

Olympus founder and Managing Director Dr. Christos Fellas (Spacecraft Engineering Consultant) has a vast performance and high experience in the design, procurement, monitoring and launching of various types of Satellites (Dr. Fellas has 23 successful satellites manufacture and launch up to date) where with pride we nominate the Hellenic/Cypriot telecommunication satellite HELLAS SAT that well manufactured and successful launched on May 2003.

Dr Christos Fellas, was overall responsible for the definition and the implementation of the Hellas-Sat Project. He was the main responsible for the procurement of the satellite, including the monitoring of the manufacture, integration and test of the satellite, the launch services and launch campaign (Spacecraft Mission Director), launch interfaces between spacecraft manufacturer and launch agency, Launch and LEOP operations as well as in-orbit tests.

Christakis N. Fellas CV

http://www.olympus-sat.com/catalogues/ChrisFellasCV.pdf

Consultant to Olympus Satellites Ltd since 2012.

"Conceptua"l Design of a Global three Satellite System in Ka-Band offering communication services in

Land, Sea and Air

Consultant to MEASAT from 2011-2012 Monitoring the manufacture, assembly Integration and test of all manufacturing activities associated with

MEASAT 3b satellite, at ASTRIUM, Toulouse, France.

Consultant to ARABSAT from 2009-2011

 duties in relation to Arabsat 5A, 5B and 5C include among others:

- Participation in design reviews PRD and CDR

- Monitoring all test activities at unit, subsystem and system level

- Participating selectively at MIPs

- Participating at Test Data Reviews

- Attending MRBs (on class 1 NCRs)

- Reporting to Arabsat Management on progress

- Validating IOT data and participating in TRBs (Test Review Boards)

Consultant, Planet Sky Orbital from 2007-2009

Conceptual design of a global Maritime and Aeronautical Broadband service utilizing the Ka-Band.

Defining the five orbital slots to be used for four satellites and one in-orbit spare and filing the necessary

orbital slots via the Republic of Cyprus.\*\*\*\*\*\*\*\*\*\*RISK Defense & Safety Company is based in Cyprus and is one of Olympus Satellites Business and Strategic partners\*\*\*\*\*\*\*\*\*\*\*\*\*

08/2006 to 01/2007: ESA RESIDENT

ESA Resident at Astrium Stevenage and Portsmouth monitoring the development, manufacture,

assembly integration and test of the HYLAS Spacecraft (by AVANTI Communications).

Monitoring six other ESA future payload development projects.

08/2003 to 08/2006: HELLAS-SAT SPACECRAFT MANAGER

Responsible for the proper operation of the Hellas-Sat Satellite System and the training of operators for

station keeping and payload configuration and re-configuration

03/2000 to 07/2003: HELLAS-SAT PROJECT MANAGER/MISSION DIRECTOR

Overall responsibility for the definition and the implementation of the Hellas-Sat Project.

Procurement of the satellite, including the monitoring of the manufacture, integration and test of the

satellite.

Procurement of the launch services and responsible for the launch campaign (Spacecraft Mission

Director).

Responsible for the launch interfaces between spacecraft manufacturer and launch agency. Responsible

for Launch and LEOP operations as well as in-orbit tests.

Other duties included participation in frequency co-ordination, preparation and approval of all technical

specifications relating to Hellas-Sat and approval of all waivers.

1996 to 2000: SATELLITE ENGINEERING CONSULTANT

2000: NILESAT 102

1997 to 1998: NILESAT 101 and ST1

Monitoring the manufacture and testing of payload units:

-TT&C transmitters, receivers

-TWTAs and Upconverters

-Troubleshooting of failures and approval of design changes

- Payload Integration and end to end tests

- Launch preparation activities

- In-Orbit tests

1990 to 1995: INTELSAT Spacecraft Engineering Consultant and PA Representative

Project Management of European operations on the INTELSAT VII & VIIA spacecraft

- Satellite Antenna Design

- Monitoring the manufacture and testing all units made in Europe:

• TT&C transmitters,

• Receivers, TWTAs and Upconverters

• Troubleshooting of failures and approval of design changes.

• Panel Integration activities at Alcatel Espace - MRBs & TestReviews -Data approval - Milestone

reviews

• Monitoring of qualification of new units – failure investigations.

 Design modifications approval.

• PA Representative (1993-1994) - MRB closures

1982 to 1990: BRITISH TELECOM INTERNATIONAL

- Preparation and approval of the RFP for the INMARSAT III Satellite procurement program

- Definition of the technical requirements of the Space sector.

- Evaluation of the technical part of the 5 proposals received by Inmarsat, on behalf of

 UK signatory.

- Inmarsat II satellite procurement - monitoring and reporting on the progress in the manufacture,

integration and test of 2nd generation Inmarsat spacecraft

- Navigation by satellite. Three satellite Global Navigational system – Conceptual Design

- CCIR XVIIth Plenary Assembly - member of UK Working Group 8D (Satellite Applications for Mobile

Services, Terrestrial and Aeronautical)

- Passive intermodulation at C-Band and L-Band

- Radiopaging via Satellite 1986 - 1988 - initial concept, design and manufacture of breadboard and

prototype Radiopaging Satellite Receiver.

- Inmarsat II Spacecraft, Tender Evaluation on behalf of the UK signatory

1984 to 1988: BRITISH TELECONSULT

Senior Consultant to INTELSAT responsible for monitoring the performance of the contracts for the

supply of spacecraft hardware in Europe destined for the INTELSAT VI spacecraft - monitoring the

production and testing of Receivers and Multiplexers manufactured at ATES in the Toulouse, and the

TWTs manufactured at Thomson-CSF Velizy.

1982 to 1984: UNISAT Project

- Assistance Spacecraft Manager Unisat project

- Conceptual definition of UK Direct Broadcasting Satellite - monitoring manufacture and testing of

spacecraft hardware.

1979 to 1982: BRITISH AEROSPACE, SPACE AND COMMUNICATIONS DIVISION

- EMC (Electromagnetic Compatibility) ECS, Marecs

- Electrostatic Discharge problem - Invented a new method for eliminating discharges caused by charge

built-up (See Publications Papers and Patents).

- Electrical interface engineer on the L-Sat project (Olympus).

1977 to 1979: GEC-MARCONI, SPACE AND DEFENCE SYSTEMS, STANMORE

- Electronic Warfare Systems and Devices.

- Microwave systems design and performance calculations for Early Warning Receivers.

- Microwave Equipment Design - designing microstrip and stripline devices: mixers, couplers, filters, etc.

Publications by Christakis N. Fellas

I. Xenon Induced Instability in Nuclear Reactors - M.Sc. Thesis, 1972, University of Aston, Birmingham, UK..

II. The Response of Scintillator to Very Heavy Irons - Ph.D. Thesis, 1977, University of Surrey, Guildford, Surrey, UK.

III. Publication number US4433201, A laminar plastics material sheet including a transparent, electrically conductive layer used to cover the front and/or rear surfaces of a spacecraft solar array to alleviate electrostatic charge build-up thereon due to electron bombardmen

Publications numbers 06374022, 374022, US 4433201 A, US 4433201A, US-A-4433201, US4433201 A, US4433201A

Papers by Christakis N. Fellas

a. The Response of CsI (TI) to Energy Degraded Fission Fragments - IEEE Transactions on Nuclear Science NS-22, 1975, P. 93-95 (C. N. Fellas, W.G. Gilboy and D.A. Ginger).

b. An Arc-Free Thermal Blanket for Spacecraft use - IEEE Transactions on Nuclear Science NS-27, 1980, p. 1802-1807.

c. The Design of an Arc-Free Thermal Blanket - NASA Proceedings of the 3rd Spacecraft Charging Technology Conference, November 1980, USAF Academy, Colorado Springs, USA. NASA Conference publication 2182, AFGL-TR81-0270, p. 261-266.

d. Improved Anti-Static Thermal Blankets - IEEE Annual Conference on Nuclear and Space Radiation Effects, July 1981, University of Washington, Seattle, USA.

IEEE Transactions on Nuclear Science NS-28, No. 6, December 1981. P. 4571-4575.

e. Internal Charging of Indium Oxide Coated Mirrors - IEEE Annual Conference on Nuclear and Space Radiation Effects. July 1981, University of Washington, Seattle, USA.

IEEE Transactions on Nuclear Science NS-28 No. 6, December 1981. p. 4523-4528.

(C.N. Fellas, S. Richardson).

f. A Solution to the Spacecraft Charging Problem - The Institute of Physics Symposium on

Electrostatics, April 1980, Journal of Electrostatics, 11 (1982) p. 281-296.

g. Anti-Static Coat, for Solar Arrays - Proceedings of 3rd European Symposium "Photovoltaic Generators in Space, Bath, May 1982 (ESA-SP-173 June 1982) p. 305-307.

h. Spacecraft Charging - How to make large Communications Satellite immune to Arcing - Proceedings of International Symposium on Spacecraft materials in Space Environment.

(June 1982) ESA Publication SP-178, p. 305-309.

i. Altering the Electrical Conductivity of Dielectrics - IEEE 1982 Annual Conference Electrical Insulation and Dielectric Phenomena. October 1982 (University of Massachusetts) p. 222-227.

Patents by Christakis N. Fellas

a. Thermal Control Materials for Satellites

UK Application No. 7938717 filed 8 November 1979

UK Application No. 8022867 filed 12 July 1980

UK Application No. 8028615 filed 4th September 1980

UK Application No. 8018037 filed 2nd June 1980

UK Application No. 8035523 filed 4th November 1980

Published by the Patents Office, London, on 20th May 1981 and given Official Serial Number 2 062 189A.

USA Appilcation No 4489906 filed 24th August 1983 (British Aerospace Company)

USA Filing Number 204, 703, filed on 6th November 1980

b. Anti-Static Coat for Spacecraft Solar Arrays

UK Application No. 8113615 filed on 1st May 1981

Dimitrios G. CHALAMPALIS CV

1986: Computer Scientist and Senior Project Manager

2004: Executive Management

Executive Protection

Risk Analysis

Risk Assessment

Risk Management

2005: Threat Management

Commanding techniques & Communication Skills

Human Resource Management

Security Plan

2006: Instructors course in security protection

Currently at

Defense Advisor at INTERNATIONAL ARMOUR Co. (www.armour.gr) \*\*\*\*\*\*\*INTERNATIONAL ARMOUR Co is aslo one of the Olympus Satellites Business and Strategic partners\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

INTERNATIONAL ARMOUR (Greece) is a NATO certified Company with NATO CAGE Code G2181,

is ICoC signatory Company, UN registered supplier, has obtained from the Hellenic Republic - Ministry

of Public Order / Ministry of Defense.

INTERNATIONAL ARMOUR has official certified branches in the Republic of Serbia, in the Republic

of Cyprus and in United Kingdom in order to serve its clients with accuracy and accountability

worldwide. \*\*\*\*\*\*\*\*\*\*\*\*\*again Cypres \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Advisor at RISK DEFENSE & SAFETY - Cyprus (www.risk-international.gr) \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*One of the Olympus Satellites Business and Strategic partners\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

RISK INTERNATIONAL is a Defense, Safety, Advanced Technology and Security Training Company

(ICoC Signatory) with worldwide interests, working and complying under the highest market standards.

Company cooperates in close with all affiliated companies of group and strategic partners in worldwide

basis established by expertise members of the international safety and defense industry

Consultant at AVISTA VENTURES (www.avista-ventures.com)

With an extensive experience in marine business, AVISTA VENTURES has been successful in servicing

a strong worldwide base of clients who commands quality products, services, consultants and turnkey

solutions on time and at the best market prices.

As a reputable company with officials with more than 25 years of experience in the International Marine

Business, AVISTA VENTURES is all the time able to meet the challenging demands of its clients

offering a wide range of services and products in all respective fields within the scope of its business.

Advisor at AVERSA LTD - Bulgaria (www.aversa-group.com)

AVERSA is an International Business Consultant Company, Security Risk Management expertise, high

technology, banking and commercial services providers and products suppliers, e-commerce and payment

solutions services Company.

Company’s main business is trusted intelligence, investigations and advisory services including security

risk management, cyber security, data recovery and payment gateway services to big and VIP merchants

by eliminated their electronic (e-commerce) business risks.

AVERSA's board of directors and personnel is constituted by expertise specialized in identifying,

remediating and monitoring risk across all our clients enterprises.

Systems Analyst at OLYMPUS SATELLITES (www.olympus-sat.com)

Olympus Satellites Company established in Cyprus and is legal Licensed as Satellite Operator.

The business scope of the company is to provide a global advanced state of design satellite system,

offering communication services on land, sea and air under a constellation of three to nine geostationary

satellites in Ka-Band.

Previous Position:

2012 - 2015: Security Consultant at POSEIDON GROUP

2012 - 2015: Security Consultant at POSEIDON MARSEC COMPANY

2003 - 2009: Training Consultant at RISK INTERNATIONAL P.S.I.

2003 - 2012: Security Consultant at RISK INTERNATIONAL SECURITY MANAGEMENT SA

2003 - 2007: Honorary President at IBA HELLAS

2003 - 2009: General Manager at RISK INTERNATIONAL DEFENCE

1989 - 2009 Director General at INFOMATIC SYSTEMS & TECHNOLOGY LIMITED

Business Summary & Activities:

- Founder of "AVERSA LTD" - Bulgaria (Est: 2013)

- Founder of "AVISTA VENTURES COMPANY" - Marshall Islands (Est: 2015)

- Founder of "INTERNATIONAL ARMOUR Co" - Greece (Est: 2008)

- Founder of "RISK DEFENSE & SAFETY (RDS)" - Cyprus (Est: 2012)

- Founder of "INTERARMOUR (CY)" - Cyprus (Est: 2015)

- Founder of "INTERNATIONAL ARMOUR" - United Kingdom (Est: 2015)

- Founder of "INTERNATIONAL ARMOUR" - Serbia (Est: 2015)

- Founder of "RISK INTERNATIONAL SECURITY MANAGEMENT SA", an Executive Security

Services Company (Est: 2004)

- Founder of "RISK INTERNATIONAL PROTECTION SCIENCES INSTITUTE Ltd", a Security and

Law Enforcement Training Institute (Est: 2004)

- Founder of "RISK INTERNATIONAL DEFENSE Ltd", a Defense and High Technology Security and

Safety Products and Services Company (Est: 2003)

- Founder of "INFOMATIC SYSTEMS & TECHNOLOGY Ltd", a High Technology Systems and

Software Company (Est: 1989)

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*founder of all the Olympus Satellites Business and Strategic partners"

Olympus Satellites Business and Strategic partners

Olympus Satellites has the full support and is officially cooperate as main business and strategic partner with International Armour Co in Greece, AVISTA VENTURES Company in Marshall Islands, AVERSA Company in Bulgaria, Vassili Group in Seycheles and RISK Defense & Safety Company in Cyprus.

All these Companies are fully support Olympus Satellites project as the people behind are expertise for many years in high technology telecommunication systems related to defense, security and safety (sea and land organizations)

Satellite Design

- MARECS

- ECS

- LSAT

Satellite Procurement

- UNISAT

- INMARSAT 2

- INMARSAT 3

- HELLAS SAT Monitoring - Assembly Integration - Test - Launch

- INTELSAT 6 (5 Satellites)

- INTELSAT 7 (5 Satellites)

- INTELSAT 7A (4 Satellites)

- NILESAT (2 Satellites)

- ST1

- HELLAS SAT

- HYLAS

- ARABSAT 5 (3 Satellites)

- MEASAT

Affiliate links on "the Founder" tab

AVISTA VENTURES MARINE SERVICES

http://www.avista-ventures.com/index.php

Partnered with KYPROSUN

Combining traditional person to person contact with the best appropriate, modern technology and a constant monitoring of the quality of products and the standards of services provided, AVISTA VENTURES serves the needs of all sectors of the International Maritime Market.

"We take pride in our experience. We are one of the oldest firms in maritime industry while the people behind the name have been in this business for many years servicing vessels and shipping companies in various positions complying and accomplish all their maritime needs"

Responsibility in the following major tasks:

 Port Agency

- Operators

- Maritime Security

- Ship Management

- Yacht Management

- Technical management

- ISM / ISPS management

- Crew management

- Ships / Yachts Chartering

- S&P (Ships / Yachts)

- Chartering Services

- Accounting & Financial management

- Insurance Arrangements.

- Legal Services & Consulting

- Claim handling

- Ship’s detention & arrest

- Arbitrations

- Marine casualty

- Salvage

- Flag registrations

Current projects

Olympus TeleCommunication Satellites Constellation

NEW MarSec floating armory

AVISTA Ventures and INTERNATIONAL ARMOUR are in the process to locate a new ocean going ship legal licensed to act as a Maritime Security Floating Armory in Gulf of Oman or in Red Sea (subject to the final decision of Companies marketing department research), in order to provide full accommodation, services and equipment storage to MARSEC Companies under Hotel Standards.

http://www.armour.gr/farmory.php

DEC 2015: Up to date, 84 MARSEC Companies declared their real written interest to use our forthcoming floating armory under special prices, terms, conditions and priorities.

Airline project

http://www.avista-ventures.com/projects.php

AVISTA Ventures and Cpt. Theodoros Kokmotos founder of CRONUS AIRLINES, GALAXY AIRWAYS and ALEXANDAIR are in the process of an investment in a new airline company that will connect countries of Africa with Europe but also some Asian countries.

Project will be start as soon as the relevant funds will be retained for the investment in small

as well as big size airplanes.

See the below PDF for Plane fleet details

http://avista-ventures.com/catalogues/airlinesproject.pdf

Affilaite links on site

INTERNATIONAL ARMOUR DEFENCE AND SAFETY

http://www.armour.gr/farmory.php

http://www.avista-ventures.com/projects.php

http://ats.com.jo/

INTERNATIONAL ARMOUR DEFENCE AND SAFETY

http://www.armour.gr/p03.php

MINISTRY OF PUBLIC ORDER CERTIFIED

MINISTRY OF DEFENSE CERTIFIED

ICoC SIGNATORY COMPANY

NATO CERTIFIED (NCAGE CODE G2181)

UNGM REGISTER COMPANY (400640)

We are ICoC signatory company, NATO certified Company, we have obtained from the Hellenic Government - Ministry of Public Order/MOD - all relevant commercial and services licenses and we have meet all the criteria and qualifications, under law, to provide defense and security products and services in all aspects of the safety industry.

We only legal trade with countries/companies that are not under any sanction by the UN and the EU

SECURITY TRAINING (VIP / GUARDING / PERSONNEL / MARITIME SECURITY)

In co-operation with RISK DEFENSE & SAFETY, RISK P.S.I. and AVANT GARDE

Cyprus, we offer high certified education programs in Executive Protection,

Counter Terrorism / Counter-Piracy Studies and Intelligence Operations

Management.

Projects

NEW MarSec floating armory with AVISTA Ventures

http://www.armour.gr/farmory.php

We only legal trade with countries/companies that are not under any sanction by the UN and the EU

Affiliates

http://alfasecuritygroup.com/

Alfa Security Group, is a private security company that provides an array of security services and technology-enabled solutions like consulting, threat and risk analysis, security management, technical design, security engineering, mobile and site security, logistics, intelligence, medical, IT & communications, training, camp construction, critical infrastructure protection, post-conflict reconstruction, operations and maintenance, humanitarian work and emerging market requirements. We are committed to legal, moral, ethical behaviour and support global initiatives including the International Code of Conduct for Private Security Companies, the United Nations Global Compact and Voluntary Principles on Security and Human Rights.

Vassili Group

http://www.vassili-group.com/

Services and solutions for green energy, development, light steel construction and infrastructure globally, focusing on turn-key services and turn-key bespoke services that are unique to each project and Coordination and Consulting services to the Energy, Construction and Infrastructure global markets.

PLEASE NOTE: The Vassili Group Ltd is registered with the United Nations-UNGM, however, any mention of any UN Agency, Government, Government Agency, European Commissions or European Union within our website is purely for the purpose of expressing their independent activities and are unrelated to the Vassili Group. The Vassili Group Ltd is not a Government Agency, UN Agency or European Commissions Agency.

http://www.vassili-group.com/space-satellites---internet.html

Providing a global satellite system, offering communication services on land, sea and air. In particular the Aeronautical service, which is only available over North America by the USA Air Force, will be available worldwide, when all three satellites are implemented.

Further all, today all shipping companies are ready to pay even more for bandwidth as long as the service is available, stable and above all it is working! Taking into account the market size and the rate of growth in demand for fast mobile internet, the new Satellite system proposed here, is utilizing the Ka-Band, which offers substantially more spectrum to users.

As a result from this investment of three (3) satellites, we expect the acquisition of market share in high speed satellite internet service, equal to 0.4% (as minimum) of today’s almost 3.5 billion worldwide internet real users, thus up to 13.5 million subscribers within 2 years. It is anticipated that this market penetration will continue for the rest of the Satellite’s life (15 years in total from the satellite launch date).

Cellular phones, streaming entertainment, data communications, civil and commercial providers; they are all placing incredible strains on available spectrum bandwidth. In the electromagnetic spectrum, many NASA missions use what is referred to as S-band, and commercial businesses are putting pressure on the government to free up other bands within the electromagnetic spectrum.

​

NASA saw this trend years ago and started opening up a new part of the electromagnetic spectrum called Ka-band. With the need to speed up transmission of high-rate science data from space missions, Ka-band, at 26 GHz, is now considered the spectrum of the future for NASA communications. Compared with S-band, Ka-band has data transmission rates that are hundreds of times faster.

http://www.nasa.gov/mission\_pages/station/research/news/ka\_band

The Ka-Band offers frequency re-use by splitting the service area into cells, very much like the mobile telephony system GSM. This system based on a minimum of three geostationary satellites will offer high speed internet services to mobiles, aircraft, ships at sea as well as land based systems.

The KA-BAND INTERNET SPACE SATELLITE TECHNOLOGY PROJECT is Known as ELEFTHERIA 2629

Glenn Research Center won an R&D 100 Award for development of the NASA/Harris Ka-Band Software-Defined Radio.

This is the first fully reprogrammable space-qualified radio of its kind operating in the Ka-Band frequency range. By providing the ability to upload new software applications once deployed to space, this radio offers future space missions flexibility to recover from problems during development, while on orbit and even adapt to new science opportunities.

There seems to be little mention of satellites

The radio was integrated into the Space Communications and Navigation Testbed on the International Space Station on July 20, 2012, and is now fully operational. Experiments are currently underway, leveraging reprogrammability and the high data rate Ka-Band link from the space station through the Tracking and Data Relay Satellite System.

http://www.nasa.gov/press/2013/november/nasa-glenn-honored-with-rd-100-awards/#.VsSwpPl95ph

Now it did mention Tracking and Data Relay Satellite System (TDRS) but

"Band link from the space station through the Tracking and Data Relay Satellite System"

So it the earth based link system in this case.

SDR on the ISS and a ground station, not a satellite.

But below is the general information

The TDRS Project is building three space communications satellites that are part of a follow-on spacecraft fleet that will replenish NASA's Space Network. The TDRS Project Office at Goddard Space Flight Center manages the TDRS development effort. TDRS is the responsibility of the Space Communications and Navigation (SCaN) office within the Human Exploration and Operations (HEO) Mission Directorate at NASA Headquarters in Washington D.C. Operations of the network are the responsibility of the Space Network Project at Goddard.

In December 2007, NASA signed a contract for Boeing Space Systems to build two third generation TDRS spacecraft for launch in 2013 and 2014. An option for a third TDRS spacecraft was executed in 2011. Within the contract there were required modifications that would enable the White Sands Complex ground system to support the new spacecraft.

The January 30, 2013 launch of TDRS-K began the replenishment of the fleet through the development and deployment of the next generation spacecraft. Replenishment continued with TDRS-L, launched January 23, 2014. TDRS-M will be ready for launch in 2015. These satellites will ensure the Space Network's continuation of around-the-clock, high throughput communications services to NASA's missions; serving the scientific community and human spaceflight program for many years to come.

Space Craft??

http://tdrs.gsfc.nasa.gov/

History

http://tdrs.gsfc.nasa.gov/tdrs/114.html

http://tdrs.gsfc.nasa.gov/tdrs/118.html

SCAN Testbed experiment on baord the ISS

Again "software defined radios (SDRs), and the antennas, avionics and other subsystems"

The testbed's purpose is to allow for the development, testing and demonstration of cutting-edge communications, networking and navigation technologies in the challenging environment of space.

These advances will enable technology developers and mission planners to understand how NASA can use SDRs in future missions as well as develop new concepts, such as new algorithms for determining orbits using GPS.

The technology also can help advance similar communications tools here on Earth.

SDRs are a viable technology for ground based platforms and are already being used in smart phones and other terrestrial applications

So GPS can utilize this radio and its "already being used in smart phones and other terrestrial applications"

This is the first NASA use of communications at Ka-Band using the new constellation of relay satellites. The SCAN Testbed also hosts the first Global Positioning System (GPS) L5 frequency (i.e., a unique aeronautical navigation band) space receiver to study an improved orbit determination capability using multiple GPS frequencies.

http://www.nasa.gov/mission\_pages/station/research/experiments/162.html

SDR is also apparently on the rover Curiosity.

The SCaN Program Office in the Human Exploration and Operations Mission Directorate at NASA Headquarters in Washington manages, oversees and funds the testbed.

Space Telecommunications Radio Standard (STRS) is NASA's standard for common SDR interfaces radio and reconfiguration. The testbed's experiments will contribute SDR applications to the STRS repository, and will enable future hardware platforms to use common, reusable software modules to facilitate interoperability across platforms, and reduce development time and costs.

http://www.nasa.gov/mission\_pages/station/research/news/scan\_testbed\_communication.html

The SCaN Testbed Cooperative Agreement notice allows for academia to use the testbed. The first NASA-external users are expected to run experiments on the testbed by 2014.

https://spaceflightsystems.grc.nasa.gov/sopo/scsmo/scan-testbed/potential-experimenter-information/

The radios provide different and complimentary capabilities while having the ability to reconfigure their functions based in signal processing hardware (e.g., processors or field programmable gate arrays). The functions performed by the radios include communication with the Tracking and Data Relay Satellite (TDRS) system in both S-Band and Ka-Band, receive Global Positioning Satellite (GPS) signals, and enable proximity communications between the International Space Station (ISS) and approaching vehicles.

The hardware consists of a flight enclosure mounted on a Flight Releaseable Attachment Mechanism (FRAM). There are five main components of the payload: the avionics system, the software defined radios, the radio frequency (RF) subsystem, the antenna pointing system, and heaters. Except for the five externally mounted antennas, most of the subsystems are installed on the inside of the enclosure.

Space Applications

The SCAN Testbed offers different radio hardware providers and various software providers a chance to demonstrate their capability in space, and tests a new communications capability for future space missions. A flexible radio system would allow spacecraft crews and ground teams to recover from unpredicted errors or changes in the system. Using the same hardware platform for various missions, and only changing the software to meet specific mission needs, would also reduce costs and risks .

Earth Applications

Radio technology designed for use in space could also be used in ground-based platforms that have limited memory and processing capability. Studying a common, open, software architecture for use in space could spark the development of open technology standards for other radio uses on the ground, such as satellite radio.

Operations

Operational Requirements

SCAN Testbed requires a frequency assignment between the flight system on ISS and TDRS at S-Band and Ka-Band, as well as a command and control interface to/from the ground to the payload system to configure the radios and antenna systems. A data connection, separate from the ISS, provides a bi-directional connection between the radios and ground stations (e.g., White Sands). Individual SCAN Testbed experiments are conducted using the testbed on a regular basis, within operational constraints. Experiments are expected to be conducted on a weekly or bi-weekly basis, ranging from 60 minutes to several days in durations. In order to point antennas, the SCAN Testbed needs ISS position and attitude information.

Operational Protocols

SCAN Testbed is an external payload which requires no crew interaction. Commands are sent from the GRC Telescience Support Center (TSC) to configure and operate a radio for an experiment. A typical S-Band or Ka-Band experiment involves sending pseudorandom or network traffic experiment data to or from the on-board radios through the Space Network (SN) program satellites, the Near Earth Network (NEN) or various ground stations and the TSC. For GPS experiments, a radio is specifically configured to receive and process GPS signals. GPS data is collected on-board and sent to ground via telemetry. Various parameters and data quality measures are routinely manipulated and examined in order to determine the efficacy of the test software on the radios.

Related Publications

Briones JC, Handler LM, Johnson SK, Nappier J, Gnepp S, Kacpura TJ, Reinhart RC, Hall CS, Mortensen D. Space Telecommunications Radio System (STRS) Definitions and Acronyms. NASA Technical Memorandum; 2008.

Briones JC, Handler LM, Hall SC, Reinhart RC, Kacpura TJ. Case Study: Using the OMG SWRADIO Profile and SDR Forum Input for NASA's Space Telecommunications Radio System. NASA Technical Memorandum; 2009.

Reinhart RC, Johnson SK, Kacpura TJ, Hall CS, Smith CR, Liebetreu J. Open Architecture Standard for NASA's Software-Defined Space Telecommunications Radio Systems. Proceedings of the IEEE. 2007; 95(10): 1986-1993. DOI: 10.1109/JPROC.2007.905071.

Johnson SK, Reinhart RC, Kacpura TJ. CoNNeCT’s Approach for the Development of Three Software Defined Radios for Space Application. 2012 IEEE Aerospace Conference, Big Sky, MT; 2012 March 3-10 1-13.

AVISTA VENTURES MARINE

http://www.avista-ventures.com/index.php

Check dates for sputnik and what it was for as the russisnas were sending up sent [meteorological rockets](https://en.wikipedia.org/wiki/Sounding_rocket) up to a height of 80 kilometres from Weather ships.

 https://en.wikipedia.org/wiki/Weather\_ship

n 1963, the entire fleet won the [Flight Safety Foundation](https://en.wikipedia.org/wiki/Flight_Safety_Foundation) award for their distinguished service to aviation.[[4]](https://en.wikipedia.org/wiki/Weather_ship#cite_note-BritishShips-4) In 1965, there were a total of 21 vessels in the weather ship network. Nine were from the United States, four from the United Kingdom, three from France, two from the [Netherlands](https://en.wikipedia.org/wiki/Netherlands), two from [Norway](https://en.wikipedia.org/wiki/Norway), and one from Canada. In addition to the routine hourly weather observations and upper air flights four times a day, two [Russian](https://en.wikipedia.org/wiki/Soviet_Union) ships in the northern and central Pacific ocean sent [meteorological rockets](https://en.wikipedia.org/wiki/Sounding_rocket) up to a height of 80 kilometres (50 mi). For a time, there was a Dutch weather ship stationed in the Indian Ocean. The network left the [Southern Hemisphere](https://en.wikipedia.org/wiki/Southern_Hemisphere) mainly uncovered.[[20]](https://en.wikipedia.org/wiki/Weather_ship#cite_note-1965physics-20) South Africa maintained a weather ship near latitude [40° South](https://en.wikipedia.org/wiki/40th_parallel_south), longitude [10° East](https://en.wikipedia.org/wiki/10th_meridian_east) between September 1969 and March 1974.[[23]](https://en.wikipedia.org/wiki/Weather_ship#cite_note-23)

**The Global Telecommunication System (GTS)**

**Ran by WMO from the UN – flat earth map**

**Also associated with**

 [International Civil Aviation Organization](https://en.wikipedia.org/wiki/International_Civil_Aviation_Organization) (ICAO) and the [Intergovernmental Oceanographic Commission (OIC)](http://www.unesco.org/new/en/natural-sciences/ioc-oceans/) both specialized body of the  [United Nations](https://en.wikipedia.org/wiki/United_Nations%22%20%5Ct%20%22_blank)

http://www.wmo.int/pages/prog/www/TEM/GTS/index\_en.html

The GTS has a hierarchical structure on three levels:

The [Main Telecommunication Network (MTN](http://www.wmo.int/pages/prog/www/TEM/GTS/GTSmanual_Excerpt/mtn.html)), linking together three World Meteorological Centres (WMCs) (Melbourne, Moscow and Washington) and 15 Regional Telecommunication Hubs (RTHs) (Algiers, Beijing, Bracknell, Brasilia, Buenos Aires, Cairo, Dakar, Jeddah, Nairobi, New Delhi, Offenbach, Toulouse, Prague, Sofia and Tokyo) see Figure 1. This core network has the function of providing an efficient, rapid and reliable communication service between the Meteorological Telecommunication Centres (MTCs).

The Regional Meteorological Telecommunication Networks (RMTNs) is an integrated network of circuits covering the six WMO regions - [Africa](http://wis.wmo.int/file%3D793), [Asia](http://wis.wmo.int/file%3D819), [South America](http://wis.wmo.int/file%3D807), [North America, Central America and the Caribbean](http://wis.wmo.int/file%3D809), [South-West Pacific](http://wis.wmo.int/file%3D811), [Europe](http://wis.wmo.int/file%3D815) and [Antarctic](http://wis.wmo.int/file%3D817) - and interconnecting the MTCs thus ensuring the collection of observational data and regional selective distribution of meteorological and other related information to Members. Until the integrated network is completed, [HF-radio-broadcasts](http://www.wmo.int/pages/prog/www/ois/Operational_Information/VolC2_en.html) may be used in order to meet the requirements of the WWW for the dissemination of meteorological information.

The National Meteorological Telecommunication Networks (NMTNs) enable the National Meteorological Centres (NMCs) to collect observational data and receive and distribute meteorological information on a national level.

[Satellite-based data collection and/or data distribution systems](http://www.wmo.int/pages/prog/www/ois/Operational_Information/VolC2_en.html) are also integrated in the GTS as an essential element of the global, regional and national levels of the GTS. Data collection systems operated via geostationary or near-polar orbiting meteorological/environmental satellites, including ARGOS, are widely used for the collection of observational data from Data Collection Platforms. Marine data are also collected through the International Maritime Mobile Service and through INMARSAT. International data distribution systems operated either via meteorological satellites such as the Meteorological Data Distribution (MDD) of METEOSAT, or via telecommunication satellites, such as[RETIM or FAX-E via EUTELSAT](http://www.wmo.int/pages/prog/www/ois/Operational_Information/VolC2_en.html) are efficiently complementing the point-to-point GTS circuits. Several Countries, including Argentina, Canada, China, France, India, Indonesia, Mexico, Saudi Arabia, Thailand and the USA, have implemented satellite-based multi-point telecommunication systems for their national Meteorological Telecommunication Network.

Their satellite staus link

<http://www.wmo.int/pages/prog/sat/satellitestatus.php>

**10. WMO Antarctic Activities (WMOAA)**

http://www.wmo.int/pages/summary/prog\_description\_en.html

10.1 Purpose and scope

10.1.1 The WMOAA programme coordinates operational meteorological activities in Antarctica carried out by nations and groups of nations and under the auspices of the WMO Executive Council. Within the framework of the Antarctic Treaty, it focuses on the interfaces between these activities and relevant WMO Programmes to ensure continuity of weather, climate, water and related environmental programmes in the Antarctic in meeting the requirements for meteorological services as well as for environmental monitoring and climate research. Important stakeholders in this engagement include the WMO technical commissions, regional associations, the IOC, Antarctic Treaty Consultative Meeting (ATCM), and key science groups such as the ICSU, SCAR, IASC and WCRP.

10.1.2 The WMOAA programme, as a component of the WWW Programme, effectively contributes to the implementation of all the WMO Expected Results of the WMO Strategic Plan. Many of the activities are strongly linked with all other WMO Programmes. It will provide direct support to all WMO high priority areas, namely GFCS, DRR, WIGOS and WIS, Capacity-building and Aeronautical Meteorology.

10.2 Main long-term objectives:

(a) Coordinate implementation and operation of the basic systems of the WWW to meet the requirements for meteorological services and research activities in the Antarctic, including climate and environment monitoring;

(b)  Collaborate with other international organizations and programmes in Antarctica in order to ensure a coordinated and cost-effective scientific and technical programme.