

Digital Communication Technologies EXPERTISE Journal

DİJİTAL YAŞAM

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SMALL SATELLITES AND CUBESATS

A Game Changer in Space Technology Development
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FIBER OPTIC EQUIPMENTS p.18

5G SERVICES p.20

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Dear readers,



Hayrettin ÖZAYDIN

Chairman of TUYAD

Nowadays our most important topic is the Corona virus which caused many organizations and meetings to be canceled.

At the same time, wars are still going on in the Middle East which cause people to die. We hope that humanity will get peace and health as deserve soon..

We are always informed about the latest developments of satellite technologies which still provides 60% of all technologies to be carried thanks to the power of communication.

The most important organizations of the telecommunication industry, Satellite 2020 and Cabsat fairs and conferences will enable us to be aware of the latest technology and innovative products.

One of the most striking topic in this fairs is going to be the close orbit, personal satellites.

In the communication we are about to welcome a new term, by forcing special data transfer and satellite capabilities which results with the usage of field marking even laser marking technologies will be applied.

Since the day of his existence, humanity continues the war of superiority at every opportunity and destroys people with this ego.

We hope this ambition does not come up with satellite wars in low orbit satellites. R&D studies continue in this direction.

Another important issue in 2020 will be 5G technology. Small satellites will be able to communicate directly with mobile systems.

5G will offer faster services with less latency, so more devices around the world will be connected and life will be faster and easier.

Therefore, the maximum level of harmony between IoT and 5G will be critical in the development of new technologies.

When 5G technology spreads, communication between the Internet of Things in many sectors and areas will be much easier.

The fastest rising trend in TV viewing options in 2019 is IP TV (internet TV).

In 2019 nearly 30 million set-top boxes are produced and exported

from Republic of Turkey and IPTV applied almost 80% of them.

TUYAD FREE IP TV, has been a technology that used for the last three years. FREE IP TV, which makes all televisions smart and reaches many applications, provides not only TV watching technology, but also rating measurement and regional advertising.

Turkey is the only technology portal of gas and oil rich Middle East, that opens to Europe. Our country, which is developing and growing in every field, is a safe and fertile port for all investors.

Turkey is ready for international cooperation with its dynamic local distribution network, adhering to all good faith principle agreements.

The industrialists who produce and develop technology can reach economic and qualified workforce in Turkey.

Our magazine Digital Life will continue to be the sectoral communication power. I wish that communication is used for "peace at home and for peace in the World" and may success be with you in your business and life.

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GVF Dialogues for 21st Century Satellite

At the most recent International Telecommunication Union World Radiocommunication Conference (WRC) regulators and industry representatives gathered to discuss competing claims for spectrum, determining its allocation between satellite and other sectors such as IMT. The satellite industry was largely focused on proposals to allocate over 33GHz of spectrum to IMT, but only a little over half of this was actually identified for IMT, and important protections for key satellite spectrum in the C, Ku, and Ka-bands were secured.

Another agenda item significant for satellite and with a positive outcome concerned identification of spectrum for mobile uses via satellite, providing high bandwidth services in transport. ESIM-based ('Earth Stations in Motion') satellite services are enjoying healthy growth and this is forecast to continue. WRC-19 increased the spectrum for ESIM services in the 28GHz band and harmonised the international framework for authorising ESIM services. A study to be prepared for WRC-23 will define the conditions for communications of ESIMs with geostationary satellites.

The Conference discussed several other issues impacting on the satellite industry and these will be covered in the opening addresses at the GVF SATEXPO Summit @ CABSAT 2020 (31 March to 1 April) when representatives of both the UAE Telecommunications Regulatory Authority and the ITU's Radiocommunication Bureau Space Services Department will speak.

GVF has a keen interest in NewSpace, or, if you like, Space 2.0. Indeed, I write this just as GVF has announced a new membership package for

'start-ups' in the NewSpace ecosystem. Any analysis of this begins with space no longer being the sole preserve of agencies and big commercial players. Smaller private companies are propelling the sector vigorously forward. The industry is undergoing an entrepreneur-driven industrialisation process going beyond the potential offered by the 'smallsats' segment. Some important questions around this subject are "What are the limits to NewSpace?", "How does it relate to Artificial Intelligence/machine learning?", "How much of a driver is the Industrial Internet of Things (IIoT)?"

Just as the satellite communications industry has evolved from being only a high-CAPEX, bespoke-built GEO satellite, segment, other facets of the satellite business environment are seeing rapid change too. The growth of the 'smallsats' segment in Earth imaging/remote sensing applications has fundamentally changed the scale, scope and potential of Earth observation. Once limited to government space agency big budgets, the technology, build and launch costs of remote sensing spacecraft is now altogether within the scope of a myriad of private companies, including new start-ups and spin-offs from academia. The satellite communications interface with Earth imaging/observation and building insights for sustainable decision-making and achieving the UN Sustainable Development Goals are all elements in a dialogue that will develop in Dubai over 31 March and 1 April.

The subject of disruptive technology is a popular one and certainly continues to manifest itself in both the space and ground segments of the satellite industry: the latest



Martin JARROLD

GVF

GEO high throughput satellites are close to achieving near-terabit capacity, existing medium Earth orbit (MEO) constellations are evolving into more powerful systems, and the first of the low Earth orbit (LEO) mega-constellations are launching. The phenomenon of small satellites is a generational disruption with miniaturisation and low-cost manufacture, improved link budgets, reduced latency and elevated constellation functionality, not forgetting opportunities for new customer markets and applications. Infrastructure on the ground is undergoing a game-changing shift too: teleports are evolving, operations are virtualising to the Cloud, and antennas/terminals are expected soon to feature cost-effective form-factor and performance departures from the traditional parabolic paradigm. All will be explored during the Dubai Summit sessions, along with mobility services, 5G and the Cloud, and robust connectivity and potential vulnerabilities, namely cyber security, interference, and orbital debris.

You can join these dialogues in Dubai at the GVF SATEXPO Summit @ CABSAT 2020.

D-Smart Everywhere!

D-Smart was founded in 2007 and carrying out operations within Demiroren Holding since 2018 as one of the Turkey's leading digital pay TV platform and internet service provider. D-Smart constantly improves its services by adapting to the new dynamics in the market.

D-Smart has approximately 1.2 million subscribers. D-Smart offers Pay TV and internet packages and makes the difference with its package structure. This package structure not only attracts new customers but also increase the customer loyalty. D-Smart closely follows the trends with customer experience centric approach while offering high-quality content.

D-Smart, as a pay TV platform offers variety of content from the worldwide known TV series to award-winning movies which appeal to diverse audience. In addition, documentary channels -including National Geographic and Discovery Group channels- sports, kids, life style, music and radio channels, as well as all national channels. More than 230 channels in total are available in the platform. While D-Smart continues to acquire the broadcast rights of the best movies and series, it also invests on original contents. La Liga Santander, Spanish 1st league will be exclusively available in D-Smart till the end of 2021/22 football season. English Premier League, NBA, Spanish Basketball League, Italian Volleyball League and much more sport content are available in D-Smart. Sports content has been playing a significant role in D Smart's growth.

D-Smart is growing with investments it makes at the intersection of TV entertainment and internet services. D-Smart has been providing internet services since 2010 branded as D-SmartNet. D-Smart sells Internet and TV packages individually or together. D-Smart attracts its customers by offering high quality TV content and internet service with a "single invoice" for all.

Since disruptive change in TV industry occurs rapidly, D-Smart launched its new OTT service branded as D-Smart GO for its subscribers. D-Smart GO has been offered as a free of service for its existing subscribers commencing from July 2019. The subscribers were allowed to watch their package content without paying any extra fee for D-Smart GO. Those who



Erkal Filiz
Deputy General Manager

were not yet subscribed to D-Smart satellite TV can only use D-Smart GO on the base of subscription. On the other hand, D-SmartNet subscribers are buying D-Smart GO at discount prices by means of "buy together" campaigns.

D-Smart GO users can watch D-Smart contents whenever and wherever they want with their smart phones, computers, tablets and smart televisions. By the help of its advanced features, D-Smart GO offers 109 TV channels and thousands of hours of VOD content as an enjoyable TV viewing experience in full HD video quality. Programs on TV channels can be recorded in the cloud and stored for later viewing with the "Cloud Recording". TV channels can be time-shifted back up to 3 days. 4K and download-watch features will be available soon.

The way of watching TV has been changing very rapidly for the last decade in the world. Sticking to linear TV program flow and watching TV only on TV set has been declining. People wants to watch TV anytime, anywhere and on any screen. This "freedom of watching" is the major expectations of the viewers. Keeping this fact in mind D-Smart is marketing D-Smart GO with "D-Smart GO Özgürlük O" motto. Variety of TV channels and rich VOD catalog are offered with an excellent user experience in D-Smart GO; regardless of time, place and screen...

In Turkey, the biggest problem in OTT video market is pirated streaming. The most valuable content is stolen by pirates and even sold by subscription. These pirates make huge profits and missing taxes while damaging legal platforms. It is very important that all stakeholders have to fight with these pirates collectively and effectively for the legal market to grow.



All the entertainment of the world is yours **with D-Smart**

D-Smart is everywhere, you can enjoy infinite choices of TV packages and internet bundles as you wish. Moreover, with D-Smart GO your favorite TV series, movies and so much more are always yours on demand.



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D-SMART



Orange and SES Team up on O3b mPOWER Communications System

Orange will be the first global telecom operator to integrate satellite-based revolutionary terabit-scale O3b mPOWER communications system in its network, to support the growing demand for connectivity in Africa.

Orange, one of the world's leading multi-service telecommunications operators and present in 18 countries in Africa, will be the first telco to adopt the ground-breaking O3b mPOWER, SES's next-generation Medium Earth Orbit (MEO) satellite communications system, to exponentially ramp up its consumer and business services, starting in the Central African Republic.

O3b mPOWER is the world's only fully-funded non-geostationary orbit (NGSO) broadband system in development today. Positioned at only 8,000 kilometres away from Earth, the system will power low-latency high-throughput solutions that can be seamlessly integrated into existing terrestrial networks. When operational in 2022, O3b mPOWER will provide multiple terabits of throughput globally to drive digital transformation and cloud adoption virtually anywhere on the planet.

The highly flexible O3b mPOWER constellation comprises ultra-high-capacity, low-latency, high-power MEO satellites, each with up to 5,000 fully-shapeable and steerable beams that can be shifted and scaled in real-time to meet customers' demands. The system is ideally suited for domestic cellular backhaul and simultaneous international IP trunking applications.

Orange has been a customer and early adopter of SES's current generation O3b MEO managed

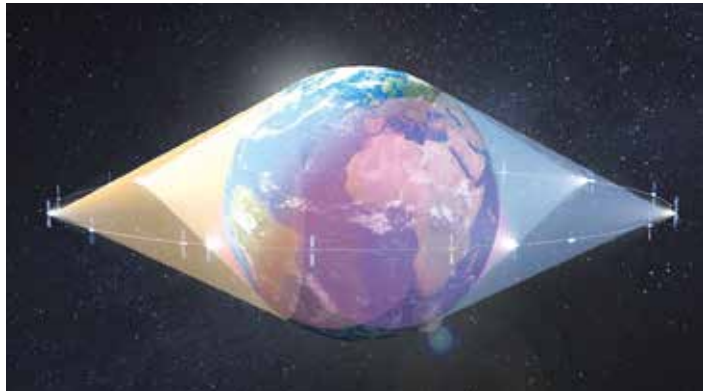
services since 2017. Orange is a strategic partner for SES with its large presence in Africa and the Middle East, and with satellite gateways in several countries on the continent. With O3b mPOWER, Orange will substantially increase its low-latency MEO-enabled capabilities to support the growth of its bandwidth demand, driven by the ever-growing customer base, the new digital uses and financial services. The revolutionary system will enable Orange to offer high broadband and seamless connectivity, while extending geographical reach.

In addition, Orange Central African Republic will leverage the world's only multi-orbit network, utilising SES's MEO and GEO (Geostationary Earth Orbit) satellites to connect and aggregate 2G/3G traffic from remote base stations around the country to the core network in the capital of Bangui. This gives the operator a single source for cellular backhaul and core IP transit, as well as a consistent and seamless experience between the MEO and GEO services.

"We are thrilled to be partners and early adopters of this innovation with SES, and to be able to offer high-quality connectivity

in the most remote locations of the Central African Republic. This longstanding partnership fully aligns with our mission of building smarter and open networks to bridge the digital divide in Africa, and to increase the speed and geographic reach of our network," said Jean-Luc Vuillemin, Executive Vice President at Orange International Networks Infrastructures and Services.

"This new agreement marks a very important milestone for both our companies and also for the broader industry. With the innovative O3b mPOWER system, Orange and SES are revolutionising the telco market, and the way networks can be extended and improved," said JP Hemingway, CEO of SES Networks. "With its ability to power a wide range of telecommunications needs, including cellular backhaul and high-performance cloud connectivity, O3b mPOWER – together with other terrestrial infrastructure – is key to connecting remote and underserved regions in the most economically viable way."





SOCIAL MEDIA & CHILDREN

Social media is an indispensable atmosphere for children and adults living in the current age to experience their creativity and sociability.

Social media can be considered as all indispensable applications in terms of serving many purposes such as making friends, having fun, following the innovations and acquiring a new identity. Over time, a child exposed to technology is beginning to accept the internet as a thought system. In activities that require attention and focus, children's imaginations develop less and slowly, as visual perceptions change very quickly and focus on very few of the written or visual resources in the current activity.

To calm an angry child, the tablet or mobile phone may appear as a good shortcut and be an instant savior. While this solution provides instant relief to our child, we actually teach our child to choose technological equipment as a way of relieving himself. In such cases, children cannot develop their ability to control their emotional state and cope with problems.

Family rules about social media use can be beneficial for children to use social media more safely and aware of their responsibilities. The suggestions that can be applied within the family in this regard can be listed as follows;

- Household areas where social media use is appropriate or not appropriate can be determined. For example, using social media only in communal areas of the house.
- Agreeing that any video, photo or audio recording that will offend or humiliate other people should not be shared.
- Agreeing on the internet that personal information should not be shared. For example; home address, identity number, place of birth, username or password, bank account number, etc.



Mert ÖZAYDIN

Specialist Psychologist

“Our customers should be very careful not to be damaged by unauthorized services.”

Celebrating its 40th anniversary last year, Sunny-Atmaca Elektronik A.Ş. continues its promotion and consumer accompaniment, which shares product portfolio information and tips on product use, does not neglect to warn consumers against possible risks.

In the statement made by Mr. Mustafa Gökçe, Director of Sunny Customer Services Center, it was stated that the customers called the Sunny Call Center 444 9 666 recently stated that the customers stated their grievances due to the wrong interventions made by unauthorized services.

Mr. Gökçe says “Unauthorized services leave our consumers in a difficult situation. The activities of people with low experience and technical knowledge in electronics and white goods both make our customers victimized and disturb our colleagues who earn money in our industry. In case of any malfunction, consumers may have problems with the repair of their products with unauthorized services they access from the internet or unknown number services. Problems cannot be solved in a healthy way due to the absence of original spare parts, or costly operations are carried out costly to these state-of-the-art devices. The products are out of warranty due to unauthorized service intervention, and the consumer suffers more.”

“Our customers should be very careful not to be damaged by unauthorized services. Of course we also have responsibilities in this regard. As Sunny-Atmaca Elektronik, we make legal warnings through our lawyers against unauthorized services that use our brand without permission as a result of our research on the internet. 444 9 666 is phone number of our Customer Contact Center can be accessed from all over Turkey and we printed that phone number on all current user manuals and product

boxes, also we share at our website and our social media accounts.”

“We advise our consumers not to hand over their devices to anyone for maintenance or repair without confirming the authorized service information by calling our Customer contact center.”

Mr. Gökçe, which has created a first in the field of sales of original spare parts and accessories through the website <http://yedekparca.sunny.com.tr>, thus prevented unauthorized repairers from using non-original, poor quality and fake spare parts.

Sunny Customer Service Center offers fast and quality service since 40 years with more than 230 authorized and trained service points.



Brand of Turkey, choice of the World

FRAMELESS



SUNNY

Sustainable Leadership

Telecommunication and satellite technologies are at the forefront with the power that transforms societies in our century. Their existence carries our quality of life to highest levels, though their absence is felt immediately.

In this sector, you can increase the importance of your brand by designing and manufacturing innovative products and by setting new target markets according to your product portfolio.

The telecommunications industry players, should focus bringing together applicable and sustainable solutions due to technologies dynamic structure.

At this point, strategically correct planning of your steps and choices are very important in terms of creating major differences while achieving your goals. Thanks to an effective strategic planning, you could support the key accounts who hold the corners of the sector as their solution partner or you are able to become a brand that has an impact in your geographical region by including those companies under your supply chain.

As a matter of fact, the success of telecommunication companies who have the mission of leading the industry will be directly related to their adaptability of integrated evolution strategies.

We, as Hedef Trading, have been providing consultancy services to our customers on the main topics of export business development and import purchasing solutions since 1989.

Thanks to our global leading role in telecommunications industry, we ensure our business partners to become significantly successful in their own field.

We believe that the most powerful competitors of the companies should be themselves in the commercial environment, where competition is getting more and more aggressive day by day.

We turn our clients to important players of the industry in short term, respectable solution and business partners in medium term and strong brands in long term by combining efficient institutional strategies with boutique corporate communication manners.

Every institution has a vision to become a world brand which will only be possible by choosing the right solution partner for sustainable leadership now and in the future.



CORRECT ANSWER in TV technology in TURKEY

Hedef Koç Consultancy- the partner company of TUYAD- is providing career services to another companies.

With the features requested by the companies, we assume preparing and announcing the job advertisements, evaluating the applications and determining the most suitable candidates for the job position. Also, we make personnel profile analysis test for each candidates to specify if the candidate matches with the related position according to their characteristic features and unique selling propositions. In addition, we are making the same profile analysis test to all employees of the company.

If you are looking for colleagues for your company, you can with Hedef Koç Consulting.

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 **Hedef Koç**
Consultancy

8K TECHNOLOGY



Caner SORGUN

Atlanta

Video watching has an important place among the activities that people love to do. Today, technology is constantly evolving, almost every kind of content is recorded as video content and presented to the service of the audience.

The pleasure of watching videos accessed from television, set top box, internet, tablets and phones is of course directly proportional to the content of the video as well as the image quality. That's why the quality of the resolution is so important. High definition videos are more quality and they are watched with pleasure.

What does the "K" expression appear in the videos mean?

One of the most common expressions and symbols in the video content is the expression "K". The resolution of a video is pixelated. The letter K is used to denote the amount of horizontal pixels in these videos. The letter K is used when referring to 1000 pixels. In this case, we can say that it is 4000 pixels for 4K images. Again, we can say that it consists of 8000 pixels for 8K.

What to Know About 8K Technology?

As technology develops, as in every area, it is trying to get better quality than the one available in the video area, to obtain a good image quality and to serve the users. With the quality of 4K, it is only beginning to become accessible and relatively low cost, and with

8k technology, the image quality will increase gradually. A video prepared with 8k will allow others to watch a video of relatively realistic dimensions. Thanks to its pixels, a smooth screen image will also increase quality and cost.

8k image quality corresponds to 4320p quality. The photo taken in 8k is 33 megapixel quality. 8k quality is not very common yet. The contents prepared in this quality are shown only in a few fairs, but since the technology is rapidly disseminated, it is expected that many users will reach 8k quality products in a very short time and at a lower cost and more easily.

Türksat A.Ş., the third company in the world that performs the "Ultra HD 8K" test, attracts attention as the only channel that continues to broadcast on satellite. Ultra HD 8K technology, which carries out test broadcasts on Türksat-3A and Türksat-4B satellites, provides 16 times the resolution of HD broadcasts.

Türksat became in the world to perform Ultra HD 8K test after Japan and Luxembourg companies. Although other organizations stop their 8K signal after a short-term test but Türksat stands out as the only company that continues to broadcast on satellite.



AFTER-SALES SERVICE

SERBIS

In accordance with Consumer Protection Law 6502 an obligation exists for the provision of service to the durable goods stated in the regulation after sales.

The consumer who needs to get the goods repaired within the scope of the relevant law acquires a service from the authorized companies related to the brand of the good to fix the problems. As most of the people around the world do, we recently try to manage all our businesses (shopping, bill payment etc.) via the internet with the increasing areas of communication, especially on the internet and social media. Since malicious companies that tend to abuse these facilities for their unacceptable and illegal purposes, the consumers might deal with some unpleasant situations. In case of needing service for repairing the goods, the costumers usually look for authorized service companies by web search engines for their goods that have a legal guarantee. However, it is unfortunate that the companies found on the internet is mostly unauthorized.

Most of us probably have seen and read the news regarding the unpleasant situations faced by the consumers due to poor quality service of these unauthorized companies through electronic, print and social media. Even, some of us have experienced directly. To solve such a problem, the Ministry of Trade initiated the Service Information System (SERBIS) project within the scope of the

180-Day Program pertaining to the Presidency of Turkey. This project aims to providing our consumers with getting information easily and truly about current authorized services which are furthermore highly qualified. The Ministry of Trade will be able to access the current information about the authorized service companies of the product used by the consumer through the website www.servis.gov.tr prepared for the project. Therefore, fraudulent companies can be prevented from misleading and victimizing the consumers. Eventually, not only the brand values of, but commercial reputation of the companies could be preserved as well. After the project is fully completed, SERBIS will enable consumers to access the authorized services of the companies as an only reliable way.

In this project, the companies as importer and manufacturer have a significant mission. They should frequently keep the current list of the authorized service companies updated on this portal whereby the consumers can access the authorized service companies for their goods fast and accurately. To get authentic information, I suggest that the consumers usually check both the corporate websites related to their goods and SERBIS.



Mesut TOKAY

Mesut Electronics

“
SERBIS will enable consumers to access the authorized services of the companies as an only reliable way.
”

TURKSAT KABLO SERVICES

Türksat Kablo provides services to 1.3 million households with high-speed broadband internet access up to 100 Mbps through fiber optic cable infrastructure, digital TV service including more than 200 TV channels, domestic and foreign, Web platform carrying movies, series, documentaries and TV channels, and the phone service that it provides over the internet.

Our Turksat Kablo Services;

KabloTV

KabloTV is Turkey's first and only cable digital TV platform system that has been at the service of our customers since 2008, which is transmitted through cable network as digitally compressed and encrypted and can be watched by connecting a Module/HD Box/i-Box with a decoder card to the TV. Currently, it transmits a total of 203 digital TV channels, of which 105 are HD and 1 is 4K, via TV systems offered in 24 provinces. KabloTV packages consist of KabloTV Entrance, KabloTV Basic and KabloTV Extended packages. Besides, Vizioon Cinema Package and Golden Cinema Package are among our services with their rich contents. Turkey's only catch-up documentary package Nat-Geo+, Catch-up content service Filmboxlive and Premium Sport

package of Türksat Kablo, which offers packages suitable for all tastes to its subscribers, are among other TV packages.

KabloWebTV

With KabloWebTV; cinema, TV series and TV channels on KabloTV platform can be watched in everywhere via computer and mobile devices.

Kablonet

With its technical superiority in the bandwidth and bi-directional communication of cable networks, it offers internet, data and interactive services as well. Kablonet is a system that provides internet connection without the need for any internet service provider and telephone



line via a modem connected to the computer over KabloTV network. It is a service currently offered at speeds up to 100 Mbps in all 24 provinces. Kablonet can simply be called as internet service over KabloTV line. Quota/Fixed Quota/Unlimited/Smart Unlimited/Symmetrical Kablonet tariffs are the tariffs offered within this service.

Kablonet Services

With 7 services such as No Sleep, No Sleep Plus, Upload Package, Quota Package, Nitro, Nitro Upload, Nitro Plus, extra speed and download/upload needs of customers are met. The service of counting the hours of 00:00-09:00 out of quota with No Sleep service, 100 Mbps service for 24 hours with Nitro, 10 Mbps upload service for 24 hours with Nitro Upload, 100 Mbps download and 10 Mbps upload service for 24 hours with Nitro plus can be purchased.

Secure Internet

It is a free and easy-to-use system that protects our customers from inappropriate content and harmful websites on the Internet. There is no need to install software on your computer. It offers you two alternatives: Family Profile and Child Profile. You can get Secure Internet Service whenever you want, change your profile whenever you want, you can give up the secure internet service if you want.

Kablo Bulut

It is a web, mobile and desktop based file hosting application that can store files in the size of storage areas, share desired files with other users in the cloud environment, and create open shares with or without encryption via connections accessible from the external environment. It is possible to upload and



download a large amount of data quickly with Kablo Bulut service. The download and upload speeds may vary depending on the internet speed of the user and the hardware used.

Kabloses

It is the telephone service offered over Kablonet. Customers can benefit from this service by obtaining a telephone number from TURKSAT number inventory or by transferring their existing telephone numbers to Kabloses. You can choose any of the packages that are suitable for your usage habit in the packages offered within the scope of Kabloses service.



FIBER OPTIC EQUIPMENTS

In recent years, besides voice and data information, many infrastructure systems such as fire detection, alarm, card pass, camera, building management systems have started to use IP based systems.



Dr. Uğur KESEN

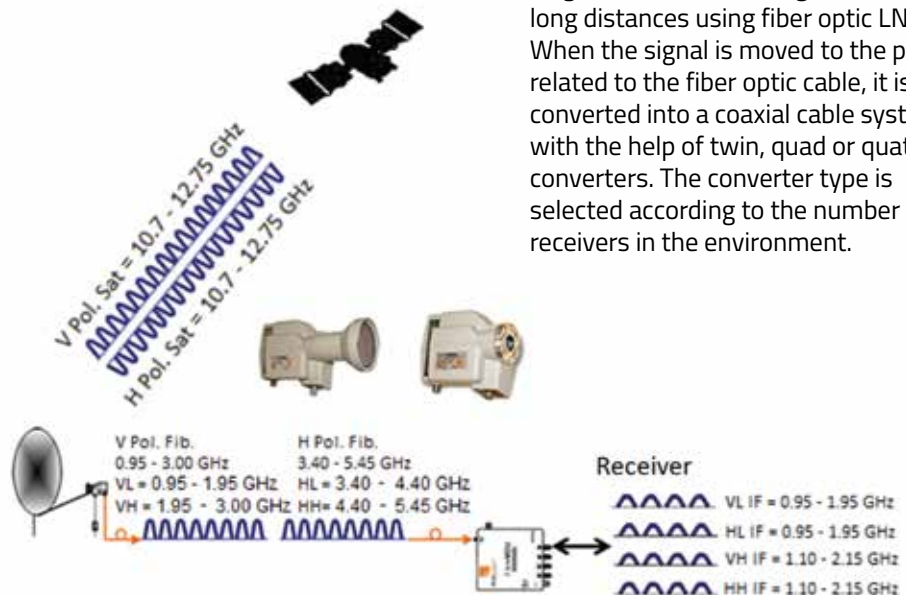
Marmara University

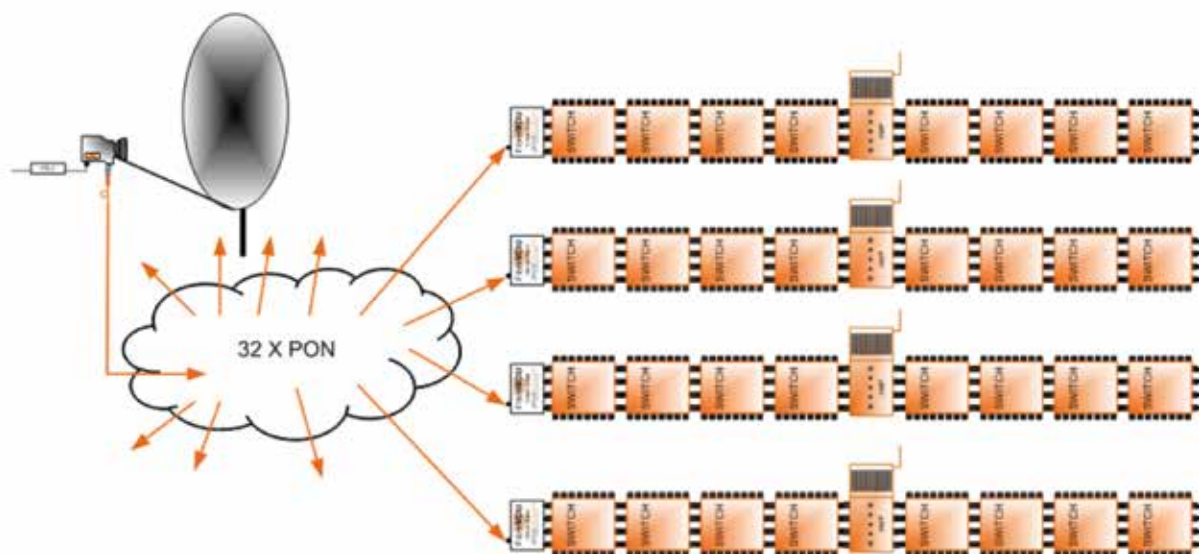
IT infrastructure has become the most critical system of such buildings. IT cabling infrastructure has led to the fact that this type of building or organization plays an important role in all commercial processes. The integration of IP-based communication with different functions over a single network system is carried out over the fiber optic backbone. Fiber optic systems are the ideal communication tool for in-building backbone cabling in terms of providing high bandwidth and high speed support as well as enabling communication up to long distances.

Today, fiber optic technology has become a widespread technology that can be applied not only in telecom and local area networks,

but also in all indoor weak current systems, from the aviation, automotive industry, to security and weak current systems. Access network applications from telecom service provider to buildings or homes are delivered using different types of fiber topologies. These applications, defined as FTTX, show topologies from the service provider to the last point they are delivered.

Fiber optic systems have started to be used in satellite distribution systems with the developing technology. Lossless signal transfer over long distances with FO cable, carrying 4 polarities over a single fiber bristle, low infrastructure cost with less wiring, can be said as advantages of single center distribution systems. 4 polarizations are reduced on a single line to transmit signals over long distances using fiber optic LNBS. When the signal is moved to the point related to the fiber optic cable, it is converted into a coaxial cable system with the help of twin, quad or quattro converters. The converter type is selected according to the number of receivers in the environment.



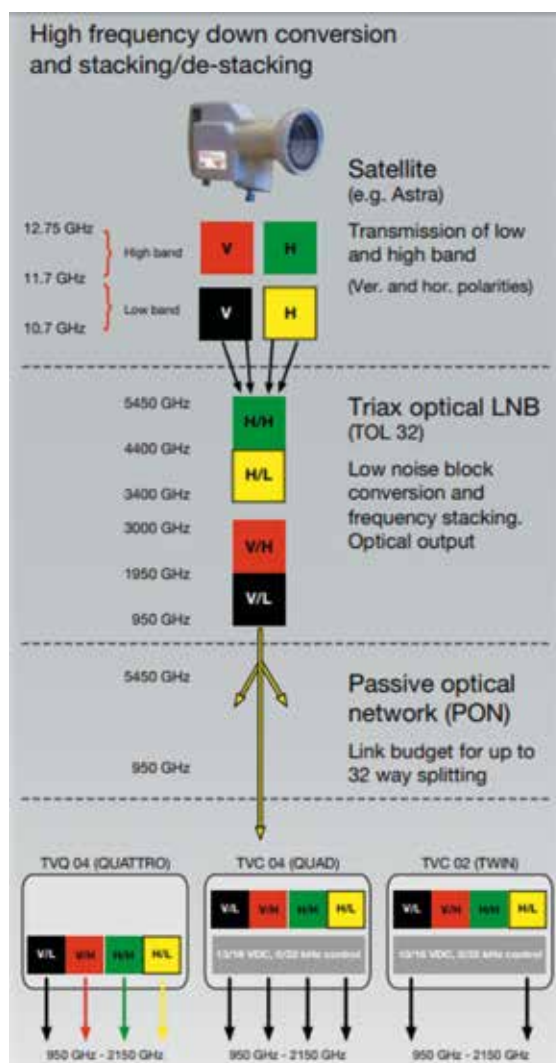


A stacker built into the optical LNB converts the four polarization combinations into different frequency ranges between 0.95 and 5.45 GHz. Afterwards, the RF signal is converted to a digital signal and transmitted by laser via a fiber-optic cable.

At the other end of the fiber-optic cable, the light beam enters a converter box called a GTU (Gateway Termination Unit) where it is transformed back into a signal that is recognizable by any standard satellite receiver.

These GTU's are available in Twin, Quattro or Quad versions. While the Twin and Quad versions are connected directly to a receiver, each output of the Quattro version delivers one of the four band/polarization combos and is typically integrated with existing multiswitches. This means that one fiber-optic cable can carry the entire frequency range of a satellite. A 3mm thick fiber-optic cable running from the optical LNB is all that's needed.

Since the light beam contains the entire frequency spectrum of a satellite, it is possible to connect as many receivers as is needed with each operating independently from all the others – all from this one fibre-optic cable. Even, for example, if an entire large apartment building needs to be supplied with satellite signals, the optical LNB brings with it enormous possibilities.



5G Services

The technology and telecom industry in Turkey has seen significant changes in the last eighteen years under the leadership of our President, His Excellency Recep Tayyip Erdogan and jurisdiction of the Ministry of Transport and Infrastructure. After our President's directives about the transition to 5G, we have taken important steps with our vision to lead the industry in the development of 5G technologies. In the coming years, we aim to increase domestic and national technology production and export in the communications sector in Turkey.



Dr.Ömer Fatih SAYAN

MTI Deputy Minister

Our government has been working on the infrastructure that aims for 5G. Therefore, we decided to establish LTE mobile networks that offer 4.5G services. This decision aims for an appropriate infrastructure for the transition to 5G after its standards are completely determined and put in place in commercial terms.

The standardization work of 5G is about to be concluded soon. Around the world, some countries have begun to deploy non-stand alone 5G services in limited urban areas. In Turkey, we work with

operators, vendors and academia for our country's 5G migration. Such decisions are not only technological. Migrating to a new technology affects the whole ICT industry as well as verticals. It also has consequences on the economy of the country at large. Thus, moving to a next-generation technology is very dependent on how and when you move. It can be considered as both an economic and strategic decision. Until now, Turkey has been a user of electronic communication technologies. With the help of 5G, we will position Turkey as a technology producer. There are various domestic vendors striving





hard to develop 5G end-to-end networks. As the Ministry of Transport and Infrastructure, we try to support all these efforts through various projects with our regulatory authority ICTA.

White Paper

The 5GTR Forum was established to develop high value-added products, services and technologies which will take place in the world market in domestic and national proportions in 5G and beyond. It was also established to develop new generation mobile communication systems with the cooperation of the public industry and academia at the national and international levels as well as other stakeholders in the ecosystem. Working groups for core network, physical network, services, applications and standardization under the 5GTR Forum organization structure were established to render the 5GTR Forum activities efficient in a short period. Under these four working groups, 16 sub-working groups were established and started their activities. These working groups prepared a White Paper including 5G and its priorities and road maps for our country. The 5GTR forum's will also be used to bring the ICT sector and the vertical sectors that will use 5G products and services together.

The 5G Valley Open Test Field Project, which has been created under the coordination of ICTA, covers the region between ODTÜ,

Bilkent, Hacettepe Universities' campuses and ICTA Headquarters. It is aimed to create an environment where universities, research centers, companies and start-ups can test 5G and beyond applications and technologies in addition to creating added value in this region. Currently, various test projects such as V2X and channel modeling are carried on in the 5G Valley using various vendor equipment. The 5G Valley Open Test Field is also conducting studies to establish "The 5G and Beyond Joint Graduate Program" between universities and disciplines to contribute to the cultivation of qualified human resources that our country will need in 5G and Beyond in short, medium and long term. The program aims to produce sustainable competence on advanced communication technologies and to produce outputs in a wide variety of forms such as patents, projects, articles, spin-off companies and thesis studies. All these developments show our determination to pioneer the world in 5G technologies and beyond. In the near future, we will have the opportunity to develop new technologies and standards and to apply them rapidly in Turkey for the first time in the world.

A virtual STB

that provides real-world solution
for your broadcast business



Heinz BEKKER

IRDETO

Since its inception 20 years ago, CAM (conditional access module) technology hasn't lived up to its potential. With capabilities largely limited to content descrambling, CAMs couldn't keep pace with the security and user experience requirements addressed by modern set-top boxes. With the advent of the CI Plus 1.4 standard, Irdeto saw a path to the development of a virtual CAM solution that provides a highly secure, operator-controlled user experience without compromising functionality.

Designed for a one-way, pure broadcast environment, Irdeto Interactive CAM (iCAM) is a virtual set-top box that fully leverages the CI Plus 1.4 standard. It provides all the capabilities and security features of a mid-range hardware STB at a reduced cost.

A critical path to success for any CAM solution is the ability to address the rapid adoption of OTT video services. Analyst firm Ovum forecasts OTT video subscriptions in Turkey to grow 41% and ARPU to nearly double between 2019 and 2023. To address these trends, Irdeto iCAM comes with an integrated HbbTV application. The result is a highly customizable user interface (UI) including advanced features such as EPG (electronic program guide) management, CA messaging, operator-controlled channel list, and a virtual home channel. Operators can develop one HbbTV app and deliver a consistent user experience for both broadcast and OTT services. This ensures a consistent user experience, easy deployment and full control across a host of brands and models. Irdeto iCAM also enables secure updates over broadcast with no IP connection required.

According to Ovum, premium services such as Netflix are seeing double digit subscription

growth in Turkey, and Digiturk's exclusive rights to prestigious live sports events such as the UEFA Champions League help maintain its 40% market share. Turkish viewers want premium content, and Irdeto iCAM ensures that operators are able to meet content owners' requirements for securing it. Built into Irdeto iCAM is the Irdeto Flexicore Processor (IFCP), which contains both SHA-1 and SHA-2 certificates. This advanced, cardless security for broadcast content provides enhanced content protection against all known vulnerabilities identified in the CI Plus Root of Trust.

With every security solution it offers, Irdeto strives to be an invaluable partner to operators by helping them maintain the integrity of their content and platform as markets and business needs change. As a fully standards-based solution, Irdeto iCAM helps future-proofing an operator's business by ensuring compatibility with all certified hosts in the market. Using CI Plus 1.4 and CI Plus 2.0 standards, the solution can currently be deployed as PCMCIA and, in the near future, as USB devices. Operators can support established PCMCIA markets now and extend their reach to the global market when USB becomes available.



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Protect your revenue, create new offerings and fight cybercrime.

You can count on our **50+ years** of expertise
and over **5 billion** protected devices.



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SMALL SATELLITES AND CUBESATS

A Game Changer in Space Technology Development



Prof. Dr. Alim Rüstem ASLAN
Istanbul Technical University

ABOUT AUTHOR

Prof. Aslan is the father of CubeSat in Turkey. He has started CubeSat development in 2005 and so far placed successfully 5 CubeSats in orbit including the first Turkish CubeSat ITUpSAT1. He has been actively involved in many space projects of various sizes with international collaborations. He is teaching Spacecraft Design in ITU and Airforce Academy in addition to delivering CubeSat and CanSat design courses worldwide. He is a corresponding member of IAA, founding member of the Turkish Amateur Satellite Society, AMSAT-TR (TAMSAT) and Turkish Universities Space Technologies Society (UTEB/UNISEC-TR), and UNISEC-GLOBAL. Dr. Aslan, also, regularly gives seminars and speeches on space technologies in different institutions to increase 'space awareness' of the general public.

World is in the verge of setting new space stations around and on the moon with a subsequent target to Mars and beyond. For the purpose, new technologies being developed with great impact on every aspects of life. Today, we are dependent on space assets particularly on earth orbit than ever before. A nation independence is going to be largely related to its capacity and capability in developing and manipulating space technology. Nations without that capability will be bound to be left behind in the world and finally being absorbed by a space power.

Therefore, it is of paramount importance, to have space technology development capability to increase national wealth and quality of life through exposure to cutting edge technology, knowledge and education. In recent years small spacecraft have become more attractive due to lower development costs and shorter lead times. There is a natural trade-off to be made between spacecraft size and functionality, but advances in both miniaturization and integration technologies have diminished the scope of that tradeoff. Some small spacecraft are assembled and integrated with the same rigor as their larger counterparts, while others are integrated within a university research laboratory. Effectively integrating individual components can substantially increase the system's functionality and density, thereby reducing unnecessary mass and volume. State of the art in small spacecraft integration techniques is as advanced, if not more, than those used for larger spacecraft. Commercial off the shelf (COTS) components from automotive and aircraft industry and consumer electronics are commonly used to build small spacecraft at the lower end of the cost range given access to any country to space technology. Today, many countries can start their journey to space technology through developing affordable space

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assets consists of constellations of tens of nano and micro satellites to support their daily needs and environmental problems. To budget required for such constellation would be roughly equivalent to just one large spacecraft for similar purpose, Figure 1. The quick revisit times will increase the value to be received from them. Classification of satellites based on their mass is presented in Figure 2. A Turkish satellite is given as an example for each mass class.

Satellite	MASS	COST	TIME
	(kgs)	Millions	(years)
Large	1000+	\$ 300 M+	10 +
Medium	500-1000	\$ 100 M+	4--6
Mini	100-500	\$ 10-100 M	3--5
Micro Sat	10-100	\$ 2-10 M	2--4
Nano Sat	1.0-10	\$ 0.1-2 M	1--3
Pico Sat	0.1- 1	~\$ 100 k	<1-2
Atto Sat	0.01 - 0.1	~\$ 10 k	<1
Zepto Sat	0.001 - 0.01	~\$ 1000	<1

Figure 1. Satellite development cost and time based on mass



Satellites (Mass)



- Large: > 1 ton (Turksat 3A, 4A-B, T6A) 
- Medium: 500 kg – 1 ton (Göktürk I) 
- Small < 500 kg
 - Mini : 100kg - 500kg (Göktürk2) 
 - Micro: 10kg – 100 kg (RASAT) 
 - Nano: 1kg – 10 kg (BeEagleSAT, UBAKUSAT) 
 - Piko : 0.1kg - 1kg (İTÜpSAT1) 
 - Femto: 0.01 - 0.1 kg (TAMSAT SimpleSat) 
 - Atto < 0.01 kg
 - Zepto < 0.001 kg

Figure 2. Satellite classification based on mass, with examples from Turkey

The CubeSat revolution has playing it out very strongly. Small satellites called CubeSats (i.e., satellites built in increments of 10 cm cubes—1 cube is called 1U or “unit,” two cubes together are 2U, and so on) historically have been used mostly as teaching tools and technology demonstrations. However, recently proposed and selected flight projects are showing that technologies have matured enough so that CubeSats can potentially address important science goals as well. CubeSats are now part of a trend toward an increasingly diverse set of platforms for pursuing space and Earth sciences [1]. In 2017 only, about 300 small satellites below 50 kg were launched into orbit; about 270 of them were CubeSats. As of March 2020, about 1200 CubeSats are launched into space to various orbits, 2 being interplanetary, namely Marco A and B which supported Insight Mars mission, Figure 3 (nanosats.eu).

The CubeSat Program began in 1999 at Stanford University by Professor Bob Twiggs and California Polytechnic State University with Professor Jordi Puig-Suari (cubesat.org). The fundamental purpose of the program was to meet an educational need to have a satellite that could be developed within two years, be very-low cost and be very low weight for reduced launch costs. The

vision of the CubeSat Program was to provide a low-cost platform, promote rapid development, and train students as responsible engineers in industry’s multidisciplinary environment.

CubeSats now are a disruptive tool impacting space technology development in developing and developed countries. They have also had a strong impact on university Spacecraft Programs in improving space education. There are quite few publications prepared by government research centers, private institutions and universities or academicians around the world presenting the fact that hands-on, project-based education is very effective for recruiting, retaining and training engineering students [1-9]. Since early eighties to mid-nineties, only a handful of universities worldwide had very small amount of student involvement in real spacecraft engineering. This trend changed dramatically in the new millennium with programs such as the USA AFRL sponsored University Nanosat Program, the CanSat/BalloonSat program, and especially the CubeSat standard with its P-POD deployment system [5]. In an incredibly short period of time (especially by aerospace standards), such activities have helped foster strong aerospace education programs in schools with no history of space activity. In fact,

it can be shown that these programs provided opportunities for “second tier” aerospace education programs to improve the quality of their programs. It is proven that the ‘success’ of these programs was a direct result of their satellite-building activities.

Those projects aim to develop next generation of aerospace engineers to lead the development of space technology in the future. They help to educate and train the future workforce through international student satellite design and fabrication competition/cooperation and to enable small satellite research and development (R&D), payload development, integration and flight test. Moreover, they provide the opportunity to infuse existing aerospace institutions with out-of-the-box methodologies and technologies which incorporate the use of next generation deployables and science instrumentation, autonomous controls, MEMS, distributed architectures, as well as advanced communications, power systems, and sensors. Particular attention shall be given to evaluating program success based on such aspects as cost-sharing advantages, education and training, program flexibility and responsiveness [1,9].

CubeSat launch opportunities are significantly increasing over the years. Moreover, today there are many companies worldwide developing dedicated launch vehicles that will carry CubeSats in to orbit as the primary load.

A student run satellite program can be very challenging, but the rewards are great for the students and institutions that participate in the project. These programs provide university students with practical, hands-on experience in the design, analysis, test, fabrication, integration, and operation of space systems. Remarks made by JAXA and NASA officials and participants from various institutions and nations during the RAST2015 UNISEC-GLOBAL meeting suggests that there is a significant improvement in quality of the students entering space workforce who have been involved in student-built spacecraft design projects. Statistical evidence also suggests that there is a considerable increase in the number of students entering space workforce just by observing that a vast number of universities are involved in spacecraft design activities. It is also worth noticing that several second tier universities have embarked on this opportunity to improve the quality of their aerospace educational programs. Moreover, universities, especially student-run spacecraft design programs have enormous freedom to fail, which makes it possible to execute high risk missions and also to test innovative space components and subsystems. The Space System Design and Test Laboratory (SSDTL) of the department of Astronautical Engineering at Istanbul Technical University (İTÜ) is the leading space research group in Turkey in terms of pico and nano-satellites

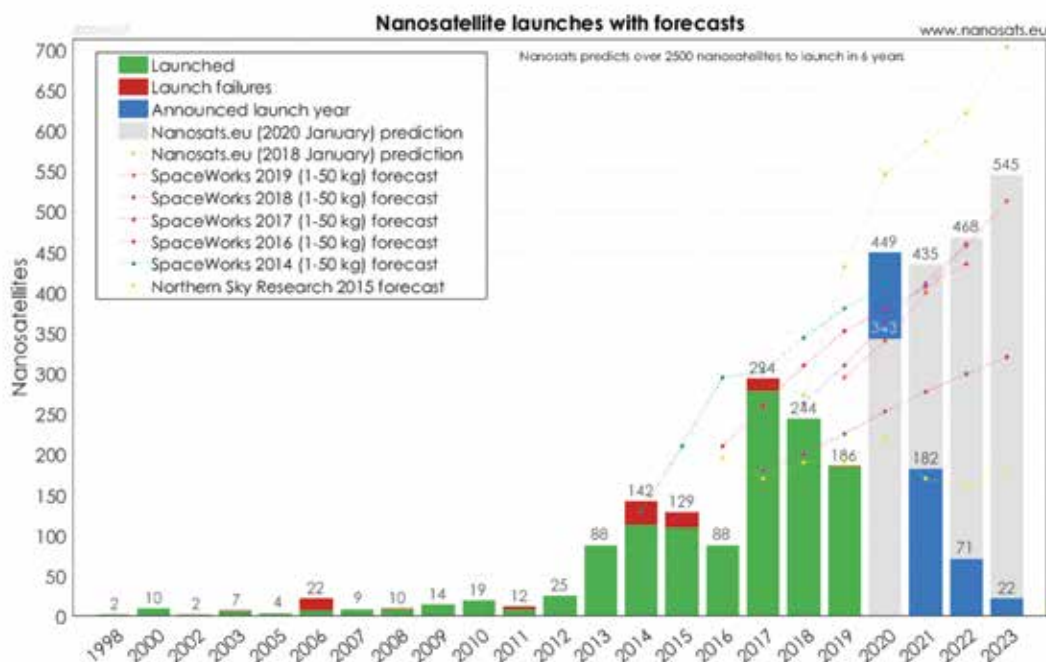


Figure 3: Nano/Microsatellite Launch History&Market Forecast (see nanosats.eu)

and amateur band ground stations. Our list of achievements includes pioneering the Turkish nano-satellite research by launching the first Turkish pico-satellite, called ITUpSAT1 (Figure 4), into orbit on September 23, 2009, from the Satish Dhawan Space Centre, India. Currently, the ITUpSAT1 is being monitored by the ITU ground station in the Small Satellites Communications Laboratory of the Department, as well as by radio amateurs worldwide. Then, a protocol was signed with TURKSAT, national communication satellite operator for collaboration on building a nano LEO communication satellite which was placed into orbit on April 26, 2013. Then, SSDDL has become part of QB50 project of FP7, EU, working on to develop a double CubeSat to meet the requirements of the project. The two CubeSats

were placed into orbit from ISS in May 2017. On May 11th, 2018 the 5th CubeSat of the ITU-SSDDL is placed into orbit from the ISS as a collaboration of Turkish and Japanese Governments and Space Agencies JAXA and HUTGM and cooperation of academic institutions namely İTÜ of Turkey and KIT of Japan. Currently, a couple other projects are pursued; i) to develop a 3U platform to house an industrial X band transmitter and ii) a 3U space and earth observation CubeSat for an international partner. The public is continuously informed about the developments in the Laboratory on space technology applications through various media resources and seminars. İTÜ-SSDDL has been delivering a number of courses on CanSat and CubeSat development both at home and abroad.

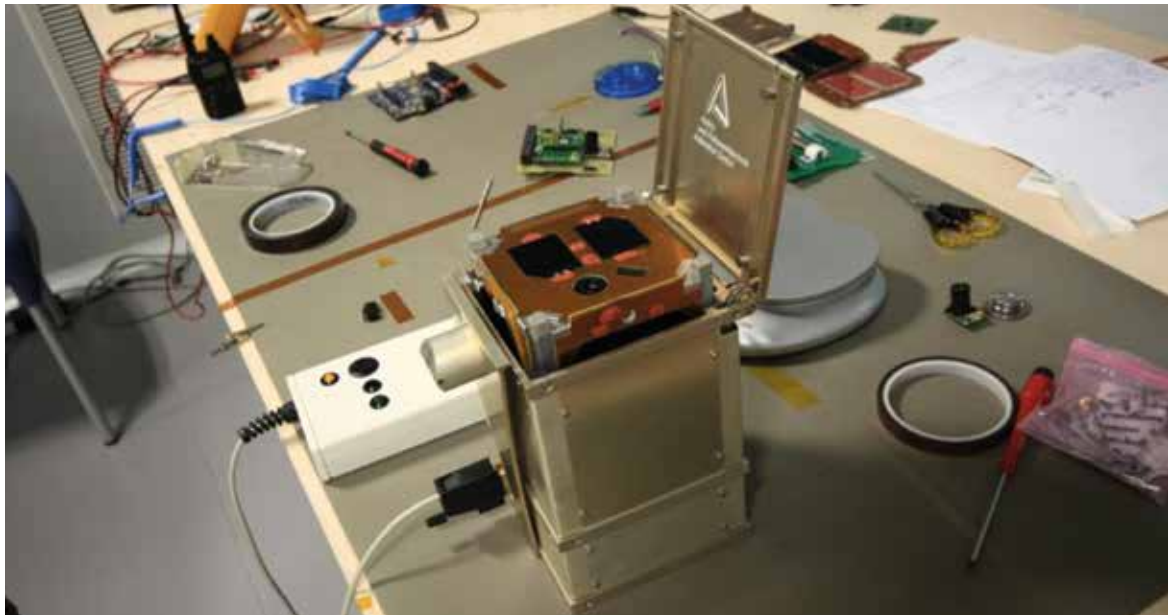
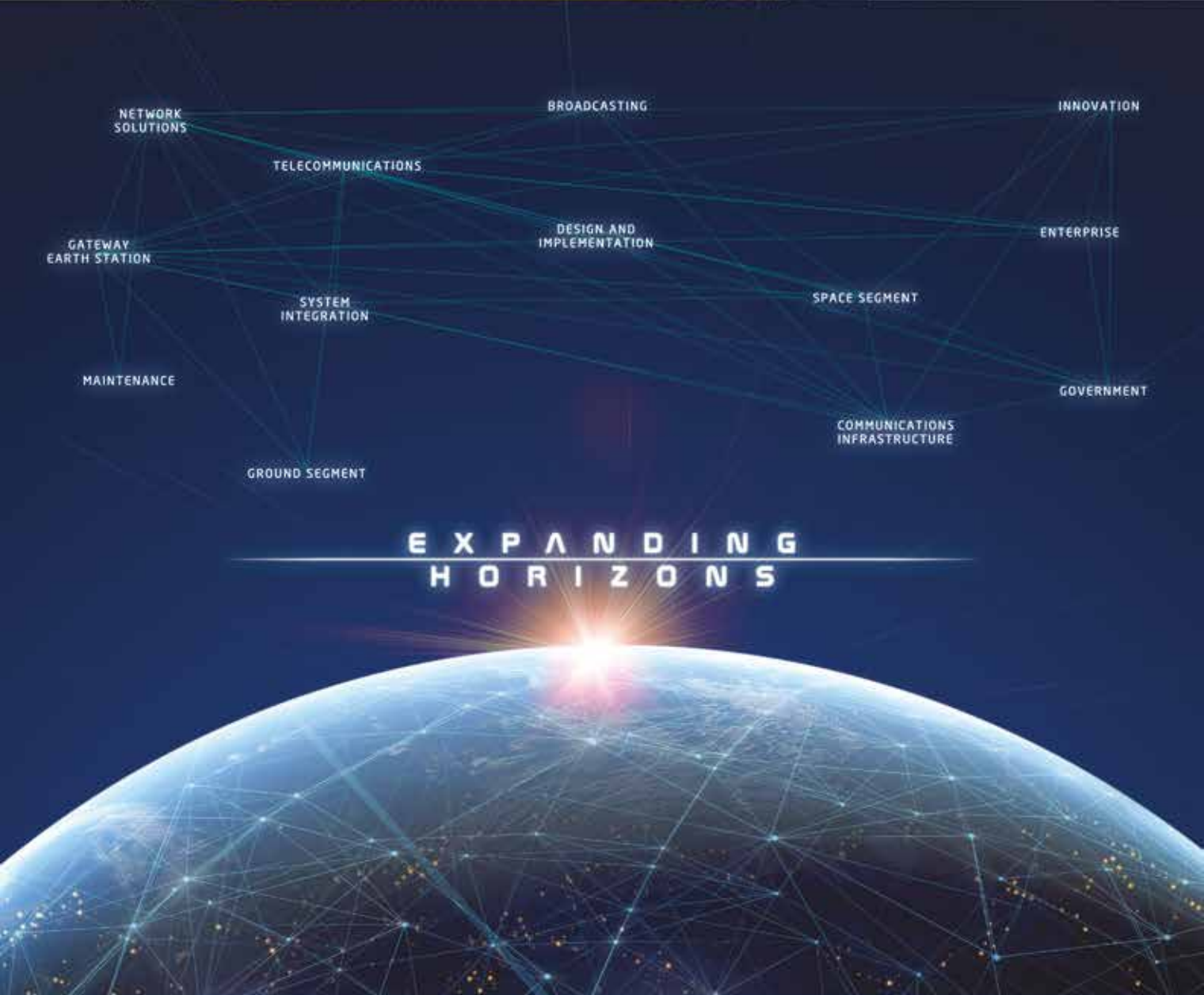


Figure 4: First Turkish Cubesat ITUPSAT1 in its launch POD in ITU-SSDDL getting ready for launch

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what is a DATA CENTER?



Erkut Göksel ÇINAR

Sinema TV

Data centers are simply centralized sites where networking components and computer systems are concentrated for the intent of collecting, storing, processing, analyzing, distributing or allowing access to plenty of data. Data Centers have existed in one form or another since the advent of computers.

How to define a modern data center?

Modern data centers are quite different than they were built in the late 2000s. Early computer systems complex to operate and maintain and required a special environment in which to operate.

During the burst of the microcomputer industry, organizations or users started to deploy softwares and hardwares everywhere, in many cases with little or no care about operating requirements.

Infrastructure has rapidly shifted from traditional On-Premises Windows/Linux physical servers to virtualized infrastructure. Virtual infrastructure systems assistance applications and lake of physical infrastructure and into a multicloud circumferences.

Today, the instruments got smaller and cheaper and data processing demands began to rise exponentially. Large numbers

of clustered servers and related instruments can be housed in one or multiple data center at the same time and monitoring/running 24/7. The data centers of some big organisations are spaced all over the planet to service the rigid deficiency for access to massive amounts of data. Modernization and data center transformation boosts performance and energy efficiency.

Which Standards to Follow during the Data Center Design?

The preference of standards should be driven by the organization's activity mission. The three major data center design and infrastructure standards developed for the industry.

1) ANSI/BICSI 002-2014

This standard covers the major aspects of planning, design, construction, fire protection, IT, hardware and maintenance. Reliability is defined by Class 0 to 4 and certified by BICSI-trained and certified professionals. ANSI/BICSI 002-2014 has been formally replaced by ANSI/BICSI 002-2019

2) ANSI/TIA 942-A 2014

The most widely adopted standard for data center design is ANSI/TIA-942. The new version of ANSI/TIA-942 which will be labelled as ANSI/TIA-942-B has been released in July 2017.

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Modern data centers are quite different than they were built in the late 2000s. Early computer systems complex to operate and maintain and required a special environment in which to operate.

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The ANSI/TIA-942 specification references public and private domain data center requirements for data center infrastructure facts such as:

Physical security and Efficiency, Fire safety, Mechanical systems, Network architecture, Electrical design, System redundancy for electrical, mechanical and telecommunication.

IT ensures compliance with one of four ranks of data center tiers.

Tier 1: Basic site infrastructure. A Tier 1 data center offers limited protection against physical events and nonredundant distribution path.

Tier 2: Redundant-capacity component site infrastructure. This data center offers improved protection against physical events.

Tier 3: Concurrently maintainable site infrastructure. This data center protects against virtually all physical events, providing redundant capacity components and multiple independent distribution paths.

Tier 4: Fault tolerant site infrastructure. This data center provides the top levels of fault tolerance and redundancy without causing downtime.

3) Uptime Institute's Tier Standart

Uptime Institute's Tier Standard is the globally recognized standard for data center reliability and overall performance. This standard develops a methodology for the data center during the design, construction and commissioning phases to determine the resiliency of the facility with respect to four Tiers or levels of redundancy/reliability.



Operational Standards

There are also many operational standards. These standards will also diverge based on the activity of the business and include guidelines associated with detailed operations and maintenance procedures.

- ISO 9000 Quality System
- ISO 14000 Environmental Management System
- ISO 27001 Information Security
- PCI – Payment Card Industry Security Standard
- SOC, SAS70 & ISAE 3402 or SSAE16, FFIEC (USA) Assurance Controls
- EN50600-2-6 Management and Operational Information

TYPES OF DATA CENTERS

There are four main types of data centers.

Enterprise data centers: These are built, owned and operated by proficient organizations and are optimized for their end users.

Managed services data centers: These data centers are managed by a third party or a managed services provider on behalf of a organization.

Colocation data centers: In colocation ("colo") data centers. Colocation facilities serve space, power, cooling and physical security for the server, storage and networking equipment for companies in need of requirements and also link them to a sort of telecommunications and network service providers with a lowest charge cost and complexity.

Cloud data centers: In this Off-Premises form of data center, data and applications are hosted by a cloud services provider such as Microsoft Azure, Amazon Web Services (AWS) or IBM Cloud.

A cloud data center is a facility that powers "as-a-service" specifically. The vendor that serves a SaaS (software as a service), PaaS (platform as a service) and IaaS (infrastructure as a service) product on servers in one or many data centers and then their clients could access the services via an internet connection.

TRENDS IN RF SIGNAL ROUTING



Introduction

RF Switch Matrices are commonly used in manufacturing test systems and design verification for commercial and military applications for the purpose of signal management and routing.

There is growing need for switch matrices for reliable automated test instrumentation (DC to 6GHz) in current LTE/WiMAX and upcoming 5G standards.

Besides routing high frequency signals, switch matrix may also include functions such as passive combining/splitting, attenuation, filtering and coupling as well as active signal conditioning with amplifiers and frequency converters.

Among all these functions the most crucial component is a switch that is configured to fit the architecture.

RF switch matrices are typically custom designed according to system application.

The flexibility of RF Signal Routing between apertures and receivers defines the adaptability and ultimately the utility of any Communication Intelligence (COMINT), Signal Intelligence (SIGINT) and hence in any Radio Monitoring System.

Technology Overview

Switch matrix can be designed as blocking style or non-blocking style depending upon their architecture. Figure 1 shows an example of blocking and non-blocking switch matrix. An example for the blocking switch matrix can be radio and antenna system where each radio gets connected with a unique antenna. Non-blocking switch matrix can be used in applications such as MIMO transceivers and Satellite Ground Station receivers.

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RF Switch Matrices are commonly used in manufacturing test systems and design verification for commercial and military applications for the purpose of signal management and routing.

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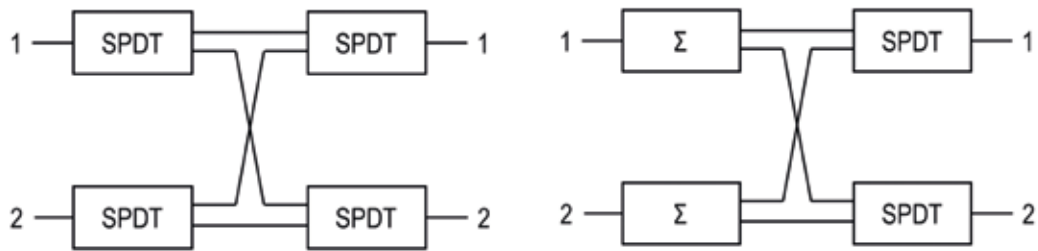


Figure 1

Solid-State or Electromechanical Design is the second phase of design configuration in selecting RF Switch Matrix in custom applications.

Electromechanical Design	Solid-State Design
Broadband Design	Narrowband Design
High Power	Low Power
Bulkier Systems	Compact Systems
Low Insertion Loss and VSWR	High Insertion Loss and VSWR
Switching speeds on the order of milliseconds	Faster swiching speeds on the order of nanoseconds
1-2 million life-cycles	Infinite life cycles

Table 1

Design Challenges

RF Design: RF signal routing and signal conditioning design and testing to satisfy specification demands for instance isolation or rejection, power handling, spurious levels, IM and harmonics besides the obvious criteria to meet minimum loss and VSWR over any input to output path

Mechanical Design: Most mechanical designs can be standard 19 inches rack wide and 1U to 7U high. Compact sizes are required for applications such as flight, space and shipboard. Cooling mechanism is extremely essential in high power applications.

DC Power and Control Hardware: The power supply and switch driver circuitry will need to be designed and developed based on the voltage and current requirement of the components. One of the challenging tasks in switch matrix design is to articulate power distribution circuits and controlling hardware.

Software Control: A software driver will need to be developed to provide an interface between the control hardware and test system program. A GUI can be installed on the host computer which can interact with matrix via Ethernet, GPIB, RS232 or RS422 style interface





Servicing Plan: A servicing plan will need to be developed to ensure the life of the switch matrix. To improve the product life, design challenges also includes on selecting components which provides higher MTBF and at the same time meets the desired specifications.

Tron's RF Signal Routing and RF Switching Matrices has been successfully deployed in naval, airborne and land platforms.

We benefit from the experience gained for 3 decades in design and production of RF Broadband Telecommunication equipment's.

Tron has in-house Research & Development Engineering Department with multi-disciplined and focused experienced engineers with up-to-date test measurement hardware, software facilities mainly dedicated to RF technology.

Tron serves with a dedicated team of people, constantly strives to highest level of quality.



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8K TV TECHNOLOGIES



Dr. Metin Nil

Vestel

Televisions and monitors with 7,680- by 4,320-pixel resolution have entered the market recently. However, content and delivery systems to support these 8K devices have not kept pace. An 8K TV can show incredibly sharp, crisp images that show more detail thanks to huge amount of pixels. In today's world, 8K TVs have state-of-the-art display panel technology, top quality picture technology and the best semiconductor technology.

8K TV is the highest resolution TV that has been released recently among UHD TVs. 8K TVs show a sharper and more detailed picture quality due to its pixel density (four times more pixels than a 4K TV). Resolution

is an important aspect of picture quality. A larger resolution creates a sharper image, giving the viewer better detail. Anybody can see the relation between resolution and quality by checking the same visuals in different resolutions.

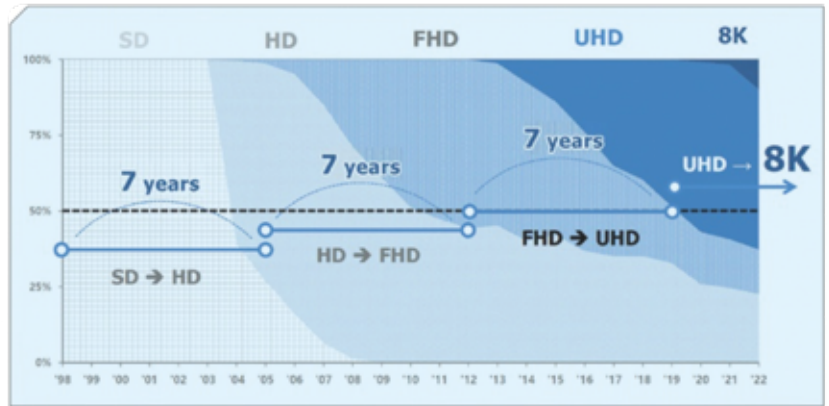


Figure 1. TV resolution upgrades are on a seven-year cycle, from standard definition (SD) to high (HD), full high (FHD), and ultra-high definition (UHD), IHS Markit and a Leading Display Company

“The explanation that 8K is an Ultra High Definition video format with four times the resolution of 4K should be easy to understand, but it immediately brings up a second and very obvious question: Do we actually need 8K?”

It is common to offer a new TV feature such as HD, UHD, OLED, 3D, QLED to the display market in order to differentiate the old and new TVs.

Although 8K is cutting-edge technology, companies have been working on it for some time. In the 2012 issue of ID, Takayuki Yamashita, Hiroyasu Masuda, and their colleagues at NHK, Japan's public broadcaster, wrote "Super Hi-Vision as Next-Generation Television and Its Video Parameters," an article that introduced the concept of 8K and

NHK's plans to develop both 8K and 4K as immersive high-resolution technology for next-generation television systems.¹

Prototypes for 8K TVs were shown in the early to mid-2010s, including a set from leading South Korean companies at the Consumer Electronics Show (CES) in Las Vegas in 2014. Leading the Far East TV producers started to ship 8K monitors in China, Japan, and Taiwan in late 2017 and in Europe by mid-2018.²



Many companies—including Samsung, Sharp, LG Display, and Sony—were showing 8K at the Internationale Funkausstellung (IFA) in Berlin in August 2018. All the 8K TVs on display at IFA, according to reporters from a wide range of publications, have positive feedbacks with their sharper and better picture quality.

The explanation that 8K is an Ultra High Definition video format with four times the resolution of 4K should be easy to understand, but it immediately brings up a second and very obvious question: Do we actually need 8K? If the question is obvious, then from the perspective of content there's an equally simple answer. As things currently stand there is virtually no content in 8K. Yes it's true that there have been broadcast trials in 8K, and the broadcasters in Japan, South Korea and China have plans to launch 8K networks by 2020, just in time for the Tokyo Olympics.³

Right now, 8K has its fans and its detractors, its pros and cons. When it comes to the latter, the 8K sets shown at IFA are very expensive, especially because, in practical terms, that extra resolution may not make that much of a difference, or any difference, when you're sitting several feet away from the screen, as is the case in most TV-viewing situations. And you won't have any 8K content to watch yet, unless you live in Japan, where NHK just rolled out some limited 8K programming. Last, if 8K content existed, it would be so massive in terms of bandwidth that it might not be able to squeeze through the pipeline to your set. But while all of the above caveats certainly apply, they are not the entire story. Let's look more

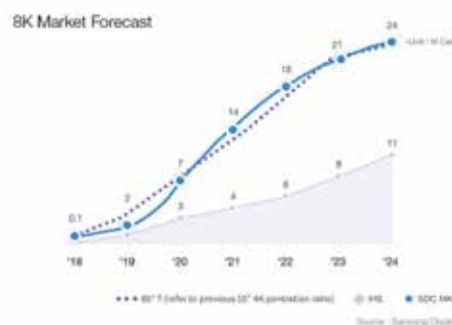


Figure 2. 8K market forecast 2018 to 2024.

closely at the issues of resolution, content, and infrastructure.⁴

According to IHS Markit's projections for 8K adoption, 8K sales will grow from just 0.1 million units in 2018 to 24 million by 2024. The same is likely to happen again for 8K. Based on South Korean Display company demand data, it is expected over 7 million units sold by 2020.

As a consequence, Ultra-high picture quality and hyper-realistic images will soon become the new normal, thanks to the rise of 8K.

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ARTIFICIAL INTELLIGENCE



Taha YÜCEL

RTÜK

Artificial Intelligence (AI) is an important topic on the agenda today. However, its foundations are much older. The Muslim scientist El Cezeri (1136 - 1206) laid the foundations of the concept called Cybernetics 800 years before our time. AI discussions that started with the concept of Cybernetics have took place themselves in every field today.

Cybernetics is a science that examines the control and management of all living and inanimate complex systems. It examines control, communication and functioning in living things and machines.

AI which comes into play here is a software and hardware system that tries to imitate human intelligence. In other words, they are systems and machines that think like humans, make decisions like humans, develop and learn themselves and correct themselves. AI emerging with the idea of creating a digital imitation of the related study method by computer scientists with the discovery of the mechanism and drawing of the neurons in the human brain is the whole of software and hardware system that can learn on their own next to skills of mathematical intelligence, visual perception, speech and voice recognition, movement and reasoning. AI consists of the fields such as machine learning, deep learning, data science, computer vision, robotics, natural language processing and data engineering sciences.

AI is related to data analysis capability and process. Elements that make AI different from

natural intelligence are that sensitive, consistent and capable of multitasking.

As it is known, the first computers were the so-called "mainframes". They were taking up a lot of space and were very slow compared to today. Over time, the processing capacity of computers has increased, they have become smaller, stronger and faster. Secondly, recording capacities have increased. In the past, when we talked about kilobytes in USB sticks, we are now talking about terabyte capacities. Thirdly, big data, cloud technologies and software-defined network technologies (SDN) began to be used. An open system was also adopted in architecture. With 5G and IoT (Internet of Things) which will increase in use, almost all objects will be connected to the Internet and, of course, broadband capacities will also increase. With the spread of the Internet, billions of devices will be connected to the network.

With this rapid development in technology, the usage areas of AI is gradually increased. All over the world in the developing of AI applications, Big data is used. It is also actively used in agriculture, security, space studies, medicine, service industry, game and

entertainment areas, submarine applications and many other areas such as virtual assistants and chatbots.

Technology is a tool that is beneficial to humanity if used peacefully and for good purposes. For example, if a knife is used correctly, a scalpel in the hands of a doctor can save lives; but if misused, it can cause death in the hands of a murderer.

Agriculture

There are many areas where AI can be used for peaceful purposes. For example, agriculture. Consider an unmanned aerial vehicle equipped with AI. Imagine that a large land was built with smart systems and where it was determined to be more efficient and this plot was driven with unmanned tractors. Again, Imagine that the necessary regions were fertilized depending on the first analysis and the required places were cleared of stones and the soil were made more productive with an unmanned vehicle and properly farming were made with smart systems that decide where and what to plant. Imagine that only the necessary places were watered and problem areas were medicated. So you made a proper spraying for human health, a productive agriculture and an economical fertilization. In addition, these systems can monitor the development of the product and take necessary precautions.

We wish AI to be used peacefully but for defense and counter-terrorism, unmanned tanks and fighting vehicles must also be built. Necessary precautions should be taken meticulously so that they do not get out of control. Besides, it is also important to make

arrangements for accidents that may occur when using unmanned vehicles.

AI can also be used in judgement. For example, as I stated in my presentation at the Council of Europe, AI can be used as an aid in making decisions in the European Court of Human Rights (ECHR). In this way, AI can help its speed up the assessment of pre-qualification requirements at the stage of making decisions. Similarly, the Constitutional Court, the State Council, the Supreme Court and even the courts should use AI in our country also. Ultimately, who will make the decision are judges. However AI can help the decision and make justice transparent.

In my speech at the Council of Europe, I had given a warning about making arrangements for possible accidents when used unmanned vehicles. By making an arrangements about who is responsible in a possible accident, the ECHR should be guided. In the accident with Uber's driverless vehicle on March 18, the responsibility areas of Uber, the vehicle manufacturer and the person purchasing the vehicle should be determined. These arrangements are essential for the correct use of AI. Indeed, unfortunately such an accident happened and Uber's driverless vehicle had a fatal accident. Therefore, Uber's driverless service was stopped. This was a bad situation but it was a good prediction. I received many positive messages about the accuracy and utility of this prediction.

The Council of Europe

The Council of Europe is a union which consists of 47 countries and Turkey is among the first members. The Council of Europe focuses specially on human rights. The ECHR is part of the Council of Europe.

In the Council of Europe, there are expertise committees working on information society and media, internet and information security. Disputes about issues such as violations of rights, personal rights and freedom of expression also come to the ECHR. Turkey participate in this kind of commission and contribute to it too. In the ECHR, there has been working more than 100 experts who wins by entering the exam from the Supreme Court, the Council of State, the Council of Judges and Prosecutors and other institutions in Turkey.



There are also PhD academics from Harvard, MIT and Oxford in the AI and Human Rights Experts Committee. This group evaluating AI in terms of philosophy and law meets twice a year. This group prepares a document for the Parliamentary Assembly of the Council of Europe on the assessment of the effects of the use of AI and big data on human rights.

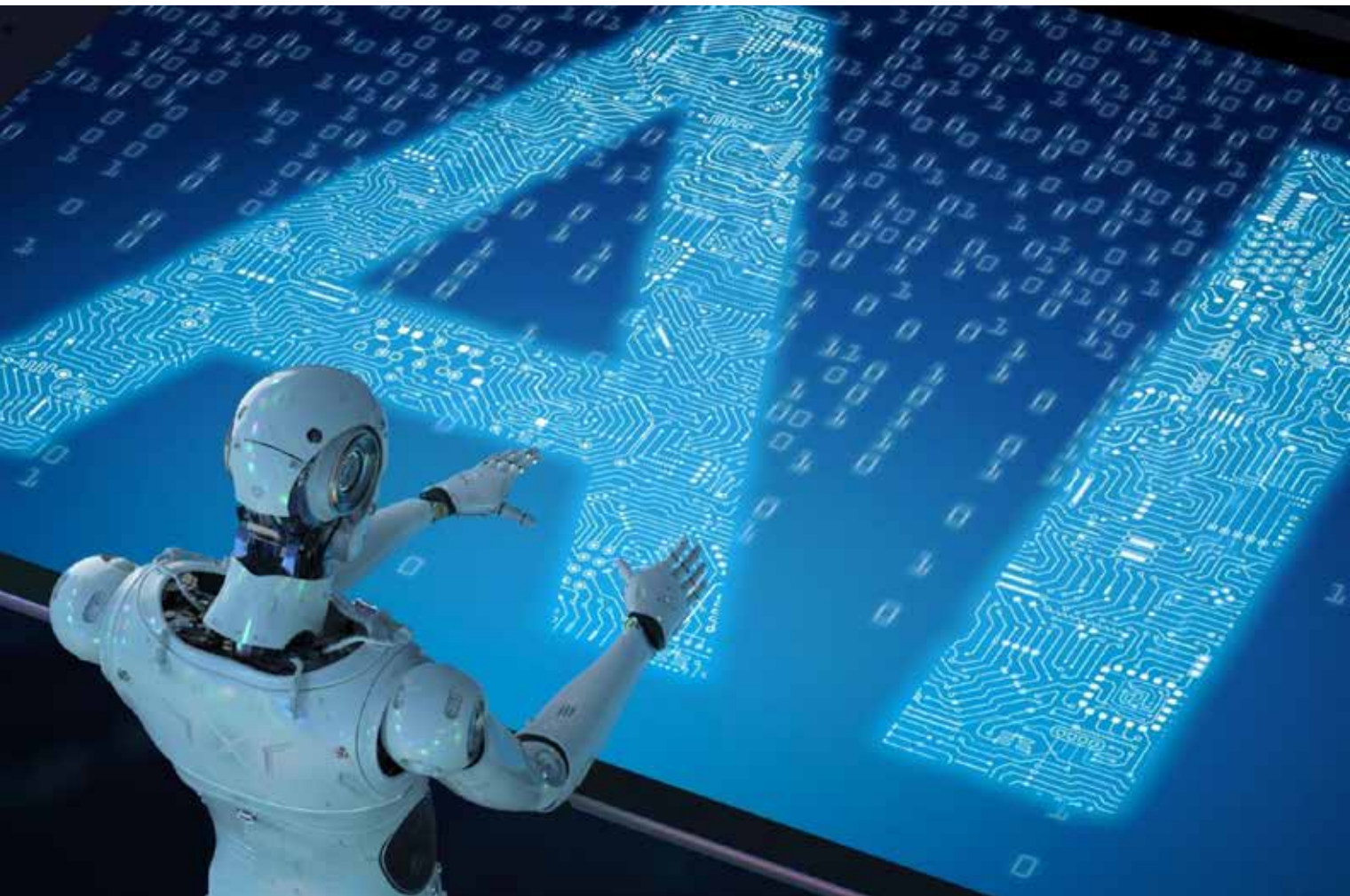
After this document has been accepted by the Council of Europe, it will be sent to 47 member countries as a recommendation. Countries are free about the use of AI but can also take advantage of these decisions. The ECHR will take advantage of these suggestions while making decisions.

There have been done some works related with AI in our universities but these are not enough yet. In this regard, important tasks are falling to our scientists. In our universities, specialization branches should also be established in this field. For example, one of our universities should start a study on the use of AI in agriculture, bring together different departments such as computer engineering and agricultural engineering,

prepare theses, train experts and then transfer this information to the industry. Otherwise, we will remain in a position that purchases and uses ready products only. This is dangerous and inconvenient. Unfortunately, this has happened in many technological innovations. For example, on mobile phones that we use today, there are certain brands. We also have domestic brands but use little. Our base stations are almost completely imported. If we cannot catch the technology in time, we can be too late. We are not late for AI. Turkey also should be much more active in this regard while 5G technology comes. Because AI will grow together with telecommunications infrastructure and will accelerate. Therefore, Turkey must not only consume technology but also need to be in a position to produce.

Image Processing

One of the important use areas of AI is image processing. This is generally used in the field of security in order to know people. These images which recorded with cameras and generated a large amount of data are processed and analyzed via AI. Currently,





license plate recognition system is used successfully in our country . In addition to this, an ownerless bag or package can be detected in this way to generate an alarm. Another example could be the detection and capture of a person sought through the camera images with facial recognition. Besides, in our institution, in Digital Recording, Archiving and Analysing System (SKAAS) which developed by TÜBİTAK, are made some content analysis such as Key Frame Capture, Video Text Reading, Video Clip Capture, Video Advertising Analysis, Radio Advertising Analysis, Keyword Capture and Sound Level/Vulnerability Analysis by using AI. In the coming period, it is also planned to take these studies carried out together with TÜBİTAK to further levels.

Our defense industry has signed many national projects under the leadership of Presidency of Defence Industries (SSB). Our national military vehicles, helicopters, ships, unmanned aerial vehicles, weapons systems and many products needed in the battlefield have been developed with national facilities and they are actively used in operations. If we examine these products one by one, we can see that there are dozens of AI technologies in each. Products using AI technologies such as communication systems, radar systems, crypto technologies, electronic warfare systems, image processing, guidance systems, friend-enemy recognition systems, mission computers, smart ammunition play an active role in fulfilling the functions of our defense systems. On the other hand, the number

of products used in defense and security systems, such as cameras and radar, at the level of tens of thousands makes it almost impossible to use these systems based on operators. At this stage, the use of image processing, signal processing and intelligent learning algorithms both reduce operator need and help prevent human errors.

AR & VR

Turkey has a very young population and can be a pioneer in the field of AI software. We should not miss this opportunity. If this goes quickly, 47% of the current professions will lose their existence within 25 years and 57% of the professions and jobs in the field we know will be realized by robots in 5 years. In addition, while traditional professions are disappearing, many new business areas will emerge thanks to AI. We should direct our children to these newly expanding areas rather than the narrowing areas. For example, software is such an area. we should educate our young people on issues such as content production, AI, augmented reality, virtual reality and provide their specialization in this field. With a good education, we can raise our children starting from primary school to a good point in the field of software. We need to bring our children to a point where they can not only play games with computers but also produce them.

Developing AI practices brings along ethical problems and threats. For this reason, it is necessary to consider AI in all its dimensions.

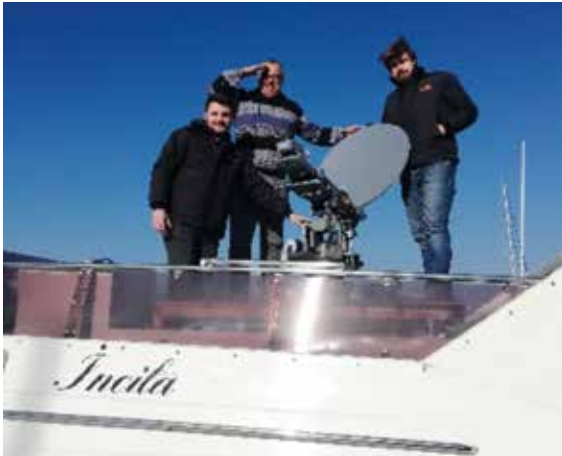
PoseidonSat Satellite

Ka Band Mobile Satellite Internet System



Cengiz DEVEKUŞU

PoseidonSat



- Provides interchangeable Satellite Internet Antennas on 0.1 - 0.2 degree instantaneous sensitivity, on a Robot 3 D stabilization system and it can work with the lines opened by any service line provider.
- The satellite tracking speed changes automatically between 3.5 degrees seconds and 12 degrees seconds depending on the need. It is designed to meet the speed and maneuverability of the ship on which it is located as a variable under suitable conditions.
- It provides satellite connection according to the signal perception status of its location with fully automatic Setup.
- Has Non Stop 360 degree Yaw rotation.
- Yahsat, Türksat, TooWay, Telenor and similar systems can operate both Jupiter and MariTime - Sourf Beam Ka band Satellite Internet services.
- Even if the negative conditions occur, even when the Internet is Time Out or Out, the conditions are improved, it can find and connect to the satellite again with Satellite connection fidelity. 3 axis Yaw - Pitch - Roll motors and logarithmic software are designed to provide stabilization in 9 axes independently.

Uses the International Standards provided by satellite Internet providers.

- All components of the system are designed as Mono Block within itself. For this reason, when VAC 220 50 Hz - 60 Hz current is applied, the system operates and starts broadcasting over Wifi. If requested, an Ethernet cable outlet can be reached. All cable presence has 5 Ghz noise and interference filter protection.
- 26/6 Downlout can process Uplout signal.
- With these features, it can provide IP TV connection for 450 msec - 600 msec bing time and live Ip Camera broadcast for the same processes.
- Setcom devices are adapted, Ip Fax, IP Voise Gsm, IP is a system ready for service to provide wireless connections between continents.
- The system operates with 1.5 Amp 440 Watt power. In terms of system safety and marine safety, it is recommended to be used with full sinus inverter devices. If the inverter devices have their own feeding units, they can be able to offer the Internet service even when the generators are not working.
- PoseidonSat Timing does not use a toothed and belt system. It is completely mechanical. With this feature, sensitivity tolerances can never be achieved even at temperatures between -40 and + 75 degrees. The clearance tolerance of my site is between 8 Arcmin and 15 Arcmin. Belt gaps in heat, tensions in cold, Triger Belts and wearing Timing gears do not contain PoseidonSat tga. The possibility of mechanical failure is negligible. Heat does not occur because there are 8 Arcmin levels that can be said to be non-friction during operation.
- VDC high Amp system is also not used. Cat 6 is also used where VDC is required. Ampere-connected cable warming is also out of the question.
- Electronic cards, which are also used, have been subjected to an active working test for 5 years. Electronic card and Electronic Module, Electronic component heating was not observed.
- If desired, cooling can be added in very hot geographical regions and thermostatic heating comforts in very cold geographical areas.
- The current distribution is designed separately for each unit. This feature also cannot support Power Supply units. The probability of failure is designed to be the minimum.
- Poseidonsat It has a rare feature that can perform Full Automatic Setup both on the ship and when navigating.
- The system is able to tolerate 40 - 60 Nm traumatic shock (dock clashes and desire conflicts due to the sea conditions of the ships).
- For example; A ship sailing in Marmara and using Poseidon Sat is intended to sail into the international waters, but it is possible to return the price from Jupiter to MariTime.
- It is possible to find Antenna, Check Test, Dounloup, Up Date, Up Gerade via Web Server. It is also possible to make joint comments and fault detection in Authorized Services Interventions.
- Electronic permission - Radoms and interventions opened without Cod are
- All electronic cards. Reset.
- National and International Service is Vsat İzmir.



SEDEC

With its unique goals and foundations it sets for its participants, the second edition of SEDEC, Security and Defence Conference, Fair and B2B Event, will take place on 2-4 June 2020 in Ankara.



Hilal ÜNAL

SEDEC

Set out with the ambition to set the grounds for the Turkish defence, and security sector with its focus and concept, SEDEC realized its first ever event success in terms of its subject, structure and organisational approach. Established with a view to being unique in the sector and in our country, SEDEC is the first and only event to cover the issues of satellite technologies, communication systems, homeland security, internal security and defence systems under a single roof. With its brand-new concept, the

event fills a significant gap in the Turkish security and defence sector. During the planning of the first edition of SEDEC, the project team determined some strategic goals and the criteria by which its success could be measured. Based on the data from the post-event final report, it has been found that SEDEC managed to meet the defined goals and success criteria established during the preparation phase.

Although it was being organised for the first time, SEDEC still managed



to attract the participation of military officials and law enforcement agencies from 39 countries involved in the areas of homeland security, border security and defence systems at SEDEC 2018.

The first day of the event included speeches delivered by distinguished guests from the Presidency of Defence Industries (SSB), Frontex, the United Nations, the European Organisation for Security (EOS), the police organisations of foreign countries, and the leading companies involved in the sector, such as ASELSAN, HAVELSAN, Turkish Aerospace, Airbus and Leonardo. The distinguished speakers invited to the event presented details of the latest technologies in homeland and border security, and their applications in other countries.

During the event, which was held exclusively for professionals and was organised as a business platform, a total of 4,200 bilateral business meetings were held.

Since its debut in 2018, SEDEC is the only trade fair in Turkey that covers homeland security.

With all of this said, SEDEC 2020 will not differ much from SEDEC 2018 in terms of subject or scope; however, there are some changes. For example, SEDEC now uses a special algorithm and platform, which was developed by SEDEC, to ensure the B2B (Business to Business) meetings. The B2B is one of the main values offered by SEDEC, and this new algorithm will ensure that these meetings will be executed more effectively and accurately. The demanding establishments and companies will be able to enter this platform before the event and they will see the companies they may want to do business with. The establishments then will be able to request meetings according to the characteristics of companies and institutions and plan their B2B/B2G (Business to Government) meetings in advance.

SEDEC is also the first event to implement the B2G concept, which refers to bilateral meetings between firms and governmental bodies. Since the only, or the biggest buyers in the sectors targeted by SEDEC are state institutions. That is why, it is extremely important for companies to conduct bilateral business meetings with local and foreign officials from the security forces and armed forces. During the first edition of SEDEC,



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During the event, which was held exclusively for professionals and was organised as a business platform, a total of 4,200 bilateral business meetings were held.

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there were official participants coming from 39 countries solely for this purpose.

Ankara is known to be the centre of the Turkish defence and security sector, and most of the end users and decision makers are situated in Ankara as well. Thus, it will be very easy for the companies participating at SEDEC to showcase and solutions to the end users and decision makers. With that said, SEDEC 2018 was visited by over 450 decision makers, who also held B2G meetings with the participants.

Although it is only the second outing of SEDEC, its concept is much more beneficial to companies than similar events in other countries. In particular, the B2B meetings, the presence of buyers and the planned meetings with buyers provide an excellent business environment.

Normally, companies need to spend significant time and financial resources to meet so many key persons individually, and so participating at SEDEC saves them considerable amount of time and resources.

SEDEC 2020 is also featuring and placing importance to satellite and communication technologies. Used by numerous other platforms and equipment, satellite and communication technologies form the backbone of many security and defence systems. From wireless communication to intelligence, or from data collection to scientific observation and measurements, satellites serve a wide variety of purposes. That is why, SEDEC is one of its kind in terms of including these technologies in its structure as one of the main areas of interest.

Companies not working for the communication, security and defence sectors, but engaged in technology development, and possessing certain appropriate capabilities, can also join SEDEC to familiarise themselves with the field, and even to start working in these sectors. We wish everyone success at SEDEC.



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