



वैमानिकी दर्पण

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by Shri S Chawla, DG, AQA

ENSURING FLIGHT SAFETY THROUGH QUALITY ASSURANCE



DGAQA

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02 Jan, 2023

NEW YEAR MESSAGE

On New Year 2023, I extend my greetings to all DGAQA personnel & their families and wish a Happy, Healthy and Prosperous year ahead. My warm greetings to our esteemed veterans & their families and wish them also to remain active and strong.


2. During the year gone by, number of major initiatives including finalization of DGAQA engagement in C-295 project through CQSP, DGAQA – AFQMS approval to private firms and newly formed OF DPSUs, revision of SOP for registration of firms, issue of AQA directives on FOD management & GSE/GHE, training of about 250 personnel etc. As you all may be aware that a study has been conducted by external consultant (M/s BCG) on Airworthiness certification & QA process being followed worldwide wherein they have observed that Indian certification & QA procedures followed by CEMILAC and DGAQA are in consonance with international standards. The revision of DDPMAS version 1.0 and AFQMS document is under way aligning best international practices wherein the input/comments from all of you are expected.

3. We have been able to showcase our capabilities in providing GQA coverage in the field of Military Aviation during Def Expo 2022 and foundation stone laying ceremony of C-295 manufacturing facility by Hon'ble PM. We have also conducted RD Meet after a long gap of four years wherein a number of QA/QC issues pertaining to various Field Establishments were deliberated and way ahead arrived upon.

4. Though, we have been able to provide best GQA services, serving our great nation, we expect you all to maintain same motto and continue to demonstrate best professional competence and excellence in this year as well.

Jai Hind!

Best Wishes !


(S. Chawla)
02-01-2023

HOW AEROSPACE INDUSTRY CAN USE DIGITAL TWINS TO IMPROVE FLEET MANAGEMENT AND SUSTAINMENT



Gokulraj K
SSO-I

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What is a Digital Twin?

A digital twin is a virtual model designed to reflect a physical piece of equipment that has multiple sensors that relay performance data on its functionality, tracking energy output, temperature, performance, efficiency, and more.

Introduction:

In the aerospace industry, spending on maintenance and repairs continues to increase in spite of aircrafts being built to last longer, more durable engines, and innovations in maintenance techniques. The cost of maintaining aircrafts comprises a sizeable chunk of aircraft operating costs. It is also critical to maintain aircrafts in order to deliver a good customer experience – customer satisfaction nosedives when flights need to be delayed or cancelled owing to unplanned maintenance.

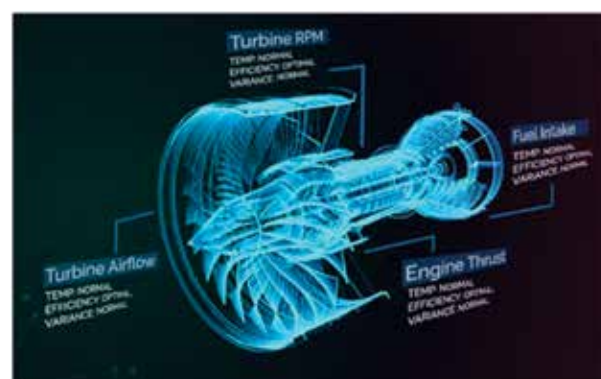
So, it's no surprise that airlines focus on cutting the MRO (maintenance, repair and overhaul) costs while ensuring operational availability of the assets at the same time. The existing approaches for fleet management and sustainment are largely based on statistical distributions of material properties, physical testing and **heuristic** design philosophies; these approaches are often unable to address extreme requirements.

Some of the major challenges include slow turnaround time, poor data integrity, aging systems and outdated manual processes – require a great deal of attention. To address

the shortcomings of conventional approaches, a paradigm shift is required. Advanced technology, in the form of 'digital twins' (a digital replica/model of a physical asset) is helping airlines bridge the gap between the physical and the digital worlds.

The Aerospace and Defence industry has been a trailblazer in the use of the digital twin technology to address shortcomings of current practices for fleet management and sustainment. This long-term vision enables the industry to save resources with prescriptive and predictive analytics.

The strategic trend of creating digital twins and feeding them with real-time data not only helps



airlines to keep their aircrafts in the air with reduced maintenance costs, but also provides tremendous value to aircrafts by optimizing the performance and reliability of airplanes. Let's take a closer look at what a digital twin is and how it can help airlines achieve the dual goals of improved maintenance and lower costs at the same time.

What exactly is a digital twin? What does it do?

A digital model of a substantial physical asset, a digital twin utilizes real-time data to enhance operations by adjusting to operational changes and it can forecast the future performance of the representing physical counterpart. The invisible digital twin is a product of multi-physics modelling together with data-driven analytics. Its ecosystem is created using ultra high-fidelity simulation software which comprises of the sensor and measurement technologies, simulation and physics-based modelling, industrial Internet of Things, artificial intelligence, and machine learning.

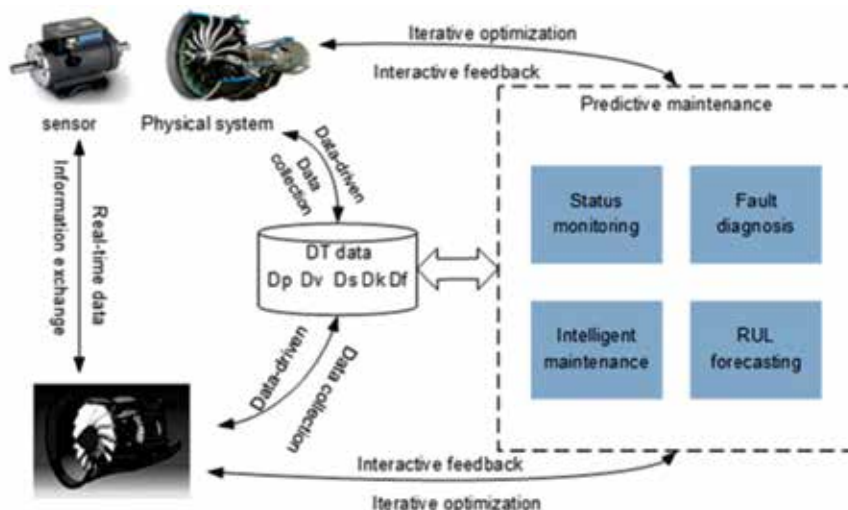
Essentially, a digital twin replication software is used to create a virtual 3D model of the asset. This model can go through a range of simulated environments that the asset is likely to encounter. Data fusion techniques play a significant role in the digital twin development. Data fusion evolves with the advances of information and communication technology and deal with increasing data in terms of its volume, velocity, and variety. The flow of information from raw

data to high-level understanding is propelled by data fusion techniques – sensor-to-sensor, sensor-to-model, and model-to-model fusion – which are implemented, and will function, at different levels. It is advisable to design a digital twin for one or more important systems, including airframe, propulsion & energy storage, life support, avionics, and thermal protection.

What role do digital twins play in the aerospace sector?

Many aerospace companies have begun to utilize digital twins to accomplish the goal of reducing unplanned downtime for engines and other systems. By using this technology, not only do they receive advance warning and predictions, but also get a plan of actions based on simulated scenarios that take into account the weather conditions, the performance of the asset, and several other variables. This has proved effective and has helped airlines to keep aircrafts in service for longer durations.

With the help of digital twins, they can do proactive and predictive maintenance to increase platform operational availability and efficiency, extend its useful life cycle and reduce its life cycle cost. Moreover, these digital twins are capable of mitigating damage or degradation by activating self-healing mechanisms or by recommending changes in the mission profile to decrease loadings, thereby increasing both the life span and the probability of mission success.



But that's not all. A digital twin makes it possible to predict the remaining useful life of the asset with a high level of accuracy. For example, in a digital twin of the landing gear, sensors are placed on typical failure points: hydraulic pressure and brake temperature. This ensures that the digital twin receives real time data from these points. This data helps predict chance of an early malfunction; additionally, it also helps to determine the landing gear's remaining life cycle. Data is critical for creating an effective digital twin. If data pertaining to the initial condition of the asset is available (system calibration details, component geometry, mechanical assemblies, etc.), it is possible to create a high-fidelity twin for the purpose of quality improvement. For instance, according to Aviation Today magazine, "Boeing has been able to achieve up to a 40% improvement in first-time quality of the parts and systems it uses to manufacture commercial and military airplanes by using the digital twin asset development model."

Conclusion

Today we are moving away from people telling machines what to do to a world where machines tell people what to do – digital twin is the best example. Although achieving a fully-functional digital twin will demand a premeditated and persistent effort to reap the rewards, it will be game-changing and can deliver incredible

results. Use of simulation based real time Dynamic Data Driven Applications Systems during production and manufacturing may result in achieving first time quality.

Since a digital twin is always connected and therefore up-to-date, it serves as a detailed "reference book" with all system information to help airlines significantly extend error-free operations. Digital twin capabilities can be seen as the single source of truth playing an extremely important role in aircraft MRO operations and sustenance. By structuring and executing digital twin initiatives appropriately, airlines can save huge amount through productivity gains.

Benefits of Digital Twins

More Effective Development of Equipment: With a digital twin and the data collected by the sensors, aerospace businesses have more effective ways to test changes to processes to increase productivity.

Improve Efficiency: In addition to the above, a digital twin provides a great testing ground for improvements to overall efficiency of one machine or a fleet.

Predictive Maintenance and Lifespan: With collected data, aerospace industries can better predict when a part or machine is reaching the end of its lifespan and become more proactive with maintenance and the ordering of parts and replacements.



About the Author:- Shri Gokulraj K, SSO-I is posted at ORDAQA (Engine), Bengaluru and joined DAQAS service in Feb 2018 .

PREMATURE FAILURE OF AN AIRCRAFT SYSTEM AND ITS PREVENTIVE MEASURES

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1. Introduction

The defence aircrafts are especially designed to operate in all weather condition including in unforeseen hostile environments. Accordingly, all possible and optimal considerations are made from the selection of materials to production of the aircraft along with adherence to maintenance and repair schedules. But, still the pre-mature failure of the aircraft are being reported and that too even below the half of their specified life. Author observed that there is/are very simple reasons for the failure of the aircraft except other-wise in one-odd cases. And, that is the non-adherence of basic (defined) and applied (expected) need of maintenance activities coherently.

2. Materials of Aircraft

Scientific community has developed a large number of materials which meet the requisite characteristics of high hot hardness, toughness, fatigue, corrosive-resistant, chemically non-degradable, creep and wear resistance etc. To mention few of them are superalloys, Al-alloys, Ni-alloys, Ti-alloys, metal matrix composites, silicon infiltrated carbide (SiSiC), boron carbide, aluminum oxide-titanium carbide, various type rubber and composites etc. However, the use of Aluminum alloys is found to be very extensive in the airframe due to inherent characteristics of light-in-weight and ease of manufacture and maintainability.

3. Shaping of Components

Components are shaped by either the casting, forging or cutting machining processes. In the complex and critical design of components, the

use of cutting machining is dominant in which the shaping is achieved by shear, erosion or by the abrasion. In spite of all possible care during shaping processes, the imperfection in the crystal structure does exist, which is primarily responsible for an early failure of the components. Although, the defects of crystal structure can be minimized in the casting or forming processes but distortion of crystal structure on the surface will prevail in cutting machining irrespective of any degree of surface finish. And this is the defect, which mainly causes the pre-mature failure of the components especially in the salty environments, if not adequately catered-for during processing, finishing, plating, painting and maintenance.

4. Operational Loading on Aircraft

The aircraft is subjected to five basic mechanical stresses. These stresses are of: (i) Tension (ii) Compression (iii) Shear (iv) Bending and (v) Torsion. All the structural members of aircraft are subjected to one or the combination of more than one stresses including of alternate in nature too. Although the aircrafts are designed with adequate amount of safety factor under the designated flight profile, still sometimes in an unforeseen condition, applied stresses cross over. And, in such circumstances, the wings and flight control surfaces get adversely affected. In the event of mechanical stresses crossing over the designated design flight profile, the crystal grain boundaries of the structure of the parts get loosened and distortion in the intactness of crystal structure starts, which paves the path for failure as well as the formation of stress corrosion.

5. Failure and its Causes

Failure can be defined as, “state where the component is no longer able to sustain the imposed load”. There are many reasons for the failure of the component but the most common reasons are (i) Imperfection in crystal structure (ii) Design deficiency/error and (iii) Formation of corrosion. Imperfection in crystal structure and design error is the subject of material processing and the consideration of safety factor respectively. These are of initial one time consideration during design, whereas formation of corrosion is having the direct bearing with the applied load, usage and aspect of maintenance for the defined life.

During operation, the most common reason for the failure of aircraft structure are Fatigue and Corrosion.

5.1 Fatigue

Fatigue is the major cause for failure of aircraft structure. It is influenced by many variables, such as frequency of loading, mean as well as peak stresses, temperature, environmental conditions, material micro-structure, surface finish, and residual stresses etc. During design, all possible aforesaid affecting factors are considered by the designers, so as to have the concept of “inspection free life” and failure due to fatigue is not of safety concern but still the failures happen including catastrophic in nature.

It is also to be appreciated that the defects pertaining to the nature of surface cracking, forging lapses, scratches and wear etc will definitely generate the local stresses. These local stresses cause stress concentration leading to crack initiation. To overcome such defect, components are thoroughly inspected after manufacturing by visual as well as non-destructive techniques and defects observed, if any, are rectified. Stress concentrations caused by

surface defects such as scratches and wear tend to be more common and are likely to be introduced during service. Another common cause of stress concentration is corrosion, which can lead to fatigue crack initiation.

5.2 Corrosion

Corrosion is a natural, irreversible and slow deteriorative phenomenal process, in which unstable metal moves to stable compounds under the imposed influence of atmospheric gases and which accelerates under the fatigue load. The corrosion has its different types, but the uniform corrosion, pitting corrosion, galvanic corrosion and stress corrosion cracking are the common one. It is very difficult to ascertain the exact reason for the formation of corrosion, but few factors which are responsible for the formation of corrosion, are mentioned below.

- (i) Strain in metal : At sheared and bends area of metal.
- (ii) Reactivity of metal : More reactive metal prone to corrosion.
- (iii) Presence of impurities : Impure metal enhances corrosion.
- (iv) Presence of electrolyte : Salty environment enhances corrosion.
- (v) Air and moisture : Enhances the formation of corrosion.
- (vi) pH Value : $\text{pH} < 7$ is more corrosive than basic or neutral medium.
- (vii) High Temperature : Rate of corrosion increases.

6. Integrity of the Crystal Structure

Unless the integrity of component crystal structure is disturbed by the natural ageing phenomenon, application of loads, internal stresses or by corrosion, failure of the

component is near-next-to impossible. Hence, the integrity of the crystal structure of components should be retained/ maintained by providing the adequate amount of safety factor during design, proper machining as well as finishing operation of the components and with the requisite regular maintenance practices. Surface roughness, Plating and Painting are the three primary aspects, which are responsible for the retention/ maintenance of the integrity of crystal structure debarring with the presence of imperfection or slag during the initial time of casting or forging of the materials.

6.1 Surface Roughness of Component

The surface roughness is the vital qualitative performance parameter of the machined component, which has to be decided during design for manufacturing processes itself. To some extent, the ability of the part to resist the loosening of crystal boundaries due to wear, fatigue and corrosion also depends upon the surface finish. Any irregularities of the surface finish creates the formation of nucleation sites, which is responsible for the development of cracks or the formation of corrosion resulting into the subsequent failure of the component structure.

6.2 Plating of Component

The plating process is generally a post-production process, which is done for the inhibition of corrosion, improvement of soldering ability, hardening of the object, reducing of friction and improvement in paint adhesion etc. In this process, a thin layer of another metal is applied on a base metal substrate to give various desirable properties to the object. It can also be done on already plated metal surface such as nickel plating over copper plated surface, chrome plating on the nickel plating etc. However, there is some difficult combination of plating, where the plating coat will have very poor adherence such as nickel plating on the nickel-plated surface.

6.3 Paint and its Finish

Paint is a unique homogeneous mixture of three major ingredients, namely the Binder, Pigment and Volatile Organic Compounds (VOCs) including some sorts of additives. Acrylic polymers (resins), alkyd polymers (resins) and epoxy polymers (resins) are the three binders, mostly being used in modern paints. However, Epoxy coatings being durable as well as resistant to many corrosive substances also provides the optimum protection against the abrasion, turbulence, corrosive fluids and extreme temperatures. Once a thin layer of paint is applied on the finished surface, it forms a solid dry adherent film after due oxidation/evaporation/ polymerization.

Application of the Paints is essential for the appearance, surface protection, stealth coatings and to improve the aerodynamic performance of an aircraft. Generally, the scheme of painting involves the coating of primer-coats and top-coats for achieving the ultimate surface protection. The paints are of many types such as Oil paints, Enamel Paint, Emulsion Paint, Cement Paint, Bituminous Paint, Aluminum Paint, Anti-Corrosive Paint and Synthetic Rubber Paint etc. And application of the respective paints depends upon their performance merit and the user's requirement. Following common steps are to be considered for the proper painting process:

- **Identification of Metal:** For the selection of primer to be used.
- **Surface Preparation:** Removal of dust, debris, rust, loose and flaked paint etc by making use of brush, rust remover (as specified by manufacturer) and acetone etc. The surface should be lightly etched for the primer to stick more effectively. In the case of extensive corrosion of metal, the use of sanding can be beneficial. But, in the case of galvanized metal, sanding can potentially abrade away the zinc layer

which makes the metal more likely to rust in the future.

- **Prime the Metal:** Priming prevents the rust from bleeding through the new paint. It also helps the paint to stick the metal surface more effectively. In some cases, the use of self etching primer is also recommended after the application special primer.
- **Application of Paint:** Apply the Paint and allow the Paint to cure under stated operating condition of temperature, humidity and airflow etc. Although composite structure does not require the paint coat as of metallic surfaces, still in some cases it has been done as of aesthetic appeal. In addition to this, it protects the structure from Ultraviolet degradation too.

7. Preventive Measures against Premature Failure

Following aspects are to be considered so as to minimize the premature failures of aircraft:

Selection of materials and their machining requirements are to be ensured as per the laid down requirements. A slight deviation in the specification of product, process and performance will lead to pre-mature failure of the product especially where the aircraft is exposed to unforeseen environmental and implied operating load conditions.

Regular called-for or even uncalled-for inspection should be undertaken, where the crossover of fatigue limits has been suspected. This will help to detect an early failure of the aircraft.

Surface preparation of the component for the painting should be of high standards else trapping of the any leftover foreign material will decrease the adhesiveness of paints on the metallic structure. Also, special care must

be taken during re-painting, where the old paint coating has to be removed and surface is prepared for painting as per the requisite standards.

The painting process is a unique-one, which need a special paint-booth where the requisite control of temperature, humidity, air velocity etc should be made available without which the whole purpose of painting will be lost.

Thickness of the Paint layer should be also ensured for effective adhesion and protection. Too much or too less thickness will not solve the purpose of painting process.

All the maintenance operation pertaining to scheduled preservative servicing should be adhered. And the situations, where the aircraft has been subjected to massive saline environments, are to be additionally washed and applied with corrosion protective fluid. This may be an addition to the laid down servicing schedule and in this regard, the judicious decision has to be taken by the competent authority.

In the cases where the aircraft are dismantled or is left over for defect investigation or for any reason, utmost care should be taken to preserve the aircraft immediately on the dismantling or at the earliest available opportunity.

Conclusion

Maintenance of an aircraft plays a major role to retain the defined reliability of an aircraft. Any short-coming in maintenance, repair and overhaul procedural aspect will lead to uncalled-for un-serviceability of the aircraft. All possible efforts should be taken to “Do the right thing at right time in right way”, for which if required the facilities for the production, inspection as well as maintenance and training cum knowledge of the technical personnel should be upgraded from time-to-time respectively and regularly.

About the Author:- Dr. U.S.Yadav, P.Sc.O, ORDAQA, Kanpur joined DAQAS service in Dec 2006.

PRINCIPLES OF NIGHT VISION TECHNOLOGY-IMAGE ENHANCEMENT & THERMAL IMAGING

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Astt.Dir.

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1. Introduction

I joined service in DGQA in Nov 2006 and my first introduction to Quality Assurance of Defense Technology was in the field of optoelectronics e.g. day/night vision & sighting devices and thermal imagers mounted on Infantry Carrying Vehicle BMP-II and its variants, manufactured and overhauled at Ordnance Factory, Medak. I again got to work on these technologies during my tenure at OAQA, Dehradun from 2012 to 2018. The Electrical & Instrumentation Group at HQrs DGAQA, New Delhi majorly deals with these equipments.

Night vision Technology, by definition, literally allows one to see in the dark and was originally developed for military use, but with the development of technology night vision devices are being used in day to day applications. Image Processing refers capturing and manipulating images to enhance or extract information. Image processing is a form of signal processing for which the input is an image, such as a photograph or frame. The output of image processing may be either an image or, a set of characteristics or parameters related to the image. Night Vision can work in two different ways depending on the technology used:

1.1 Image enhancement

This technology works by collecting the tiny amounts of light including the lower portion of the infrared light spectrum; those are present but may be imperceptible to our eyes, and amplifying it to the point that we can easily observe the image.

1.2 Thermal imaging

This technology operates by capturing the upper

portion of the infrared light spectrum, which is emitted as by objects as heat. Hotter objects, such as warm bodies, emit more of this light than cooler objects like trees or buildings. Thermal

2. The Principle of Thermal Imaging

In order to understand night vision, it is important to understand something about light. The amount of energy in a light wave is related to its wavelength. Shorter wavelengths have higher energy. Of visible light, violet has the most energy, and red has the least. Just next to the visible light spectrum is the infrared spectrum.

Infrared light can be split into three categories:

(i) Near-Infrared (Near-IR)

Closest to visible light, near-IR has wavelengths that range from 0.7 to 1.3 microns, or 700 billionths to 1,300 billionths of a meter.

Mid-Infrared (Mid-IR)

Mid-IR has wavelengths ranging from 1.3 to 3 microns. Both near-IR and mid-IR are used by a variety of electronic devices, including remote controls.

(iii) Thermal-infrared (Thermal-IR)

Occupying the largest part of the infrared spectrum, thermal-IR has wavelengths ranging from 3 microns to over 30 microns.

The key difference between thermal-IR and the other two is that thermal-IR is emitted by an object instead of being reflected off by it. Infrared light is emitted by an object because of what is happening at the atomic level.

In Thermal Imaging, a special lens focuses the

infrared light emitted by all of the objects in view. The focused light is scanned by phased array of infrared-detector elements. The detector elements create a very detailed temperature pattern called a thermo gram. It only takes about one-thirtieth of a second for the detector array to obtain the temperature information to make the thermo gram. This information is obtained from several thousand points in the field of view of the detector array. The thermo gram created by the detector elements is translated into electric impulses. The impulses are sent to a signal-processing unit, a circuit board with a dedicated chip that translates the information from the elements into data for the display. The signal-processing unit sends the information to the display, where it appears as various colors depending on the intensity of the infrared emission. The combination of all the impulses from all of the elements creates the image.

4. Night Vision Devices (Image Intensifier Tube based Equipment)

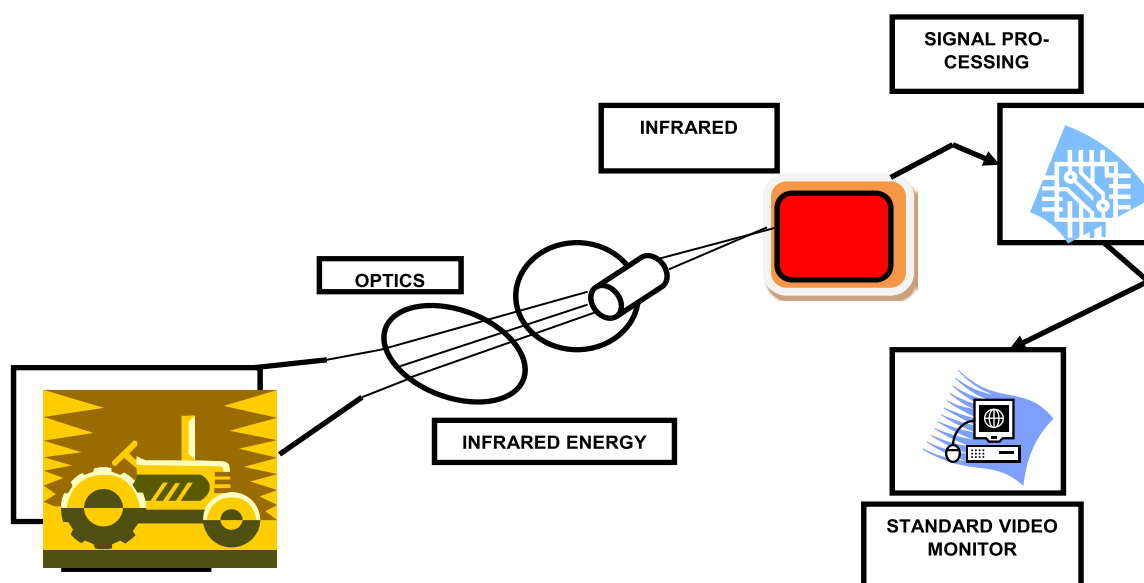
A night vision device (NVD) is an optical instrument that allows images to be produced in levels of light approaching total darkness. They are most often used by the military and law enforcement agencies, but are available

to civilian users. The term usually refers to a complete unit, including an image intensifier tube, a protective and generally water-resistant housing, and some type of mounting system. Many NVDs also include sacrificial lenses, IR illuminators, and telescopic lenses. Night vision devices were first used in World War II. The technology has evolved greatly since their introduction, leading to several "generations" of night vision equipment with performance increasing and price decreasing.

5. The Principle of Image Enhancement

Image-enhancement technology is what most people think of when you talk about night vision. In fact, image-enhancement systems are normally called night-vision devices (NVDs). NVDs rely on a special tube, called an image-intensifier tube, to collect and amplify infrared and visible light. Image enhancement works in the following manner:

A conventional lens, called the objective lens, captures ambient light and some near-infrared light. The gathered light is sent to the image-intensifier tube. In most NVDs, the power supply for the image intensifier tube receives power from two N-Cell or two "A" batteries. The tube outputs a high voltage, about 5,000



Principle of Thermal Imaging and General Layout of a Thermal Imager

made using fiber-optic technology. The MCP is contained in a vacuum and has metal electrodes on either side of the disc. Each channel is about 45 times longer than it is wide, and it works as an electron multiplier. When the electrons from the photo cathode hit the first electrode of the MCP, they are accelerated into the glass micro channels by the 5,000-V bursts being sent between the electrode pair.

As electrons pass through the micro channels, they cause thousands of other electrons to be released in each channel using a process called cascaded secondary emission. Basically, the original electrons collide with the side of the channel, exciting atoms and causing other electrons to be released. These new electrons also collide with other atoms, creating a chain reaction that results in thousands of electrons leaving the channel where only a few entered.

At the end of the image- intensifier tube, the electrons hit a screen coated with phosphors. These electrons maintain their position in relation to the channel they passed through, which provides a perfect image since the electrons stay in the same alignment as the original photons. The energy of the electrons causes the phosphors to reach an excited state

and release photons. These phosphors create the green image on the screen that has come to characterize night vision.

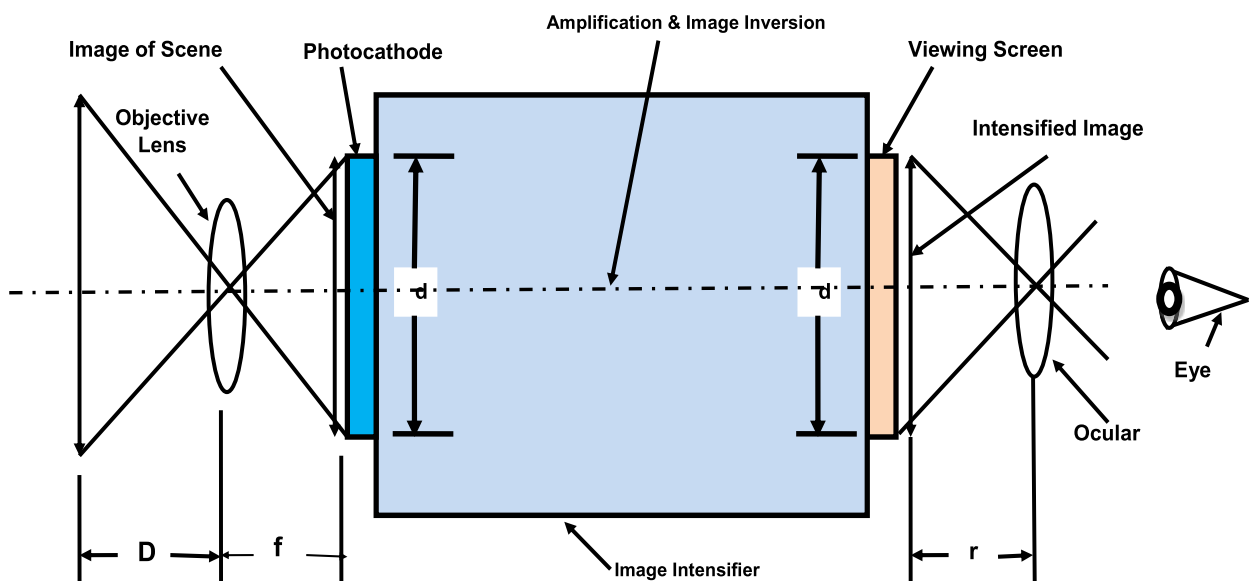
The green phosphor image is viewed through another lens, called the ocular lens, which magnifies and focuses the image. The NVD may be connected to an electronic display, such as a monitor, or the image may be viewed directly through the ocular lens.

6. Generations of NVDs

NVDs have been around for more than 40 years. They are categorized by generation. Each substantial change in NVD technology establishes a new generation.

Generation 0

The original night-vision system created by the United States Army and used in World War II and the Korean War, these NVDs use active infrared. This means that a projection unit, called an IR Illuminator, is attached to the NVD. The unit projects a beam of near-infrared light, similar to the beam of a normal flashlight. Invisible to the naked eye, this beam reflects off objects and bounces back to the lens of the NVD. These systems use an anode in conjunction with the cathode to accelerate the



General Layout of an Image Intensifier Tube based Night Vision Device

electrons. The problem with that approach is that the acceleration of the electrons distorts the image and greatly decreases the life of the tube. Another major problem with this technology in its original military use was that it was quickly duplicated by hostile nations, which allowed enemy soldiers to use their own NVDs to see the infrared beam projected by the device.

Generation 1

Generation 1 of NVDs moved away from active infrared, using passive infrared instead. These NVDs use ambient light provided by the moon and stars to augment the normal amounts of reflected infrared in the environment. This means that they did not require a source of projected infrared light. This also means that they do not work very well on cloudy or moonless nights. Generation-1 NVDs use the same image-intensifier tube technology as Generation 0, with both cathode and anode, so image distortion and short tube life are still a problem.

Generation 2

Major improvements in image-intensifier tubes resulted in Generation-2 NVDs. They offer improved resolution and performance over Generation-1 devices, and are considerably more reliable. The biggest gain in Generation 2 is the ability to see in extremely low light conditions, such as a moonless night. This increased sensitivity due to the addition of the micro channel plate to the image-intensifier tube. Since the MCP actually increases the number of electrons instead of just accelerating the original ones, the images are significantly less distorted and brighter than earlier-generation NVDs.

Generation 3

In Generation 3, while there are no substantial changes in the underlying technology from Generation 2, these NVDs have even better resolution and sensitivity. This is because the

photo cathode is made using gallium arsenide, which is very efficient at converting photons to electrons. Additionally, the MCP is coated with an iron barrier, which dramatically increases the life of the tube.

Generation 4

What is generally known as Generation 4 or "filmless and gated" technology shows significant overall improvement in both low- and high-level light environments. The removal of the ion barrier from the MCP that was added in Generation 3 technology reduces the background noise and thereby enhances the signal to noise ratio. Removing the ion film actually allows more electrons to reach the amplification stage so that the images are significantly less distorted and brighter. The addition of an automatic gated power supply system allows the photocathode voltage to switch on and off rapidly, thereby enabling the NVD to respond to a fluctuation in lighting conditions in an instant. This capability is a critical advance in NVD systems, in that it allows the NVD user to quickly move from high-light to low-light (or from low-light to high-light) environments without any halting effects. With the new, gated power feature, the change in lighting wouldn't have the same impact; the improved NVD would respond immediately to the lighting change.

7. Characteristics of Night Vision Devices

Using intensified night vision is different from using regular binoculars and/or your own eyes. Below are some of the aspects of night vision that you should be aware of when you are using an image intensified night vision system.

7.1 Textures, Light and Dark : Objects that appear light during the day but have a dull surface may appear darker, through the night vision unit, than objects that are dark during the day but have a highly reflective surface. For example, a shiny dark colored jacket may appear brighter than a light colored jacket with a dull surface.

7.2 Depth Perception : Night vision does not present normal depth perception.

7.3 Fog and Rain: Night vision is very responsive to reflective ambient light; therefore, the light reflecting off of fog or heavy rain causes much more light to go toward the night vision unit and may degrade its performance.

7.4 Honeycomb : This is a faint hexagonal pattern which is the result of the manufacturing process.

7.5 Black Spots: A few black spots throughout the image area are also inherent characteristics of all night vision technology. These spots will remain constant and should not increase in size or number.

7.6 Blooming : Blooming is the loss of the entire night vision image, parts of it, or small parts of it, due to intensifier tube overloading by a bright light source. It is also known as a "halo" effect, when the viewer sees a "halo" effect around visible light sources. When such a bright light source comes into the night vision device's view, the entire night vision scene, or parts of it, becomes much brighter, "whiting out" objects within the field of view. Blooming is common in Generation 0 and 1 devices. The lights in the image to the right would be considered to be "blooming".

7.7 Bright-Source Protection (BSP) : High-Light Cut-Off, an electronic function that reduces the voltage to the photocathode when the night vision device is exposed to bright light sources such as room lights or carlights. BSP protects the image tube from damage and enhances its life; however, it also has the effect of lowering resolution when functioning.

7.8 Chicken Wire: An irregular pattern of dark thin lines in the field of view either throughout the image area or in parts of the

image area. Under the worst-case condition, these lines will form hexagonal or square wave-shape lines.

7.9 Equivalent Background Illumination (EBI) : This is the amount of light you see through a night vision device when an image tube is turned on but no light is on the photo cathode. EBI is affected by temperature; the warmer the night vision device, the brighter the background illumination. EBI is measured in lumens per square centimeter (lm/cm²). The lower the value the better. The EBI level determines the lowest light level at which an image can be detected. Below this light level, objects will be masked by the EBI.

7.10 Emission Point : A steady or fluctuating pin point of bright light in the image area that does not go away when all light is blocked from the objective lens. The position of an emission point within the field of view will not move. If an emission point disappears or is only faintly visible when viewing under brighter night time conditions, it is not indicative of a problem. If the emission point remains bright under all lighting conditions, the system needs to be repaired. Do not confuse an emission point with a point of light source in the scene being viewed.

These are some of the important characteristics of the NVDs.

8. Applications:

The original purpose of night vision was to locate enemy targets at night. It is still used extensively by the military for that purpose, as well as for navigation, surveillance and targeting. Common applications for night vision include, Military applications, Law enforcement, Hunting, Wildlife observation, Surveillance, Security, Navigation, Hidden-object detection etc.

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HUMAN RESOURCE DEVELOPMENT THROUGH TRAINING IN DGAQA

Biswajit Choudhury

SSO-I

ALISDA, Bangalore



Introduction

Training and development is a process that prepares an employee with knowledge, skills and abilities required to perform a specific task. It plays a vital role in not only improving the current performance but also prepares the employees for future responsibilities. It helps in developing leadership skills, motivation, loyalty and positive attitude that a successful employee and manager should display. It is an integral part of the whole management program since all other functional activities of an organisation are inter-related to it. It is very crucial for an organisation that wants to take the advantage of advances in technology and techniques, methods and strategies through a series of well structured training programmes.

Role of ALISDA, Bengaluru in Training of DGAQA Officers & Personnel

ALISDA plays an important role in executing DGAQA tasks in various domains - be it managing DGAQA Pavilion in Aero India show, organising Regional Directors (RD) meets, conducting defence exhibition for local public or participating in Aerospace and Defence Manufacturing Show (ADMS) which are events of national repute. Beside these, ALISDA also provides routine QA coverage to R&D labs, DPSU and private industries.

But the role for which ALISDA is generally recognised is its involvement in the training of officers and personnel. It coordinates training for the new recruits as well as existing cadres.

The Tech-Coord Group at HQs DGAQA also plays a vital role in the Training of Officers & Personnel. It initiates Foundation & Mandatory Training of new recruits and existing cadres, processes the approval of these trainings from the Competent Authority and co-ordinates the

trainings along with ALISDA, Bengaluru. The Group also conducts Miscellaneous Trainings on need basis in the fields of Quality, Technology, Management and Personal Development for all cadres at Training Institutes of National Repute e.g. ESCI, Hyderabad, CMTI, Bengaluru, ISTM, Delhi, HMA, Bengaluru etc.

Changing QA Requirements

Under the Atmanirbhar Bharat initiative, the manufacturing ecosystem of Military Aviation Stores (MAS) is getting more and more linked to MSMEs and Start-ups either directly or through the DPSUs and Defence R&D labs. The growing trend of setting up of industrial complexes for defence across the length and breadth of the country is transforming the defence manufacturing scenario in the country. The transformation is destined to bring a number of benefits towards achieving self-reliance and acquiring export capabilities. But, it also poses many challenges for the QA regulatory agencies of the country.

In order to meet these challenges, there is a critical need to prepare and develop the QA Human Resource through necessary training and development programs. Towards this, DGAQA has brought about many improvements in training programs. The training and development program of officers has been redesigned with significant change in duration of training and additions to the syllabus in keeping with the present requirements. Many external training agencies have been roped in for overall skill development in technical and managerial abilities to make officers new generation QA professionals.

Training Curriculum

The training syllabus is designed to inculcate the knowledge on generic aspects of

military aviation as well as domain specific competencies in the field of Aeronautical Quality Assurance effectively.

The curriculum includes QA methodologies of Aircrafts, Aero-engines, Helicopters, Missiles, Rockets, Bombs, Explosives & Propellants. Topics on Quality Audit and Surveillance form an integral part of the curriculum. The methodologies involved are explained with case studies collected from various Field Establishments. The syllabus on QA aspects during indigenisation is designed to include outsourcing policies. Areas of major involvement e.g. defect Investigation, Court of Enquiry, FOD management etc are also given prominence. Practical demonstrations are planned to augment classroom delivery of courses. These include factory visits to different HAL divisions. Assessments and Feedbacks are held on culmination of all trainings and courses to assess the training efficacy.

Quality in context of Atmanirbharta as part of syllabus

In the coming times, India will become a global defence manufacturing hub if an effective quality culture can be built among the operative management of all the stake holders including the society in general. Towards this, important topics and facts that are specially included in the training modules are:

(a) The fact that there is no **'One-Size-Fits-All'** approach to quality and reliability anymore. Needs for handholding and guiding the MSMEs / Start-ups to develop standard Quality Management Systems in their work place is emphasized.

(b) Need for **moving beyond 'Quality 3.0'** which was earlier based on Control, Compliance and Cost (3C) to solve the complex issues under changing scenario.

(c) Quality is required to be **driven by Innovation, Data and Technology** and QA professionals are encouraged to use these tools not only themselves but also disseminate

the same to all stakeholders.

(d) The QA professionals are trained to play a pivotal role in **spreading awareness and creating capabilities** in terms industrial excellence, exchange in technologies / ideas, skill-talent advantage and resource optimisation to create an ecosystem for the realisation of Aatmanirbhar Bharat in Defence.

(e) **Creating Ownership in People** is being emphasized. For this, QA professionals are trained to identify quality needs specific to Design, Development and Production phases separately.

f) **Improvisation in methods of Quality Audit and Surveillance Check** is the key for improving the quality & reliability of products and services for which creation of robust data collection methods and analysis programs are being encouraged.

(g) Use of **automation / digitization** to avoid delay. For this, use of various digital tools / applications which help in tracking defect investigations and corrective actions are encouraged. Training on this aspect helps in developing the networking and connectivity advantage which in turn encourages sustainability and self-reliance.

Conclusion

The success of Atmanirbhar Bharat and Make-in-India program in Defence Manufacturing will depend on how seriously the quality aspects are taken by one and all and how effectively the QA methodologies and strategies are implemented on ground. QA professional have to play a vital role in implementing these methodologies and strategies with required effectiveness. The skills that are required for these are the priority of DGAQA. ALISDA and Technical Coordination Group at HQrs DGAQA, New Delhi are making all out efforts for developing QA professionals committed to implement these requirements through continuous innovative critical thinking and problem solving ideations.

About the Author:- Shri Biswajit Choudhury, SSO-I is posted at ALISDA, Bengaluru and joined DAQAS service in July 2009.

COUNTER MEASURE DISPENSING SYSTEM (CMDs) FOR AIRCRAFTS

I Ahmad
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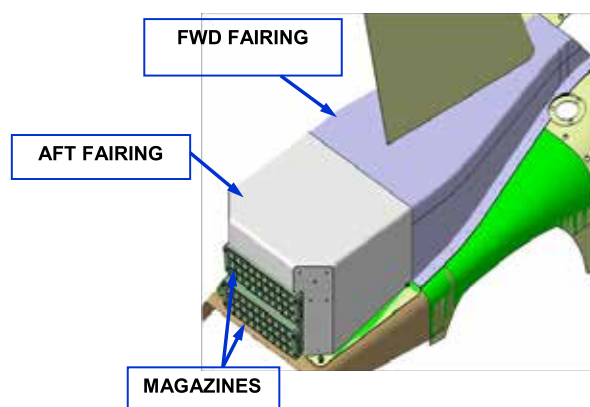
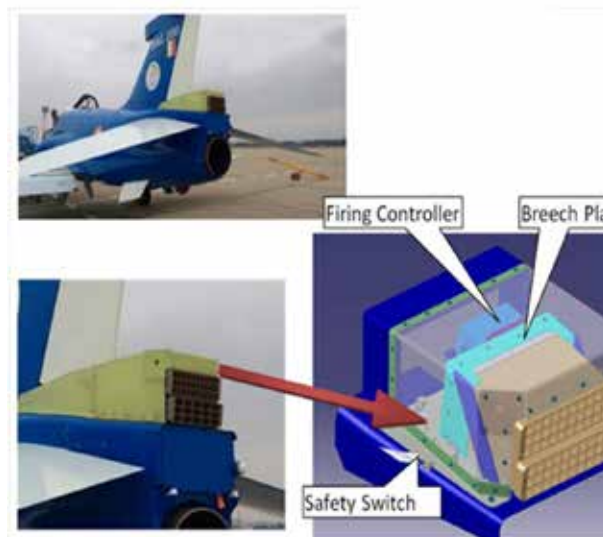
COUNTER MEASURES DISPENSING SYSTEM (CMDs)

Counter Measures Dispensing System is a state-of-the-art Flare and Chaff Dispensing System providing self-protection to the aircraft against Radar guided & IR seeking missiles. Self-defence for airborne platforms means knowing whether any enemy weapon is observing you or making you a target. That (Self Defence) requires keeping track of every type of signal and keeping your countermeasures ready in the response. The systems are battle proven and are used on fighter aircrafts, helicopters as well as in transport aircrafts. Counter Measure Dispensing System. (CMDs) is also known as KAVACH System. This system mainly comprises of Four Units namely Control Panel, Firing Controller, Breach Plate and Chaff & Flair Magazines.

Chaff System

A Chaff system onboard an aircraft is used to protect the aircraft or a helicopter from the radar-guided missile. This is done by firing the chaff cartridge into the air, where chaff cloud is formed rapidly. Chaff forms a volumetric radar reflecting material and is composed of distributed metalized radar reflector material. This protects the host aircraft from a radar-guided missile by luring it to a better radar cross-section substitute, thus achieving a distraction towards the Chaff cloud. This decoy is considered effective when it is able to lead the anti-aircraft missile away from the host aircraft such that it passes target aircraft safely. The chaff are designed to operate in a frequency band of 2 to 18 GHz and can create

an average Radar Cross Section (RCS) of about few square meter within a fraction of a second. These systems are designed for extreme environmental conditions like minus 45 to plus 70 degrees Celsius etc.



Similarly, warships use ship borne chaff naval decoy system to distract radar-guided anti-ship missiles in a self-defence role of the ship. The indigenized version is christened Kavach decoy system which releases Chaff made up of silver

coated glass fiber. The Chaff forms a radar clutter using these fibers, while they remain suspended in the air. This clutter is aimed to confuse the incoming missile to lock-on it instead of the warship.

Chaff system basically comprises of multiple barrel launchers (Port and Starboard configuration), with each launcher possessing a built-in stabilization system against roll, pitch and yaw motions. The Chaff launcher comes in various ranges viz. Short Range, Medium Range and Long Range. Chaff rockets are pre-loaded into the barrels and are fired using squibs, the firing initiation controlled electrically by an FCS system located in the Operation Centre of the ship. The FCS computer calculates the best solution for chaff launch sequence based on various factors like target motion parameters, wind speed, wind direction etc. The computer can prioritise the threat and also suggests the Commanding Officer the Course to Steer to obtain best decoy capability.

Flares

Onboard the aircraft, Flares are part of CMDS configuration and protect the platform from

the Infrared (IR) seeking missiles. Flares on being fired provide an alternate strong IR source to heat-seeking anti-air missiles so that they are lured away from the aircraft. The dispensation of the flares is a well-measured solution so as to create a new energy centroid in the field of view of the chasing missile. Thus, the IR radiation signature created by flare is larger than that of the aircraft and attracts the missile towards it.

Conclusion

Advanced self-protection is essential for airborne missions in today's demanding and complex mission environments. It ensures survivability, safe return home and the freedom to act and room to manoeuvre. Countermeasure Dispenser Systems are the latest, most powerful and innovative solutions in airborne self-protection. The state-of-the-art CMDS significantly enhance the platform survivability, extend the reach and create the time needed to disrupt the opponent. Their need and importance in modern warfare is critical and indispensable.

About the Author:- Shri I Ahmad, Director (A/c) Division, Bengaluru joined DAQAS service in Feb 1996.

विचार :

*आत्म-निर्भरता को उत्पाद एवं
गुणवत्ता को सह-उत्पाद मानकर
आत्मनिर्भर भारत के लिए
प्रयत्न करें।*



अत्यंत हर्ष का विषय है कि, हालहीं में भारत ने जी-20 की अध्यक्षता संभाली है। इसके साथ ही जी-20 के प्रतीक चिन्ह का अनावरण भी हुआ। यह अत्यंत सुखद है की भारत आज विश्व पटल पर अपना परचम फहरा रहा है। भारत ने गत वर्षों में भरपूर तरक्की की है और यदि देखा जाए तो आगामी अनेक वर्षों में तरक्की की राह भी बना चुका है। वह काल जिसमें पूरा विश्व महामारी से जूझ रहा था तब देश के प्रधानमंत्री ने देश की जनता का आवाहन कर आत्मनिर्भर भारत की अपील की। आज भारत तेजी से आत्मनिर्भरता की राह पर आगे बढ़ रहा है। स्वदेशी टीके से लेकर स्वदेशी स्पेस शटल तक, आज भारत में निर्मित हो रहे हैं। इन सब विकास गतिविधियों को देखकर प्रतीत होता है मानो सबका साथ, सबका विकास का स्वप्न साकार हो रहा है।

जी-20 की अध्यक्षता भारत के लिए ऐतिहासिक मौका है। हमारा जी-20 मंत्र— **“वसुधैव कुटुम्बकम्”, “एक धरती, एक परिवार, एक भविष्य”** है। प्रतीक चिन्ह पर बना कमल भारत की ऐतिहासिक विरासत को दर्शाता है, यह इस मुश्किल समय में उम्मीद की किरण है। इसकी खासियत इसके 7 पंख हैं। यह 7 पंख, सात महाद्वीपों को दर्शाते हैं। माननीय प्रधानमंत्री के अनुसार सात, संगीत की सार्वभौमिक भाषा में सुरों की संख्या है। संगीत में, जब सात स्वर एक साथ आते हैं, तो वे एक पूर्ण सामंजस्य बनाते हैं। लेकिन हर सुर की अपनी खासियत होती है। इसी तरह, जी-20 का उद्देश्य विविधता का सम्मान करते हुए दुनिया को एक साथ लाना है। इस मौके का तब मिलना जब भारत पहले ही **“आजादी का अमृत महोत्सव”** मना रहा है, यह गर्व का विषय है। न सिर्फ भारत आज आत्मनिर्भरता, गरिमा और अध्यक्षता

की राह पर है बल्कि यह लगातार अपने गौरव को बढ़ाने में निरंतर प्रयासरत है। हालही में भारत ने शर्म ईल शेख, मिश्र, में आयोजित **कोप-27** में भी भागीदारी ली। इस सम्मेलन का मुख्य विषय, विश्व में प्रदूषण पर रोक लगाना है। देश इस दिशा में भी प्रभावी कदम ले रहा है। सरकार विद्युत वाहनों पर ज्यादा से ज्यादा ध्यान दे रही है। देश की राजधानी में सार्वजनिक परिवहन जैसे बसें, इत्यादि अब विद्युत पर चल रही हैं। इस अभियान को जबकि 100% प्राप्त नहीं किया गया है परंतु इससे संबन्धित प्रयास अपने आप में उत्साहजनक व सुखद हैं।

गत वर्षों में भारत ने अपने समावेशी विकास पर अधिकाधिक ध्यान केन्द्रित किया है। भाषा से लेकर तकनीकी विकास आज भारत हर क्षेत्र में अपने पाँव पसार रहा है। बीते दिनों आंध्र प्रदेश के **सतीश धवन स्पेस सेंटर** से निजी रॉकेट **विक्रम-एस** का प्रक्षेपण हुआ जो आज से कुछ वर्षों पहले कल्पना से भी परे था। इस अभियान का नाम **“प्रारंभ”** दिया गया है और वस्तुतः यह भारत के विज्ञान क्षेत्र में निजीकरण का प्रारंभ है।

जिस भारत के लिए रैपिड रेल एक स्वप्न था आज वह भी साकार होने की कगार पर पहुंचता नजर आ रहा है। देश की पहली रैपिड रेल अपने प्राथमिक खंड के ट्रायल के लिए तैयार है। उम्मीद है कि नव-वर्ष के शुरुवात में रैपिड रेल के ट्रायल की शुरुवात भी होगी।

आज यदि चारों ओर नजर डालें तो हम भारत को हर पटल पर विकासशील पद पर अग्रसर पाएंगे। आज महात्मा गांधी का स्वप्न **“ग्रामीण विकास से सम्पूर्ण देश का विकास”** भी सिद्ध होता नजर आता है।

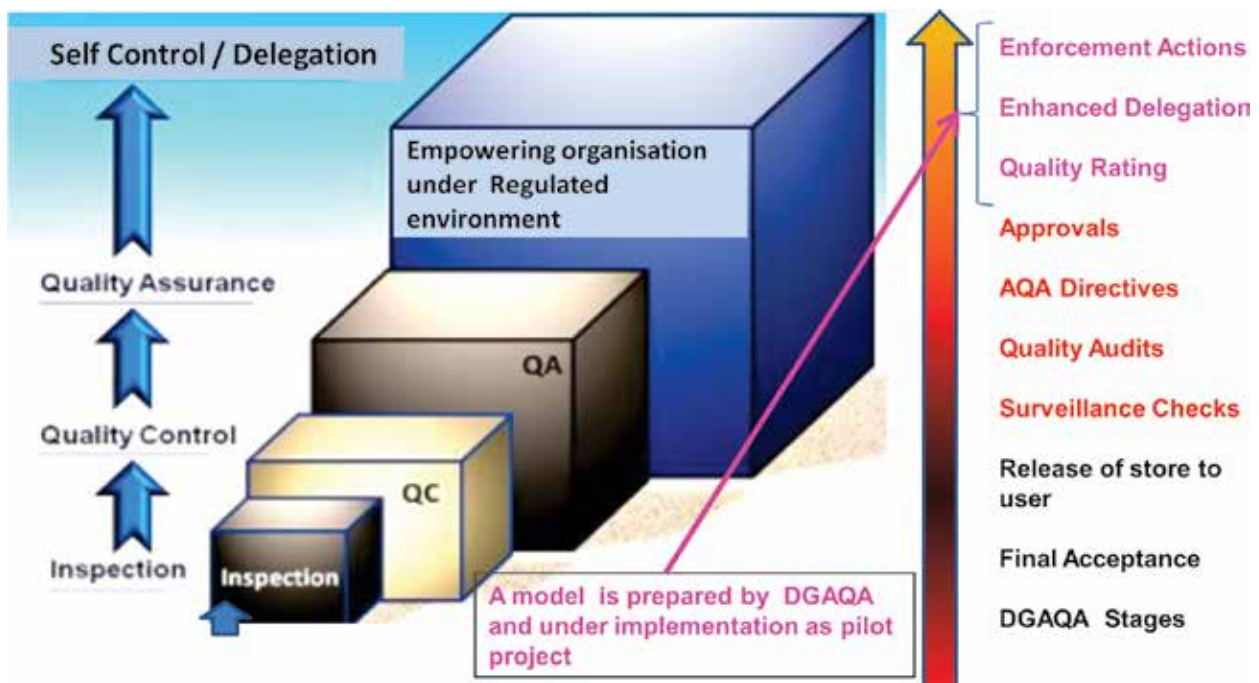
अमृत महोत्सव के मौके पर प्रधानमंत्री जी ने महिलाओं के प्रति अभद्र भाषा के प्रयोग के विरुद्ध कहा कि मेरा हर भारतीय से एक अनुरोध है। क्या हम रोजमर्रा की जिंदगी में महिलाओं के प्रति अपनी मानसिकता को बदल सकते हैं। नारी शक्ति का गौरव भारत के सपनों को पूरा करने में महत्वपूर्ण भूमिका निभाएगा। यह महत्वपूर्ण है कि हम अपने भाषण और आचरण में कुछ भी न करें, जो महिलाओं की गरिमा को कम करता है। किसी न किसी कारण हमारे अंदर आई विकृति के चलते हमारे बोलचाल, व्यवहार और शब्दों में हम नारी का अपमान करते हैं। क्या हम स्वभाव से, संस्कार से, रोजमर्रा की जिंदगी में नारी को अपमानित करने वाली हर बात से मुक्ति का संकल्प ले सकते हैं?

प्रधानमंत्री का भाषण महान लेखक भारतेन्दु हरिश्चंद्र द्वारा कथित एक दोहे की याद दिलाता है।

**“जो हरि सोई राधिका, जो शिव सोई शक्ति।
जो नारी सोई पुरुषयाम, कछु न विभक्ति।।”**

अर्थात् जो हरि हैं वैसी ही राधा, जो शिव हैं वही शक्ति भी और जो स्त्री में है वहीं पुरुष में भी है कुछ भेद नहीं है, सब समान हैं। सबसे बड़ी समानता तो यह है कि स्त्री-पुरुष दोनों को ईश्वर ने ही बनाया है अतः हमें उनमें कोई भेदभाव नहीं करना चाहिए। इसके साथ में आगामी भारत की मंगल कामना करते हुए लेख को यहाँ समाप्त करना चाहूंगी।

लेखक के बारे में: श्रीमति रचना मिश्रा, कनिष्ठ अनुवाद अधिकारी की नियुक्ति क्षे.नि.कार्यालय, वैमानिक गुणवत्ता आश्वासन (शस्त्र) किरकी, पुणे में 14 जुलाई, 2022 को हुई।



Progressive steps in Quality Assurance

MINIMIZATION OF HIGH PRESSURE TURBINE (HPT) BLADES REJECTION RATE VIA EDM PROCESS PARAMETERS MODIFICATIONS



Navneet Mishra
SSO-II, OADG, Koraput

Why Aero-engines Blades Rejection is critical? :

OADG(KPT),DGAQA is involved in providing QA coverage for Aero engines (AL31FP) (SU30MKI) and its components during manufacturing, overhaul and repairs.

High pressure turbine blades(single crystal investment casted) is one of the most critical parts in SU-30MKI aero engines. These blades work under very harsh conditions of extreme thermal, centrifugal and axial stresses as well as amounts to approximately 9% of overall cost of the aero engine.

During manufacturing as per OEM technology, a blade has to undergo numerous micrometric inspection checks followed by fatigue tests, residual stress tests and many more before it gets accepted for exploitation, wherein a single deviation observed during any stage of inspection results in rejection of blade. Any reduction in rejection rate will contribute in a big way by saving to the state exchequer of our developing country.

What we observed?

During visual inspections of ventilating holes at the leading edge of HPT blade,it was found that the blades were getting rejected due to wall puncture noticed at ventilating holes of HPT blades.

What is causing high rejection rate?

As per the study, it was observed that the blades are received from Foundry& Forge

shop with inner wall thickness of the casting at the lower side of tolerance limits (i.e. technological value $\Delta=1.4$ to 1.95) due to which the existing process parameters of EDM (Electrical Discharge Machining) is not suitable to make holes without damaging the side wall with existing process parameters, resulting to rejection of approximately 9% to 25% of blades in a batch.

The process was studied and rigorous brainstorming happened between DGAQA and Production Agency, resulting in conclusion that high MRR (material removal rate) can be the main cause of puncture of ventilating holes.

How high MRR impact rejection of blades?

High MRR was in practice to increase production rate. For maintaining this high MRR, high amount of energy is needed which is a function of current given and length of ON time i.e. $E \propto f(\text{lamp} \ \& \ \text{ON TIME})$. This was resulting in broader and deeper crater as well as Heat Affected Zone(HAZ) thereby causing wall puncture at ventilating holes of HPT blades and their rejection.

What we concluded!

During further discussion and study it was found that by reducing the MRR, it is possible to trade off lower productivity with reduced rejection rate. The EDM parameters like current is reduced to 57.14% and ON time (micro sec) was increased to 122.12% in stepwise approach with respect to existing EDM

variables with voltage remaining constant. Limiting factors considered are the stability of arc and minimum heat generation for material removal. These changes in EDM parameters do not imply any changes / violation of existing technology.

Outcome and Verification:

The above mentioned process was followed for subsequent 2 batches after the establishment

of optimum EDM parameters and the results are found to be very encouraging which are as given below:

Conclusion:

The above study and outcome will result in reduction in rejection rate of HPT blade and thereby saving the cost of production thus contributing in a big way towards saving to the state exchequer.

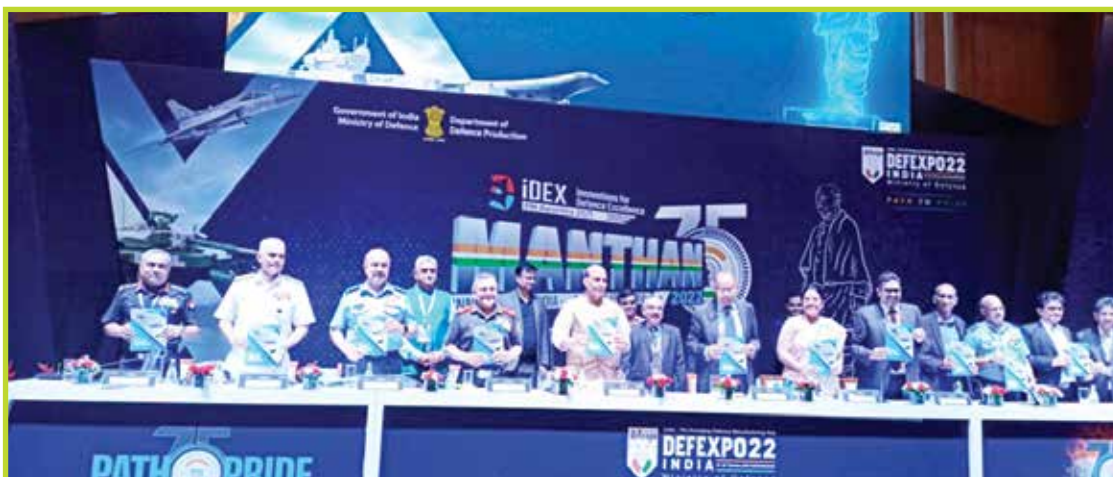
REJECTION OF BLADES WITH EXISTING TECHNOLOGY (PER BATCH)			REJECTION AFTER ESTABLISHMENT OF MODIFIED PARAMETRS		
Quantity	Rejected blades	Rejection %	Quantity	Rejected blades	Rejection %
73	7	9.58%	107	2	1.86%
28	7	25%	108	2	1.85%

About the Author:- Shri Navneet Mishra, SSO-II is posted at OADG, Koraput and joined DAQAS service in March 2020.

विचार :

*गुणवत्ता को आत्मसात करना
सर्वोत्तम गुण है, जिसके
द्वारा सर्वोत्तम हासिल किया
जा सकता है।*

DGAQA AT DEF EXPO 2022



Release of report on Indigenisation of Military Materials by Hon'ble RM during Manthan Event



DG, AQA handing over the Indigenisation certificate to industry in presence of Defence Secretary



DG, AQA handing over the Indigenisation certificate to industry in presence of Defence Secretary

DGAQA AT DEF EXPO 2022



Inauguration of DGAQA Stall at DefExpo 2022 by Dr Ajay Kumar, Defence Secretary



IAF & SIDM Seminar on Certification & Qualification of Airborne Stores for Supporting the Private Sector to Promote Indigenous R&D and Manufacturing



Handing over of DGAQA-AFQMS approval to Airbus for C-295 Project by Shri S Chawla, DG, AQA

DGAQA AT DEF EXPO 2022



Visit of Vice Chief of Air Staff



Visit of Deputy Chief of Air Staff



Meeting with Reps of Airbus & TASL and DGAQA Team on C-295 Project

DGAQA AT DEF EXPO 2022



Visit of AOC-in-C (Maintenance Command)



Visit of SMSO at DGAQA Stall



Visit of ACNS (Air Material) at DGAQA Stall

PHOTO GALLERY OF DGAQA



Visit of DG, QA to HQrs DGAQA



Pledge Taking Ceremony during Vigilance Week Celebration at HQrs DGAQA



Swatchta Campaign 2.0 celebration at OADG(Kpt) from 01 Dec 2022 to 15 Dec 2022

PHOTO GALLERY OF DGAQA



Visit of Shri. Jayant Kumar, JS(Aerospace) to HQrs. DGAQA



Release of 10th Edition Vaimaniki Darpan Magazine



Shri VSN Murthy, SSO-II has won the Gold Medal in 100 mtrs freestyle at the 7th Telangana Masters Swimming Championship -2022 held on 30th Oct 2022. He has also won medals at 1st Andhra and Telangana Master Aquatic Championship held on 11 Dec 2022.



V Nikhil S/O Shri VSN Murthy, SSO-II has won medals at Hyderabad District Swimming Association conducted interschool competition, Gachibowli Swimming Association conducted Charminar Cup, Ranga Reddy District Aquatic Association conducted District Selection and several other competitions.

Appointments, Promotions and Superannuations during Oct-Dec 2022



Shri M Natesh superannuated as ADG (SZ) on 30 Nov 2022. He joined DAQAS Service in Feb 1994.



Shri Satish Kumar took charge as ADG, Nasik on 1 Dec 2022. He joined DAQAS Service in Dec 1993.



Shri P Mathiyazhagan superannuated as Director on 30 Nov 2022. He joined DAQAS Service in July 1997.



Shri Dashpati Upadhyay took charge as Director, SSQAG, Hyderabad on 1 Dec 2022. He joined DAQAS Service in Oct 2001.



Shri Achyut Kumar Chowdhury took charge as Director, OAQA, Kolkata on 1 Dec 2022. He joined DAQAS Service in Feb 2002.

Promotion

Sl. No.	Name of officer	From	To
1.	J Naveen Kumar Reddy	SSO-II, ORDAQA, Korwa	SSO-I, ORDAQA, Korwa
2.	Ashok Kumar Passy	SSO-II, OADG, Nasik	SSO-I, OADG, Nasik
3.	Venkatesh B	SSO-II, ALISDA, Bangalore	SSO-I, ALISDA, Bangalore
4.	Pawan Ramesh Vairagade	MTD Ordinary Category, Dett. AQAW (A), Ambajhari	MTDG-II, Dett. AQAW (A), Ambajhari
5.	J Narayan Raju	MTDG-II, OADG, Koraput	MTDG-I, OADG, Koraput
6.	B Ranga	MTDG-II, MSQAA, Hyd	MTDG-I, MSQAA, Hyd

Superannuations

Sl. No.	Name of officer	Designation	Date of Superannuation
1.	Rishi Kumar	PScO	30 Nov 2022
2.	G Neduncheralathan	SSO-II	31 Oct 2022
3.	Amar Singh	SSO-II	30 Nov 2022
4.	P R Khandate	Foreman	30 Nov 2022
5.	Dharmesh Kumar	JSO	30 Nov 2022
6.	M M Bankar	Chargeman	30 Nov 2022
7.	Budh Narayan Prasad	Foreman	31 Dec 2022
8.	Shuvendu Chakravorty	Tradesman HSG-II	31 Dec 2022

New Joining/Appointments

Sl. No.	Name of officer	Designation	Date of Joining	FE/Unit
1.	Swati Vina Lakhra	JTO	17 Oct 2022	OADG, Nasik

श्रद्धांजलि OBITUARY

“जिंदगी एक ही है, अच्छे से जियो तो एक ही काफी है। – मेय वेस्ट”

ऐसा कहा जाता है कि ईश्वर को भी अच्छे मनुष्यों की जरूरत होती है, इसलिए अक्सर देखा गया है कि अच्छे लोगों का कम उम्र में ही स्वर्गवास हो जाता है। ऐसा ही हमारे प्रिय सहकर्मी स्वर्गीय श्री यशपाल जी के साथ हुआ जिनका स्वर्गवास 13.12.2022 की शाम को हो गया।

श्री यशपाल जी जिला-करनाल, हरियाणा के रहने वाले थे। उन्होंने अपनी 12 वीं कक्षा तक की पढ़ाई करनाल में की और विद्युत अभियांत्रिकी में स्नातक (B-Tech in Electrical), क्षेत्रीय इंजिनियरिंग महाविद्यालय, कुरुक्षेत्र (REC, Kurukshetra) से किया। यू.पी.एस.सी. द्वारा चयनित होने के बाद उन्होंने दिनांक 10.07.1996 को एम.एस. क्यू.ए.ए., वै.गु.आ.म.नि. हैदराबाद में कनिष्ठ वैज्ञानिक अधिकारी के रूप में पदभार ग्रहण किया।

श्री यशपाल सिंह को दिनांक 25.07.2001 में एम.एस.क्यू.ए.ए., वै.गु.आ.म.नि. हैदराबाद में रहते हुए अपनी पहली पदोन्नति मिली और उन्होंने वरिष्ठ वैज्ञानिक अधिकारी-II का पद संभाला। दिनांक 02.04.2007 में उनका स्थानांतरण क्षेत्रीय निदेशक का कार्यालय, वै.गु.आ.म.नि., गाजियाबाद में हुआ, जहां 24.04.2009 में उनकी वरिष्ठ वैज्ञानिक अधिकारी-I के पद पर पदोन्नति हुई। उनका स्थानांतरण दिनांक 30.03.2017 में अपर महानिदेशक का कार्यालय, वै.गु.आ.म.नि., नासिक में हुआ। यहीं उन्हें दिनांक 05.09.2017 में प्रधान वैज्ञानिक अधिकारी के रूप में दायित्व मिला। इस विभाग में आपने 26 साल, 05 महीने एवं 05 दिन तक का एक लंबा सफर तय किया और पूरी ईमानदारी, कर्मठता एवं अखंडता से अपने दायित्व का निर्वाहन किया। वह व्यवसायिक कौशल (professional skill) से परिपूर्ण थे। उन्होंने न केवल अपने कर्तव्यों का पालन किया, अपितु सारे तकनीकी क्षेत्र में उत्कृष्टता का प्रदर्शन किया। सरकारी सेवा में उनका योगदान अतुलनीय है।



स्वर्गीय श्री यशपाल सिंह, प्र.वै.अ.
(1968-2022)

स्थिति चाहे जैसी भी हो, उनके चेहरे पर हमेशा एक मुस्कान थी। तकनीकी कार्यों के अलावा श्री यशपाल सिंह एक अच्छे कवि भी थे जो विभाग के विभिन्न समारोह में अपनी कविताओं का पाठ कर समा बांधे रखते थे। इसके अलावा अन्य गतिविधियां जैसे खेल-कूद में भी उनकी विशेष रुचि थी।

वह अपने पीछे अपने बूढ़े माँ-बाप, पत्नी एवं दो बड़े हो रहे बेटों को छोड़ गए हैं। उनके परिवार के लिए इस क्षति की भरपाई मुमकिन नहीं है। परिवार के अतिरिक्त श्री यशपाल सिंह का स्वर्गवास विभाग के लिए भी भारी क्षति है।

उनके सहयोगियों एवं कनिष्ठों के लिए उनका मार्गदर्शन हमेशा याद किया जायेगा। उन्होंने उन सभी की सद्भावना अर्जित की जिनके जीवन को उन्होंने छुआ। उन्होंने अपनी आखरी सांसें एच.ए.एल. टाउनशिप, ओझर(नासिक) के मैदान में क्रिकेट खेलते हुए ली। श्री यशपाल सिंह व उनका तकनीकी योगदान इस विभाग में हमेशा स्मरणीय रहेगा।

स्वर्गीय श्री यशपाल सिंह के जीवन एवं सेवा की याद में।

स्वर्गीय श्री राजेश कुमार गुरुंग, अवर श्रेणी लिपिक



हमें अत्यन्त दुःख के साथ सूचित करना पड़ रहा है कि ओ.ए.क्यू.ए., डी.जी.ए.क्यू.ए., रायपुर देहरादून में कार्यरत श्री राजेश कुमार गुरुंग, अवर श्रेणी लिपिक का निधन दिनांक 29 दिसम्बर 2022 को हो गया है। संपूर्ण डीजीएक्यूए परिवार दिवंगत आत्मा को अपनी श्रद्धांजलि अर्पित करते हुए प्रार्थना करता है कि इस दुःखद घड़ी में ईश्वर उनके परिवार को हिम्मत एवं शक्ति प्रदान करें।



7th Regional Directors /HoEs Meet at ALISDA, Bengaluru

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How Aerospace Industry can use Digital Twins to improve Fleet Management and Sustainment
Gokulraj K, SSO-I



Minimization of High Pressure Turbine (HPT) Blades rejection rate via EDM Process Parameters Modifications
Navneet Mishra, SSO-II

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This magazine can be viewed on DGAQA website at <https://www.dgaeroqa.gov.in/> under 'Media' menu.

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