President of DCU Professor Brian MacCraith, Distinguished Guests it is a privilege to be here this evening to address some of the challenges which we all face. In understanding a turbulent world it would be wise to learn how to 'Cope with Complexity'.

To that end I want to draw on some of my professional military and academic experiences to examine some themes that will help bridge between understanding Complexity and attaining a level of wisdom to address the challenges of complexity. These themes include Innovation, Diversity and leadership all framed in the context of values.

ONH is a key component of the Security architecture of the State and when all is said and done it is Part of the bedrock that underpins our sovereignty helping to provide the framework for our civil society.

Few people realise that Ireland claims a jurisdiction which is about three times the size of Germany, almost a million square kilometers, 93% of which is under water, encompassing significant reserves of yet to be found hydrocarbon and mineral resources. Our land and seas combine as one of the richest food producing ecosystems and potential renewable energy environments on the planet.

Our sea lines of communication are the lifelines of our economy and airspace under Irish control is the center of gravity of most air travel between EU & North America.

Sovereignty and Sovereign rights that are not upheld are more imaginary than real. Which brings me to the purpose and mission of ONH quite simply it is to defend Ireland its people and Irelands interests.

24 hours a day, 365 days a year, soldiers, sailors, and aircrew of Óglaigh Na hÉireann support An Garda Síochána, who have primacy in State security. We secure vital installations, deliver specialist and other services such as Emergency Aero Medical and Explosive Ordnance Disposal. We patrol to the edge of our claimed jurisdiction, over a 1000 kms offshore.

Óglaigh Na hÉireann are ready to provide the defence element of our national security architecture.

Ireland according to the Global peace index is in the top 6% of safest countries in the world. This is a privileged position which I sometimes think we take for granted. It is undoubtedly a consideration in attracting FDI. Ireland is a global hub for 9 of the top 10 Global software companies, the top 10 born on the internet companies, the top 10 global pharma companies, 9 of the top ten US ICT companies.

Of course this makes us one of the most globalized economies in the world therefore it would seem natural that we have an interest in what happens elsewhere in the world. This interest is not new found. For centuries through the Irish missionary network Ireland has been committed to playing a constructive role in institution building.

Our commitment to the UN, playing a positive and constructive role in the maintenance of international peace and security is widely acknowledged. For members of Óglaigh Na hÉireann our privileged position is put into context when we serve in international missions. It is in these missions we come face to face with the simple reality that Freedom is NOT free.

Over the past 12 months the Defence Forces has continued to support our nation's commitment to international peace and security with over a 1000 individual rotations of duty in 12 missions, in 11 countries and on 1 sea.

Irish troops have maintained a presence in the Middle East for over 38 years. I was with our troops on the Golan last week and I have to say when you have Force Commanders from countries like Italy and New Zealand describe our men and women as the best of the best it really makes you feel proud.

I was with UNIFIL in July where an Irish Officer, Maj Gen Michael Beary, holds the position of UNIFIL Force Commander and Head of a Mission. He is a great leader who exudes humility, he is also a key leader

in the regions' peace and security. The situation currently is calm but extraordinarily complex.

Whether it be Lebanon or areas such as Golan or Mali, Irish troops help facilitate a safe and secure environment which is a key enabler for civil society. The entitlement to live in a civil society is a human right of every man, woman and child. It is an institutional arrangement built on values, where people are free, where the institutions of state function, and where the vulnerable are protected.

In the humanitarian mission on the Mediterranean for most of the almost 18,000 people rescued by ONH, the first semblance of a civil society experienced in months, if not years, was what the survivors experienced under the Irish Tricolour on the afterdeck of an Irish sovereign warship in the Mediterranean. The stories which many if not most of these rescued people recount are harrowing, of rape, violence and murder. They are an affront to civilisation.

All over the world we see challenges to the values of civil society. These challenges are characterised by an extraordinary complexity with the distinction between internal & external threats becoming increasingly blurred.

Often these problems are what have been termed by Rittle and Weber as 'wicked', with multiple causes, they cross cut political, economic, societal/cultural, legislative and environmental perspectives. They are transnational, have no clear solutions and often only get worse when you try and fix one element of the problem.

In the recent past we have become more aware of the challenge to global security presented by N Korea. The tensions in the South and East China seas are also a cause for concern where disruption of the almost 5 Trillion Dollars of trade which transits the area annually could cause a shock to the global economy.

Today on Europe's border with Ukraine, a full scale Hybrid war wages after the annexation of Crimea. This annexation included Crimea's Ports and significant offshore maritime resources valued at Trillions of Euros. UN estimates suggest that almost 10000 people have been killed in this conflict to date.

200 Kms to east of the EU border at Cyprus in Syria a full scale proxy war continues with disparate State and non-State actors. When I was on Golan last week some credible commentators put the death toll estimate at over 600000.

The threat from ISIS and other fundamentalist networks remains, with the ISIS footprint extending from Iraq through Syria to Libya and the Magreb and as far as the Sahel where from Mauritania to Eritia and south to Sudan & Somalia there is growing instability. We see ISIS influence in NE Nigeria where Boko Haram prevail and in Asia. Use of Social media enables radicalisation of the impressionable in a matter of weeks if not less.

ISIS attacks have resulted in the loss of life and injury to the citizens of many countries, including Ireland. In Tunisia three Irish citizens were killed, in Paris an Irish citizen was shot with were near misses for Irish citizens in Barcelona, Berlin, Brussels, London, Manchester & Niece.

In West Africa criminal and drug cartels operate from South America through the GOG, where Piracy is on the increase. These criminal networks while mainly focused on narcotics will traffic anything, including People and Arms.

They supply up into Europe powering transnational criminal gangs. All of these challenge our Values, they seek to undermine the institutions of state and civil society. Their values prioritize power, criminality and fundamentalism.

In addition to terrorist, criminal and state sponsored instability there is growing evidence of state sponsored cyber-attacks being used to undermine the democratic process in both the EU and the US. These attacks have potentially strategic implications for how the integrity of our values are upheld into the future.

When we horizon scan and look at the complexity that surrounds us, in addition to interstate conflict, terrorism and criminality, we can see challenging vectors such as climate change as well as population increase.

Climate change is not only driving a decline in resources but is inextricably linked with a reduction in biodiversity. 30 years ago the Brundtland Report, Our Common Future, was one of the first seminal reflections to advocate a holistic approach to Ecosystem Governance.

It promoted the key principle of sustainable development which in the context of the norms, that should inform our values should be a meta-norm, for which we are willing to punish for both non-adherence & non enforcement.

In reality however due to externalities the burden is often borne by others. Africa is one of the most vulnerable populated continents to the negative impacts of climate change.

Expanding dry areas, extreme poverty, shorter growing seasons are all linked to climate change impacting parts of Africa and countries like Afghanistan. Climate change impacts are driven by inadequate in ecosystem governance in the west 1000s of miles away from where the impact is greatest. Brundtland foresaw this as he advocated for both multilateralism, & corporate social responsibility.

Over the decades since Brundtland, progress has in the main been in the form of soft law. The desire for change is reflected in the Irish led codification of the UN 17 Sustainable Development Goals. The process leading to the codification of these goals was co-sponsored by Ireland ably

led by Amb David Donoghue. Attainment of these goals requires Governance that is comprehensive, integrated and ecosystem based.

In the context of the second challenging vector, population increase, the UN predict that the population of Africa will more than double by 2050. I have visited Mali a country the size of France and Spain combined – it is expected to double its population by 2030. Spanning the Maghreb and Sahel the twelve countries that surround the Nile basin are expected to almost triple their populations from 265 to over 700 million by 2050.

In a connected world where mud huts have satellite dishes, the wealth and security of Europe is set to remain a pull factor in migration trends for the coming decades. This will especially be the case for countries impacted by poor governance, insecurity and areas across the Sahel where life expectancy is at most 2/3 of that here in Europe.

But don't get too depressed....there are positive vectors, positive vectors such as the growth in tech, enhanced use of automation and robotics and perhaps the most exciting of all, the explosion in data. Data when codified becomes information with the potential to drive the creation of knowledge and understanding.

A few years ago it was estimated that there were about 4zb of data in the world – a ZB is 10 power of 21, the world's data are expanding with Moores law with suggestions that we could have over 100 zb in five years. It is like a blizzard, which could smother us.

Three things are clear to me, if we do not harness the data available to us as organizations, wherever they come from, own or open source – we increase risk. If our competitor or enemy leverages data available to them they become more formidable. Thirdly, the explosion in data underpinning information and new knowledge means that every moment new technologies and new ways of doing things are being created.

For example the acceleration in areas such as reinforcement learning and deep learning combined with robotics is leading to extraordinary outcomes. Such learning is accelerating artificial intelligence to such a degree that Kurzeil has predicted that within the next two decades we may have reached a Point of singularity, where AI exceeds human intelligence- many thinkers look at such a future with a sense of foreboding!

But why is this really important?

Knowledge is a prerequisite for understanding and it is the application of understanding within the framework of values that lead to wisdom. Wisdom ensures resilience & greater sophistication in the institutions of civil society.

In could be argued that it is the disconnect between understanding and values which is one of the greatest challenges facing us today. It is undermining the institutions of civil society, leading to an absence of wisdom resulting in the pursuit of populism, unilateralism, short-termism and selfishness. This is a paradigm which has relevance not just at state level but also at inter and intra organizational levels.


This logic is consistent with Ireland's sustained strong commitment to Multilateralism represented by institutions such as the UN and the EU.

In a world of complexity we are increasingly interdependent and sharing knowledge is critical. However the robustness of these institutional arrangements are directly proportional to the sophistication of the values that underpin them.

Within the Defence Forces I have increasingly been making the point that we must cede power to gain power. Indeed our white paper on Defence makes the point that as the rate of generation of information, knowledge and understanding grows it is ever more likely that the answers to complex

problems will lie outside organizational boundaries. This requires that we both collaborate and innovate.

At an organisational level achieving congruence in the interplay between knowledge, understanding, values & wisdom requires innovation. Innovation is not just about creativity, it is a systematic change in individual mindset and culture that permeates entire organisations with internal and external dimensions. The world of complexity requires shifting from operating solely inside closed org boundaries, to open innovative structures, where creativity and knowledge-sharing are encouraged & nurtured.

Open innovation is innovating with others through networks that facilitate the exchange of data, information, knowledge and understanding. I remember once making the point of the need to innovate within the Defence Forces. I was challenged as it was suggested that we have always been innovating. That was a fair comment but only to a point. What we had been doing is innovating from within the walled garden of the DF. That is closed innovation. What I am advocating is the need to move from closed to open innovation and ultimately towards ecosystem centric innovation.

Open innovation involves using open source data, information, knowledge and leveraging networks. This requires an openness to ideas and information exchange. The creation of what I call innovation networks allow for the sensing and exploring for new ideas and new ways of doing things is facilitated and actively encouraged.

An evolution is the creation of an Innovation Partnership The relationship is codified through an MOU allowing the partners to seize & exploit opportunities. Codification of the relationship facilitates a more structured approach to wealth generation which is more challenging if the relationship is not properly codified. Critically codification of the relationship allows for a common understanding of the values that underpin the relationships.

In my experience different organisations collaborating with values and principles such as trustworthiness and reciprocity can do remarkable things.

Moving towards an innovation ecosystem, incorporating for example, state bodies, enterprise, academia and civil society actors, can lead to disruptive innovation. Networks leading to codified partnerships allow researchers to get a real world problem, the state body to get a new capability or technology and enterprise to generate jobs, while civil society benefits from an improved public good.

The collaborative arrangements between the DF & HEIs and other partners have delivered significant impacts. These innovation networks and partnerships are helping transform our force, enhancing personnel and capability development, driving enterprise, job creation, infrastructural development and new tech. These collaborations are shifting partnership perspectives from being just cost centres towards investment centres with the potential for elements to be profit centres.

As a case study the Irish Maritime and Energy resource cluster is an example of an Innovative Partnership between UCC, CIT & the Irish Naval Service. It facilitated diversity by connecting the dots between the main partners and disparate players leading to disruptive outcomes.

IMERC enabled the establishment of the Future Earth Coast International Project Office and the Establishment of the Entrepreneurship.

Amongst some technologies examined is the idea of the use of kite sail technology as a power for ship propulsion, large scale kites can generate up to two MW of power. This technology could significantly reduce fuel bills and carbon footprint.

I would like to dwell for a few minutes on the theme of diversity. I have outlined the challenges associated with complexity & suggested innovative networks have a role in developing strategies to mitigate the impacts complexity.

In my experience the more diversity we can stimulate and sustain in OUR networks the more potentially disruptive will be the innovation, leading to better outcomes. Sustaining greater diversity is a governance challenge because it is inevitable that cultures will feel challenged when asked to collaborate.

One of the fundamental principles for collaboration is trustworthiness. Trustworthiness is more than trust. It is where partners are worthy of the trust bestowed upon them. It is inextricably linked with the principle of reciprocity. Achieving congruence with multiple diverse partners & preventing free riding requires strong leadership.

Institutionalizing diversity and innovation necessitates that the status quo is challenged, that cultures are open and inclusive, that there is no room for egos and, importantly, that there is an acceptance that mistakes will happen. But as Samuel Beckett has said - Ever tried ever failed no matter try again fail again fail better. (Irish writers are great for talking about failure)

Institutionalising diversity and innovation also requires silos to be broken down and cross cutting structures embraced. Silo mentalities undermine trust, efficiency and effectiveness and prevent the exchange of knowledge. Violations, which are unacceptable breaches of the rules, must be distinguished from errors or mistakes that will inevitably occur in complex organizational dynamics.

In terms of internal organisational dynamics, driving diversity and inclusion is important. Spanning external and internal diversity requires an appreciation of the importance of science, tech, engineering, arts & maths.

This has implications for organisational and people development. Investing in work-based learning and raising the scholarly standing facilitates diversity and inclusion. Training prepares for the predictable, while education prepares for the unpredictable scenarios, where a greater understanding of other perspectives is required.

Facilitating 'cross-cutting' structures also requires highly developed, receptive interpersonal skills which nurture and build collaborative networks and partnerships. Humanities and Arts, encompassing the social and political sciences, enhance the knowledge that builds and connects institutions, organisations and people.


The future is about how collaboration and knowledge sharing is achieved, where ego is the enemy and empathy is the kingmaker. Einstein is credited with saying ego=1/knowledge, the greater the knowledge, the lesser the ego.

Bringing together diverse disciplines requires that an atmosphere of tolerance, which understands different perspectives, is nurtured, where the humanities mix with the sciences. The philosopher Theodore Zeldin has asked 'When will we make the same breakthroughs in the way we treat each other as we have made in technology.'

Of course diversity requires institutionalising a Gender Perspective. That is organisations must strive to have the ability to detect if and when an individual is being treated differently, based solely on their gender. An institutionalised gender perspective analyses a person's perceived value in a given context, their access to power, influence and resources and mitigates against societal inequalities and unconscious bias.

Improvement in gender balance at all levels facilitates better decision-making and creative processes. While the Defence Forces is striving to make progress in this regard, achieving greater gender balance is a societal issue.

Studies show how women, for example, in many countries are socialised from a young age to fulfill certain stereotypical 'feminine' roles such as caregivers and not to opt for careers such as in STEM and indeed, the military. Conversely, the socilisation of our young males, predisposes them to more 'masculine' pursuits.

Developing a D&I strategy in all organisations, one which promotes equality, values difference, and embraces LGBTA and other communities is vital. Embracing diversity across perspectives such as culture, ethnicity, creed and generation is critical.  D&I in all networks improves resilience and becomes an antidote for complexity.

In summary, dealing with complexity is a leadership issue. Leadership in government, market and civil society institutions, driving innovative multilateral arrangements can mitigate the effects of climate change and other challenges by progressing, for example, the UN 17 Sustainable Development Goals. Thirty years on from the Brundtland Commission Report, these goals and targets present a strategic roadmap towards normalizing sustainability.

Empowering innovation and dealing with the 'Push Back', is a leadership issue.  Institutionalising a 'Gender Perspective' and embracing D&I are all leadership issues. Leadership is about values - values such as the moral courage to do the right thing and the physical courage to persevere despite danger and adversity.

It is also about a respect that treats others as they should be treated and giving sufficient autonomy to people to reach their full potential. Values encompass an integrity characterised by honesty, sincerity and reliability. Fostering and creating an environment of loyalty which encourages selflessness while putting service before individualism is important. Values, notably, are also about accountability.

As a uniformed organisation the Defence Forces in some respects can be viewed as standing apart. Our members are subject to military law, swear an oath of loyalty to the State, do not have a union, do not strike and are subject to an unlimited liability contract, in that we may have to go into harm's way. While the fundamental role we play within the State sets us apart, we are also very mindful that we are of the people.

In the words of Gen R Mulcahy, the DF "has been the people, is the people & will be the people…our uniform does not make us less people it is a cloak of our service, a curtailer of our weakness, an amplifier of our strength".

A diverse, inclusive, reflective organisation characterised by strategic humility, will ensure the benefits of innovation are fully realised. It will attract the best of talent, facilitate employee voice and autonomy, driving improved performance and outcomes. For us in the Defence Forces where people are the COG that will allow us achieve our vision which is to Strengthen the Nation, by inspiring Pride and leading excellence.

In my view in a civilized society the pursuit of knowledge and understanding in a framework of values are essential elements for the application of wisdom and should be central to how we as individuals, organisations, institutions and indeed states proactively engage.

Leadership, like innovation, is also about accepting risk-taking and mistakes. Clausewitz said in war 'everything is simple, but even the simplest thing is difficult'. In a world of complexity inevitably mistakes will happen, but mistakes drive learning. Therefore be comforted by the words of George Bernard Shaw who said 'a life spent making mistakes is not only more honourable but more useful than a life spent doing nothing'. Mistakes are the portals for learning (James Joyce).