

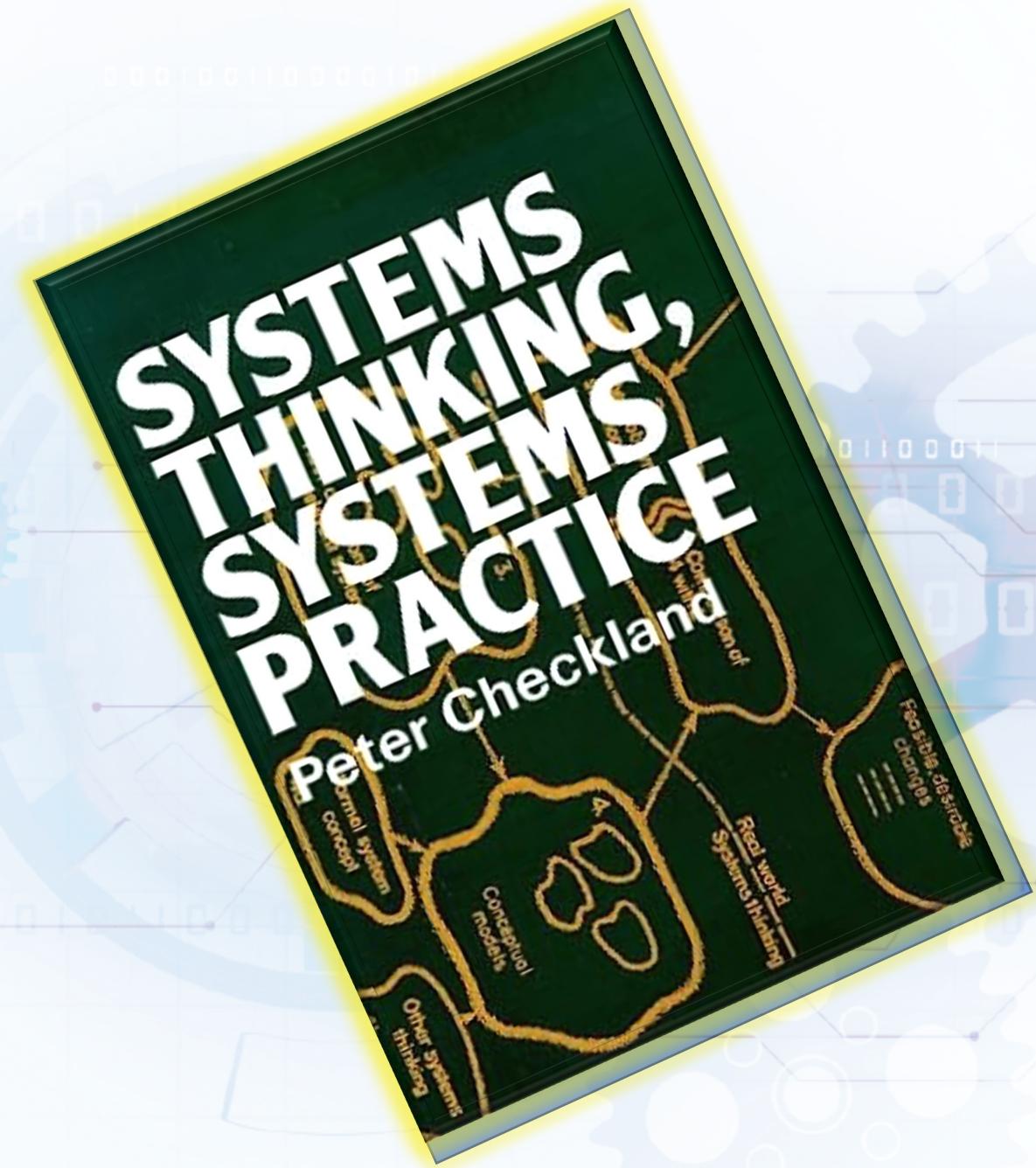


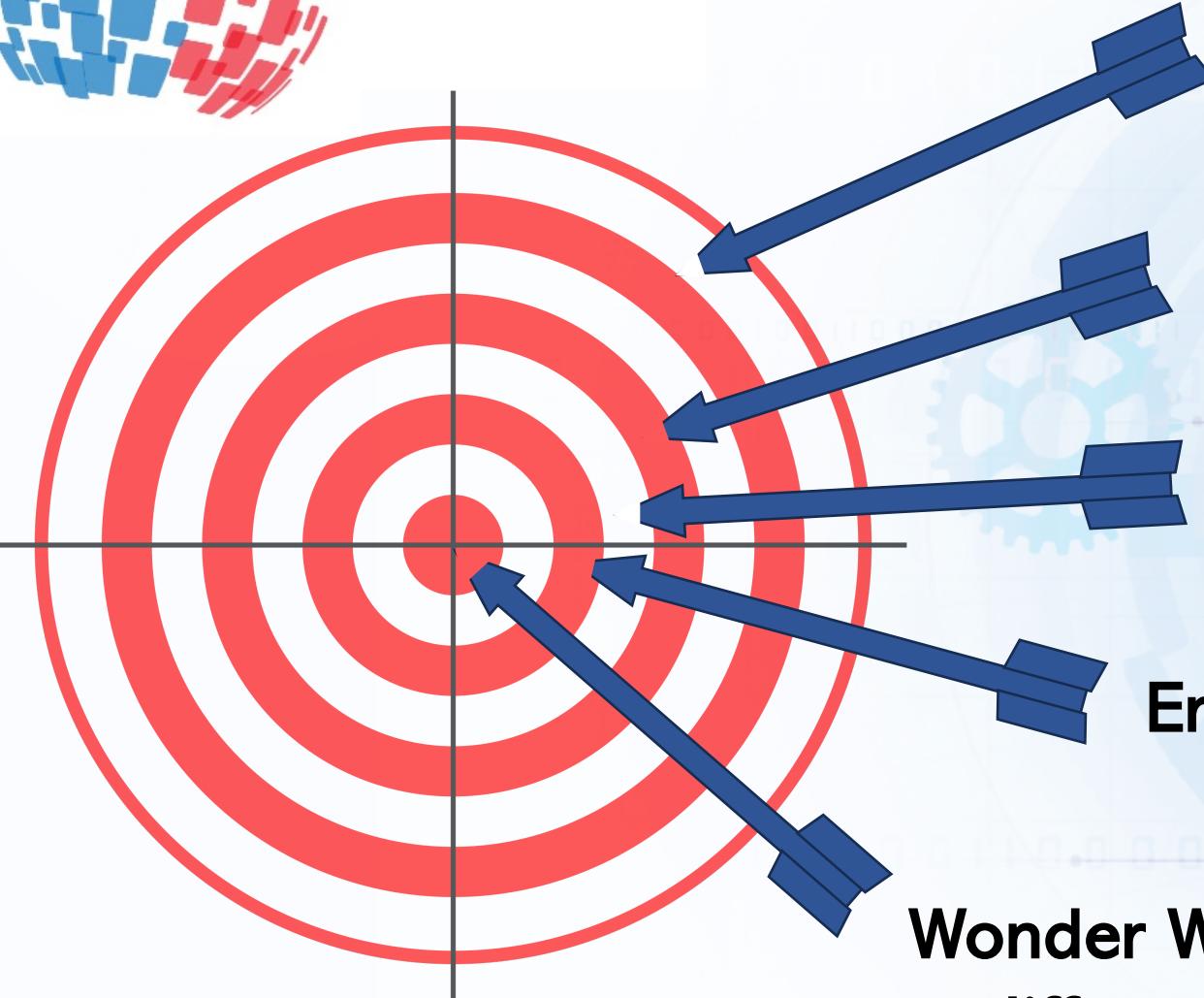
33rd Annual **INCOSE**
international symposium
hybrid event
Honolulu, HI, USA
July 15 - 20, 2023



Inspiring Systems Engineers: the Wonder Woman & Superman methodology ...different actions first

Sir Julian Young
@chf_eng_air





Me & why I think the way I do

Reflections from a Chief Engineer

Why I'm a convert to systems engineering

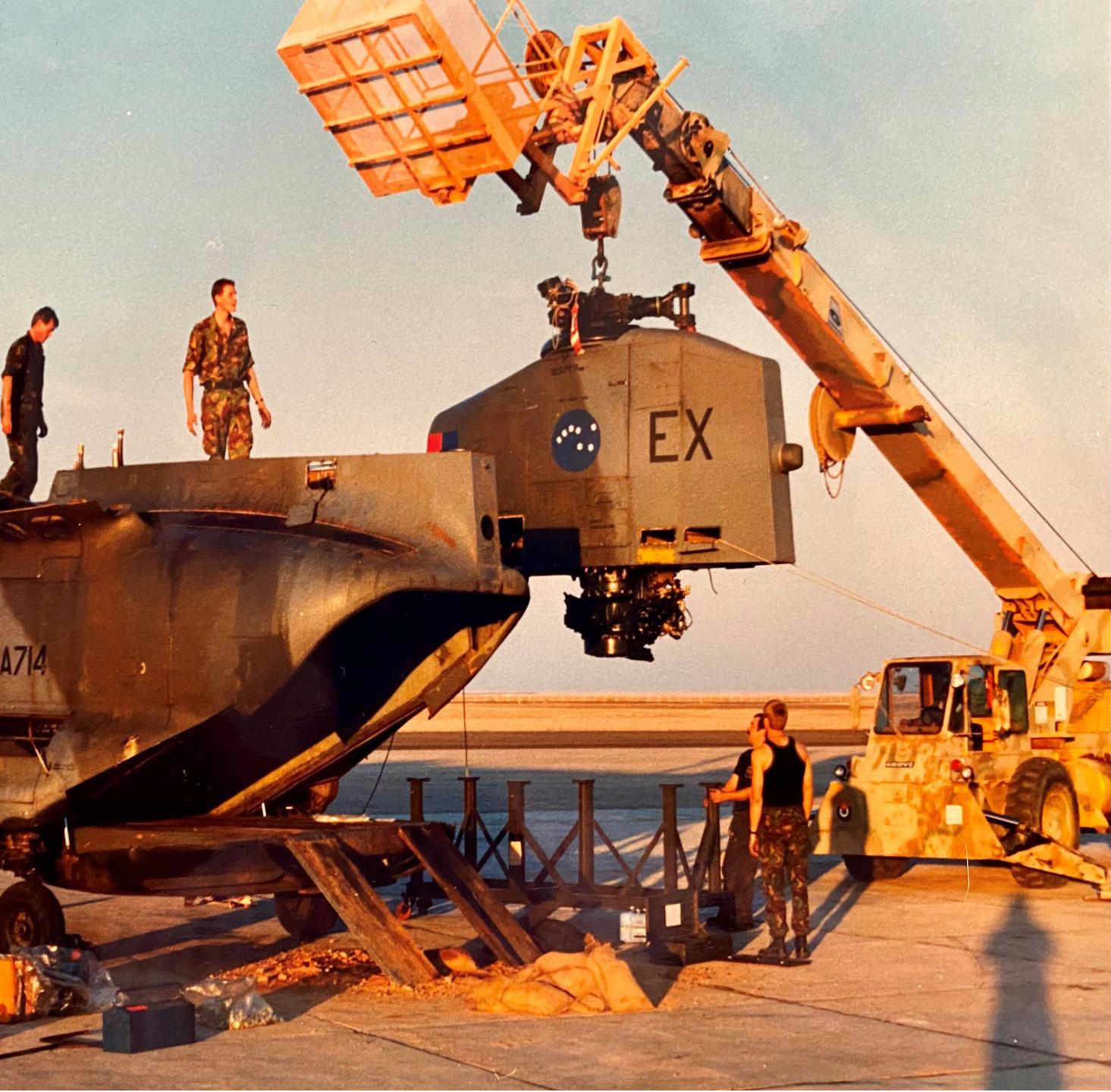
Engineering landscape

Wonder Woman & Superman Methodology
...different actions first



The Institution
of Engineering and Technology







Defence Equipment & Support, UK Ministry of Defence

*“To equip and support our Armed Forces
for operations now and in the future”*







Reflections of a Chief Engineer



- Comprises 3 roles:
 - Professional Engineer
 - Project Manager
 - Leader

...within a heavily regulated safety environment



Reflections of a Chief Engineer



- Comprises 3 roles:
 - Professional Engineer
 - Project Manager
 - Leader

...within a heavily regulated safety environment
- What worked for me & what would I have done differently?



1 - Being good at your job

What
worked



- Sad, but true: you can simulate the outcome of smart working by working harder
- Read the rules and understand them ...no, really understand them; then you can exploit them to your advantage
- Always drive for success; take responsibility; life is competitive, and so is teams' delivery of projects



2 - Making change stick

What
worked



- Be an Engineer - be 'restless' - and never be content with the situation
...continually improve
- Use proven models, eg John Kotter's 8 steps to successful change -
DO CX RITE[©]
- Always change the highest set of rules possible to embed into policy
your great new idea



3 - Continually refresh your education

What worked

- Undergraduate education and professional training will not easily support a successful full, long-term career
- Technology refreshes required - regularly
- Over time, serious business acumen and programme management play a greater role in outputs and career progression



1 - Make more of fun opportunities

What to do differently



- People said I worked too hard
- Never been to 'RAF Ski Champs'; never good enough to play regular Station sport
- However, have always encouraged others to participate ...remember, engineering is a team sport



2 - Consider non-mainstream role

What to do differently



- I've always been an engineer - happy, but too narrow use of my engineering skills?
- Broaden career opportunities by utilizing good engineering skills in another branch or field
- However, remember your professional career anchor, and return/protect



3 - Don't pretend to be someone else

What to do differently

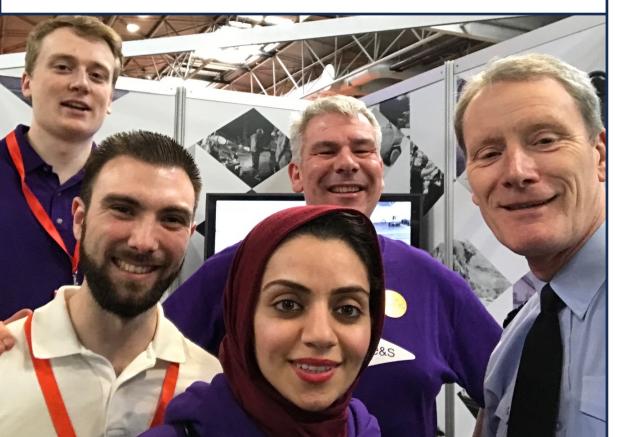
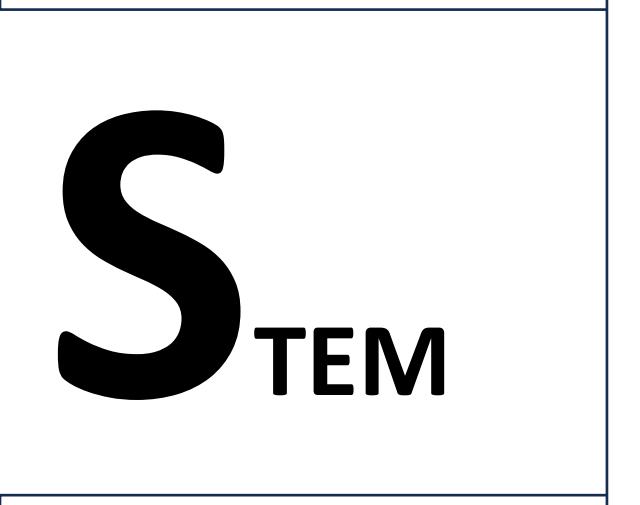
- Either stick to what you do best or consciously push yourself to adapt, openly
- Seek to use your softer skills to influence outcomes - mentoring & performance coaching versus straight transactional/ transformational leadership
- Be comfortable in your own skin; today, the enlightened world encourages Diversity & Inclusion like never before

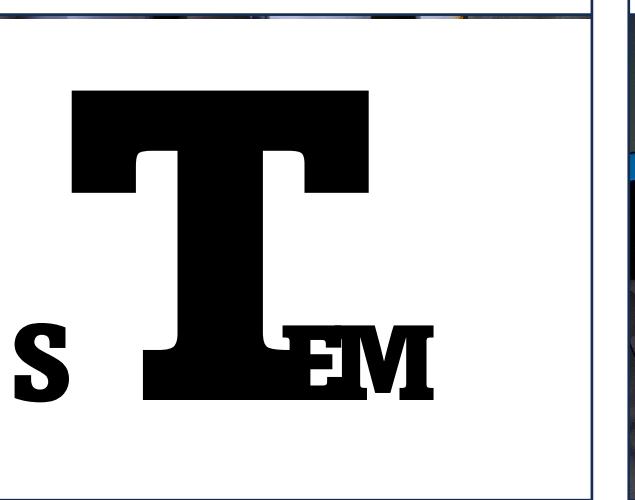


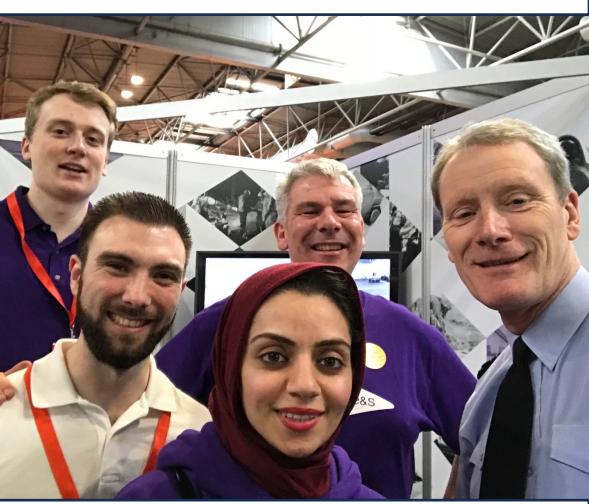
**Early responsibility for any
Chief Engineer on appointment is to
ensure a succession route to replace
themselves...**

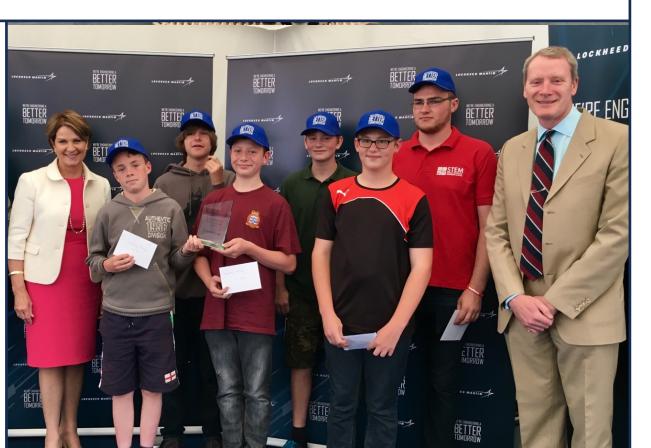
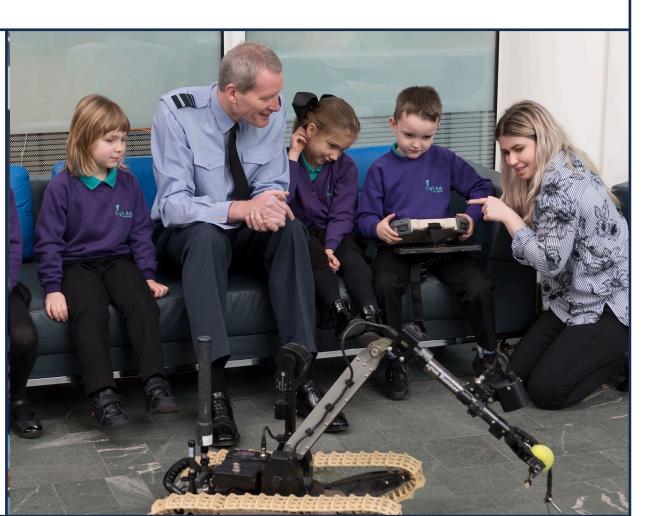


STEM











STEM & Inspiring ...a crowded activity

Institute of Engineering and Technology: **Inspiring the next generation** [of engineers]

Cranfield University: **Inspiring the next generation** - welcoming school children to engineering

UK Government: Year of Engineering - landmark campaign to **inspire the next generation** of engineers

Make UK, UK Manufacturing: **Inspiring the next generation** of women in engineering

University of Sunderland: Hosts engineering challenge to **inspire the next generation**

British Compressed Air Society: Award for **inspiring the next generation** of engineers

'New Scientist' magazine: How to **inspire the next generation** of engineers

STEM Learning: **Inspiring the next generation**. Engaging young people in engineering and technology

University of Portsmouth: Graduate features in book to **inspire the next generation** of engineers

IEEE Women: 'TryEngineering' - initiative to foster the **next generation** of technology innovators



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INCOSE: Fellows Awards - developing the **next generation** of successful systems engineers



Scope for collaboration on STEM?



- **Collaboration** on shared values needs underpinning with a mix of **curiosity** and **creative** ideas with **courageous commitment**
- I think that working together could make a significant difference?



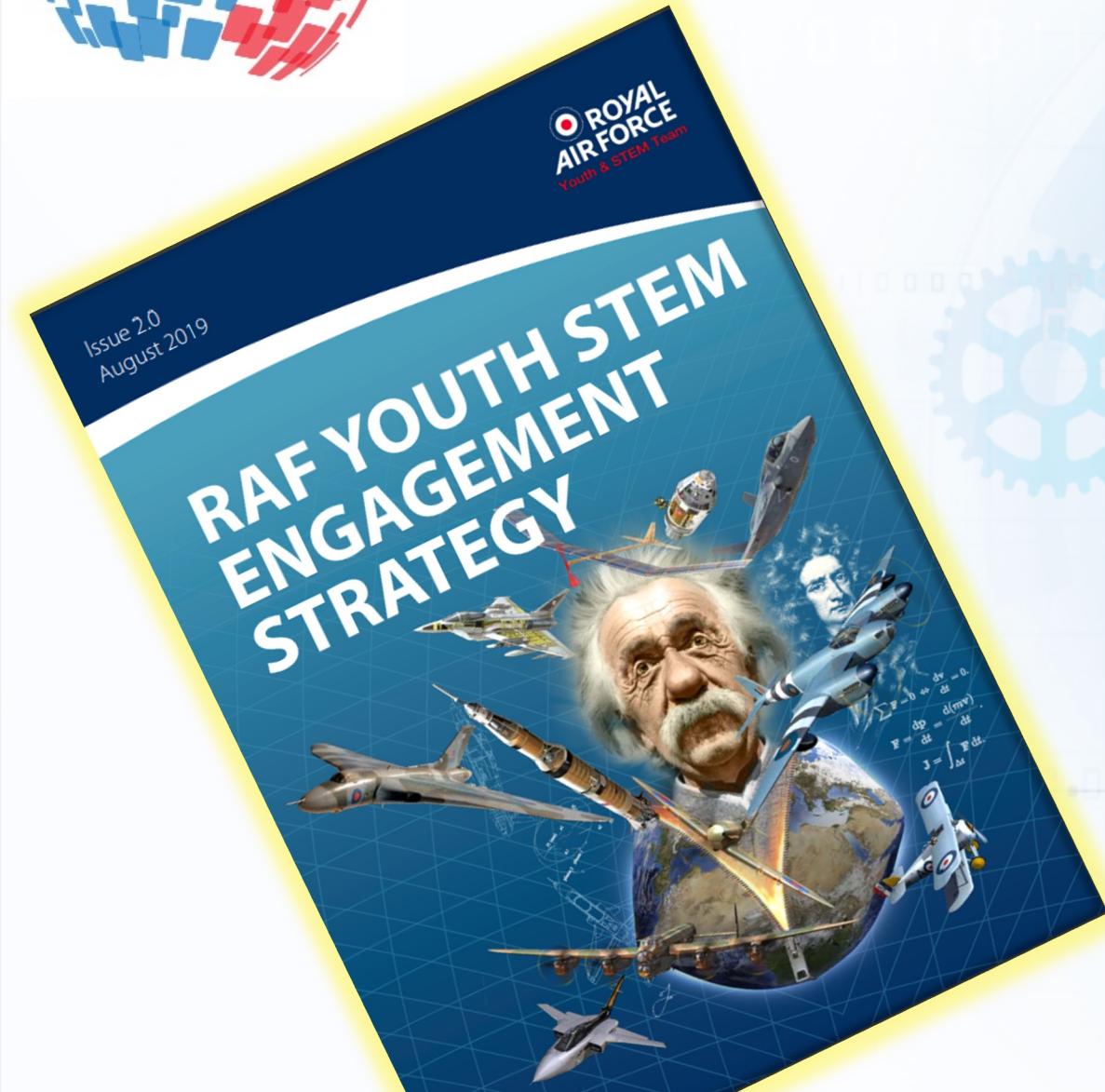
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- I think that working together could make a significant difference?
- “SE Vision 2035 can ... support **collaborative efforts** to advance the discipline and grow the skill base to meet current and future challenges related to systems development.”



STEM & youth outreach



- If you are a young engineer, then inspire the next generation directly
- And if you are an old(er) engineer, then give permission to younger engineers to inspire the next generation indirectly
- Time and resource required...



**Complexity has converted me to
Systems Engineering thinking...**



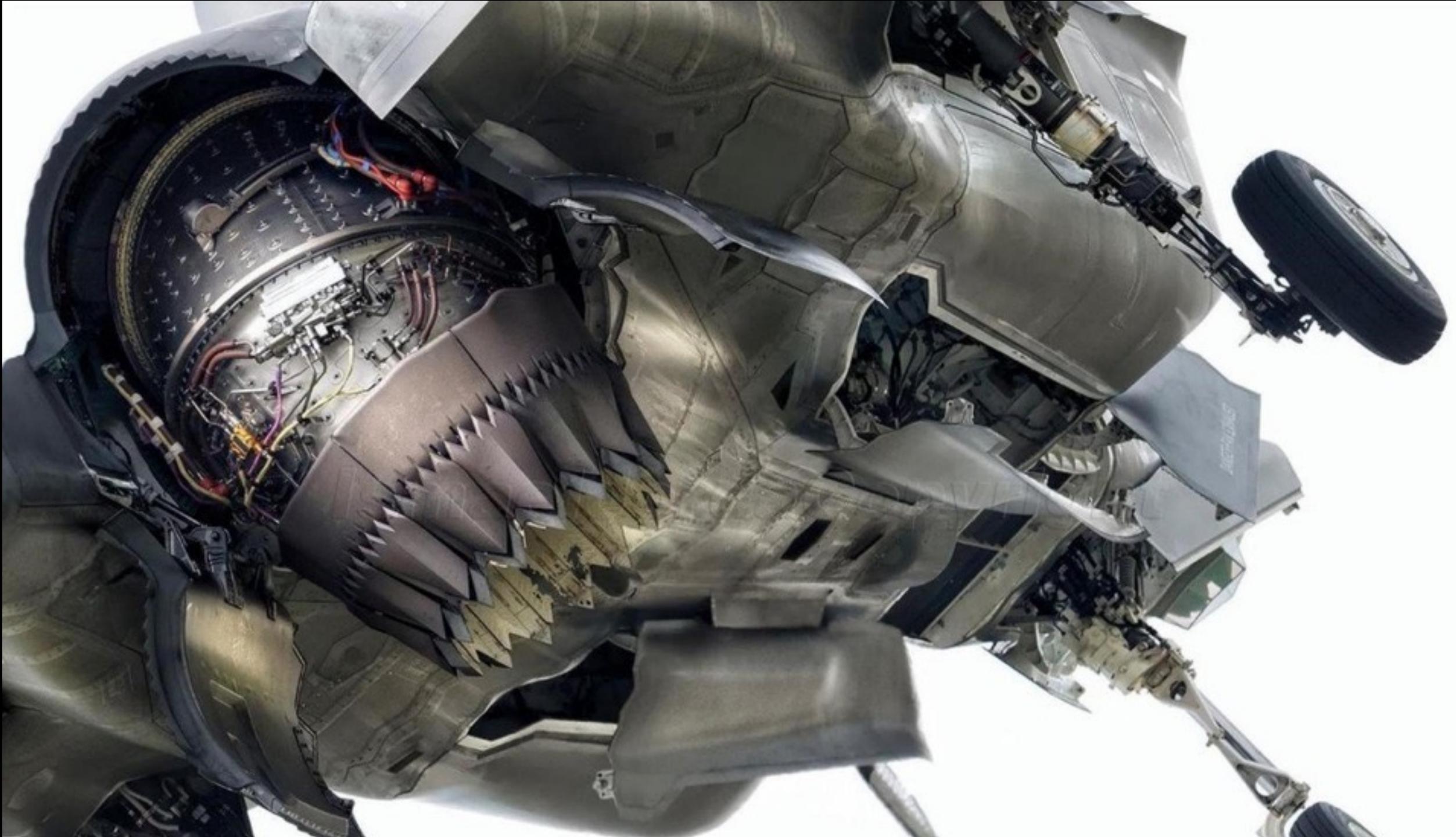


Complexity has converted me to Systems Engineering thinking...



- Project CENTURION: rapid integration of 4 new weapons onto Typhoon to maintain national capability and allow ground attack specialist Tornado GR4 to retire and generate savings
- 4-nation programme for agile Eurofighter jet, including 4 nations' industry partners - focus on national workshare
- 42x interconnected computer systems, old design, with no delineation between flight safety and mission enabling software















Engineering landscape (1) - shortfall in Engineers & influence

“The US would need to increase its yearly production of undergraduate STEM degrees by 34% over current rates to match the demand forecast for STEM professionals.” - US President’s Council of Advisors on Science & Technology

“Between 2016 and 2026 there has been and will be a shortfall of 6 million engineers, or more.” US Bureau of Labor Statistics

- UK shortfall of between 37,000 and 59,000 in meeting the annual core demand for engineering level 3+ skills
- 17% of UK job vacancies are in engineering, with almost 10% of these from expansion demand
- Fewer than 5% of UK FTSE250 company directors are engineers
- Engineers needed to enable global opportunities and solve the world’s most significant threat...





Engineering landscape (2) - lack of understanding about engineers



Google image of an engineer

Common myths about engineers:

1. No social skills
2. Not creative
3. Love mathematics
4. Poor communication skills
5. Work in a predominantly male field
6. Don't start work until their 30s



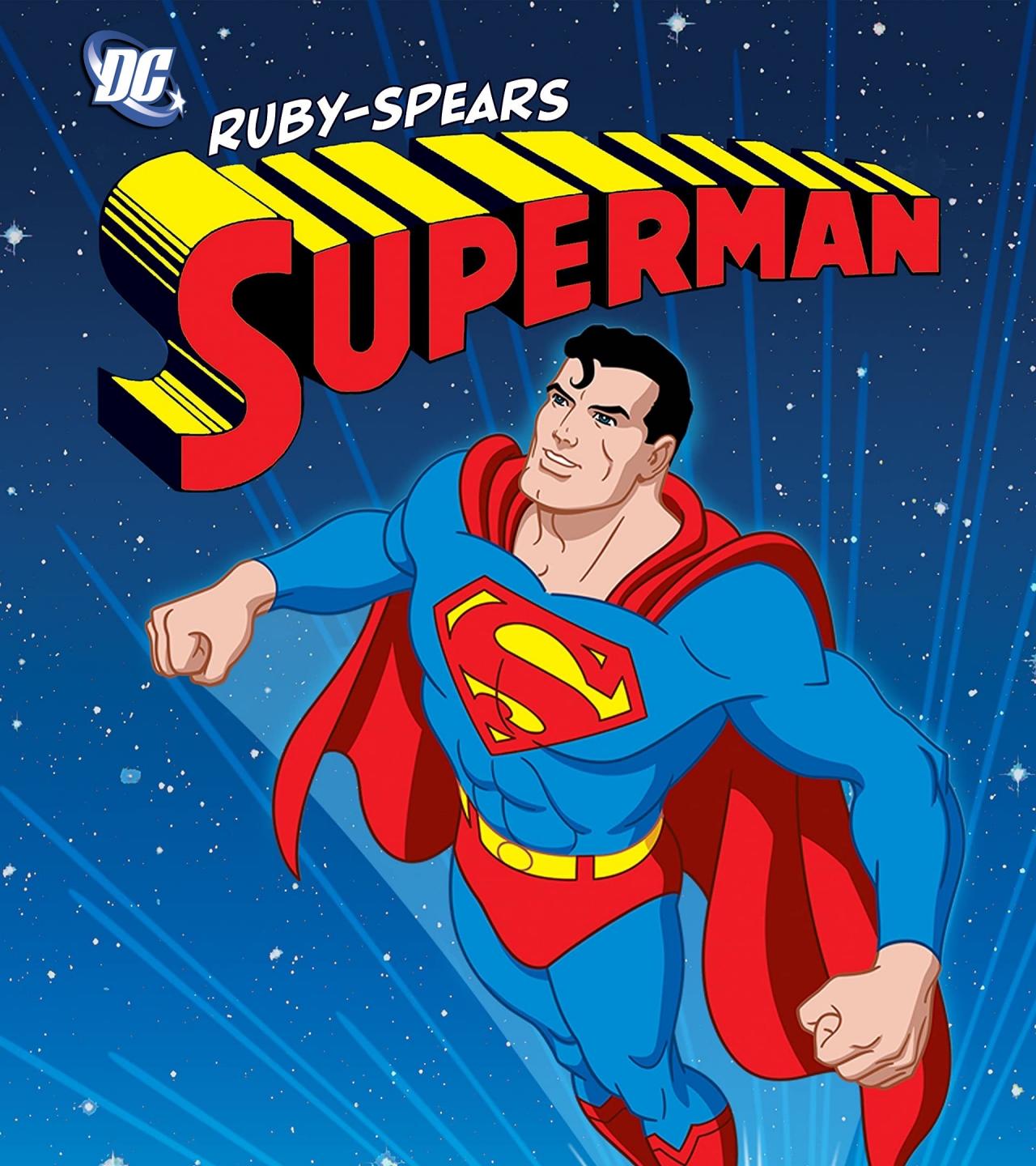
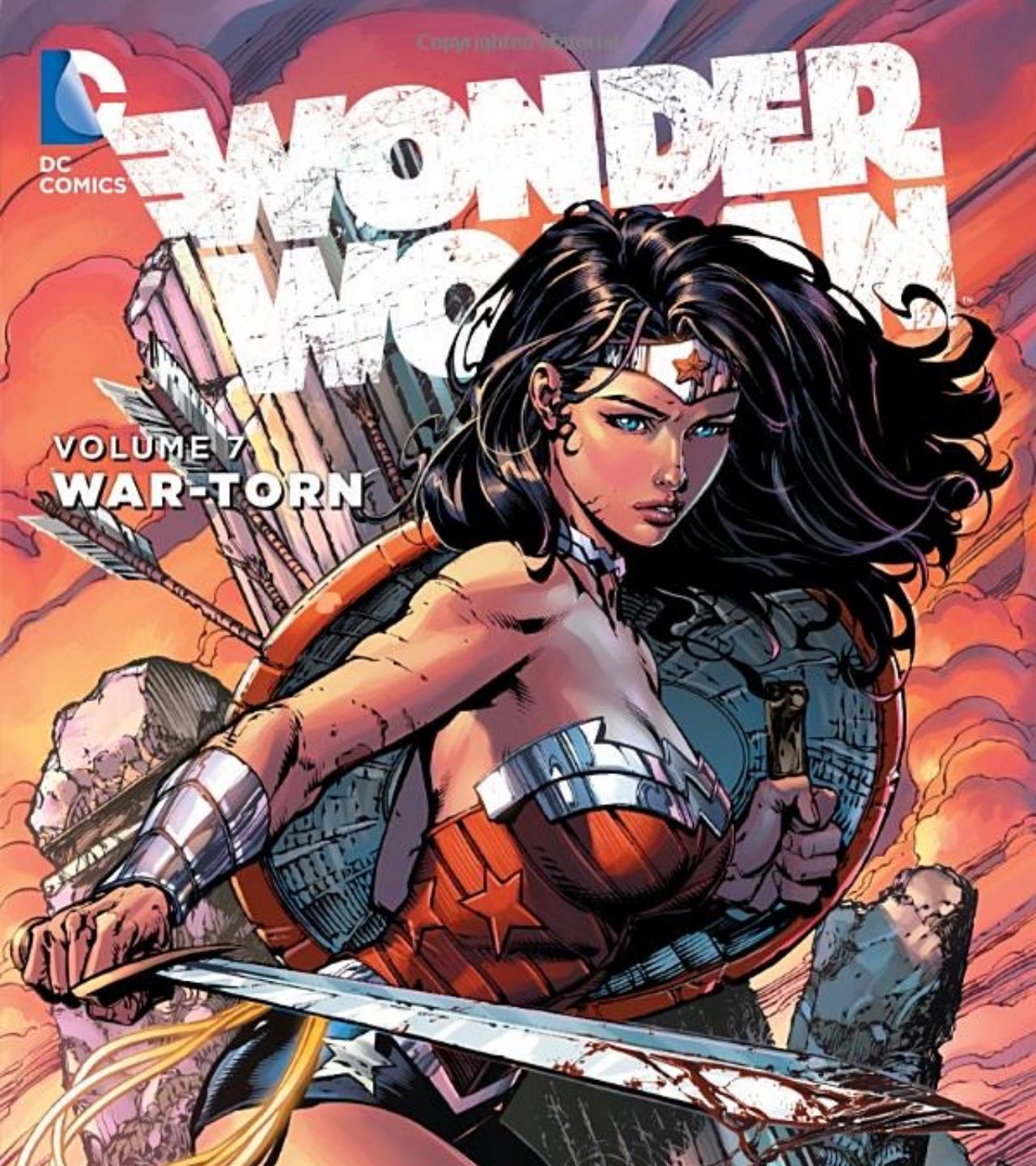
Focus on Strengths & Opportunities

SE Vision 2035: “Engineering solutions for a better world”

IET Vision: “Engineering a better world”

IMechE: “Improving the world through engineering”

- Through collaboration we could change the common view of engineering
- Focus on key universal challenges
- Develop opportunities together to influence policy of Governments
- Beyond the Accords, seek common recognition of standards and enable international career mobility





‘Wonder Woman & Superman methodology’

- Continue to be restless and continually improve something, everyday
- Deliver, deliver, deliver great solutions
- Don’t be downhearted about missed or misplaced recognition
- Be confident that Engineers will realize the benefits of a digital future, and Engineers will deliver a sustainable future and fix the planet



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- Don’t be downhearted about missed or misplaced recognition
- Be confident that Engineers will realize the benefits of a digital future, and Engineers will deliver a sustainable future and fix the planet
- **Be overtly modest and inwardly proud: Engineers can be super-heroes when required!**









Any reflections from you?
Ανελέγετε σαν κανένας;

