

# The Highcliff Program



An audacious human-centric AI moonshot  
of twelve research missions to make  
**the vulnerable SAFE**  
**the powerless STRONG**  
**the unfulfilled *THRIVE***

**Don't be daunted by the number of slides!**

Of course your immediate reaction is there are too many to read in their entirety.

But the presentation is deeply structured, so it's very easy to skim. However, before you do so,

**PLEASE READ SLIDE 42**

and then read more of the pack than you'd originally intended...

**Since its inception three years ago The Foundation has achieved some groundbreaking research that everyone involved should be proud of**

- Unit-Selection/DNN voices, unparalleled prosody, singing (CereProc)
- Prototype avatar (Embody Digital)
- Photorealistic avatar (Optimize 3D)
- CHARLIE Cyborg Harness And Robotic Life-Improving Exoskeleton (Permobil)
- ACAT-based eye-tracking UI (Intel, Fjord)
- Cyborg Universe (CU) in Hololens2 (DXC/Drexel)
- Transfer to Apache open source of last year's CU research (DXC/Drexel)

## Leveraging these – and Peter’s other projects – we have also gained very substantial media coverage

- Feature article in *The Times Magazine*
- Primetime Channel4 documentary *Peter: The Human Cyborg*
- ‘Must Watch’ recommendations across all major TV listings
- Numerous excellent reviews (*Financial Times, Times, Telegraph, The Mail*)
- Exceptionally positive reviews on social media
- Feature article in *The Observer Magazine*
- Podcast trilogy *Peter 2.0: The Making of a Cyborg* (Cardiff Productions/ We Are Unedited) Bronze winner at Cannes Lions, shortlisted for Rose d’Or Award
- Serialised extracts of *Peter 2.0* in *The Mail* (UK’s highest circulation paper)
- Major feature article in *The Mail*

## Leveraging these – and Peter's other projects – we have also gained very substantial media coverage (continued)

- UK launch of hardback *Peter 2.0*; overwhelmingly 5-star reviews on Amazon
- World-first interview of Peter 2.0 avatar on ITV's flagship breakfast program *This Morning*
- Showing of *Peter: The Human Cyborg* in numerous countries (after it aired in Australia Peter gained 4,000 new Twitter followers overnight)
- Unprecedented (for an 'unknown') 8-page feature in *Attitude Magazine*
- Worldwide media interest prior to publication of foreign-language editions of *Peter 2.0* in China, Japan, Korea, Russia, Romania, Italy...
- Acclaimed 50-minute interview by Stephen Fry at *Hay Book Festival* with a world-beating quality of voice and Big Reveal of Peter's photorealistic avatar
- 10-minute feature on BBC News as part *BBC Click* strand

## Despite these important first steps we have had major shortfalls

- HUMAN-CENTRIC AI

This is the cornerstone of our research but we are far behind our aspirations

- HOLOLENS-2

Problems fitting the headset have dramatically held back testing

- F5 WHEELCHAIR

For numerous reasons there have been no upgrades for the last year

- USER INTERFACE

Partly because of the above our UI's functionality is far below what we need

- COMMITMENTS

A couple of members were inconsistent in delivering their aspirations

## **But we have great new capabilities that open up exciting opportunities**

- Lenovo is enthusiastic to contribute in multiple ways
- Through Lenovo, Intel, etc, we can enrol other megacorporations
- Through Jerry's new Applied AI Studio we have a route to Open Sourcing
- We already have sufficient profile to attract support from others
- We have exceptional potential to attract growing media coverage worldwide

**We will seize these emerging opportunities not just to make up shortfalls  
but also light a beacon of hope for everyone who wants to *THRIVE***

# THE REMAINDER OF THIS PACK IS A LIVING DOCUMENT

As covered in the section on The Foundation's operating model, normally, Mission/Program Enablers will propose possible additions and amendments. To ensure strategic, tactical and operational alignment, Peter (in consultation with Jerry and relevant specialist Directors) will make revisions to this pack.

*Last revised: 07 July 2021*

*Minor amendments to slides 7, 8, 28, 33, 37, 60, 86*



**By 2030 we will rewrite  
the future of disability**

**Here is how we will do it...**



**We will take the strategic, tactical and operational leaps needed for an audacious human-centric AI moonshot of twelve research missions**

## **THE HIGHCLIFF PROGRAM**

### **1. STRATEGY**

**We will adopt an ambitious, compelling, universal focus for our research and devise the key success factors needed to best realise it**

### **2. TACTICS**

**To match our strategy the 8 original 'Augmentation' Missions of our research portfolio will be upscaled and 4 'Highcliff' Missions added**

### **3. OPERATIONS**

**We will upgrade The Foundation into an organisation that will rapidly keep improving**



# 1. THE HIGHCLIFF PROGRAM STRATEGY

SIGNPOST SLIDE

**We will adopt an ambitious, compelling, universal focus for our research and devise the key success factors needed to best realise it**





# THE HIGHCLIFF PROGRAM

## STRATEGY OVERVIEW

Francis and Peter plan to build a family home like no other.

Superficially, HIGHCLIFF will be a large contemporary south-facing clifftop villa on the English Riviera, set in a semitropical garden, a stroll away from both Torquay seafront and the beautiful rural village of Cockington.

In reality, it will be ***a groundbreaking Applied AI Lab.***

Francis and Peter will privately fund all HIGHCLIFF's physical presence (grounds, building, permanent services, interior décor, etc). However, from the start, they will make the whole endeavour freely available to The Scott-Morgan Foundation as the home and laboratory-infrastructure of its pioneering AI moonshot program of audacious research missions toward the ultimate goal of ***using human-centric AI to make the vulnerable SAFE – the powerless STRONG – the unfulfilled THRIVE.***



# THE HIGHCLIFF PROGRAM

## STRATEGY PHILOSOPHY

At the core of this experiment in Augmented Living, the home and grounds bristling with hi-tech sensors and actuators will become the body of an artificial intelligence. Like an ever-resourceful cybernetic Jeeves, HIGHCLIFF will look after three generations of family – including Peter, already completely paralysed by MND/ALS but looking to harness the power of AI to liberate himself.

Francis and Peter don't merely plan to build a family home; throughout this decade they and their family (Laura and Andrew and boys Ollie and Eddie) will showcase how, when people and AI cooperate, *both* are made better. They will trailblaze for everyone a whole new way of living – ***partnering with human-centric AI*** – that embraces the power of digital innovation to reinvent and enhance how we live.





# THE HIGHCLIFF PROGRAM

## STRATEGY CRITERIA

The rule-breaking house design will reflect this new normal: one home, two living spaces, three generations, four pets.

For this typically atypical household, thriving in the accelerating changes of the next decades requires HIGHCLIFF to be *futureproof*. If pandemics become the norm, self-isolation and working from home should be easy and fun. Infirmary should bring no restricted access or reduced independence.

Even dementia should be no reason to move to a safer environment – in AI terms, protecting a toddler from the cliff may turn out to be little different from saving a confused adult from the same risk.

There should *be* no more secure place to live; none of the family should ever have to leave for health reasons. HIGHCLIFF should *always* be the optimal environment for each family-member to *thrive*.



# THE HIGHCLIFF PROGRAM

## STRATEGY OF HUMAN-CENTRIC AI

The Foundation advocates making AI our partner rather than our rival.

Think of AI on its own as a brilliant jazz pianist. But without anyone to jam with. On the one hand, AI can give an impressive solo performance. Wow the audience. Yet even so, it's nowhere near its full potential.

On the other hand, if the pianist is seamlessly merged with a talented vocalist, who has noticeably different skills, the combined virtuoso performance can seem close to magic.

The HIGHCLIFF environment is one where people and AI work *together*, Human-Centric AI. In other words, AI in harmony with people, neither the AI nor the individual giving a solo performance. A mutually dependent partnership, not a rivalry. Synergy, not a zero-sum game. A jazz combo.

Peter will be an extreme case of this, but it applies to the whole family.



# THE HIGHCLIFF PROGRAM

## KEY SUCCESS FACTORS FOR HIGHCLIFF AI

- What should HIGHCLIFF's personality be, and how should it vary?
- How can HIGHCLIFF best learn how the family, and any guests, and even the regular postal worker, all think – and what their individual needs are?
- How can HIGHCLIFF best interact with each individual? And how can Peter best interact with them *and* HIGHCLIFF – in a timely way that also keeps Peter's personality intact?
- How can HIGHCLIFF help train Peter's care team? Or help Laura revise for a new qualification?
- How can HIGHCLIFF best reach out to protect and to serve the family by integrating with the family cars and heavily-customised wheelchair-accessible vehicle, and everyone's mobiles and tablets?
- How can HIGHCLIFF seamlessly multitask?
  - Helping Ollie and his friends in the garden with their homework
  - Guiding Francis to compose something on the robotic grand piano
  - Assisting Peter and Andrew in the future-tech library
  - Texting Laura at work that the package she was waiting for has just been delivered
  - Turning down the oven containing the lasagne Andrew prepared earlier for a family dinner
  - Turning off the sprinklers to stop Eddie getting wet as he wanders around the front of the house
  - Monitoring the individual who has twice tried to look over the gate





# THE HIGHCLIFF PROGRAM

## KEY SUCCESS FACTORS FOR HIGHCLIFF ENVIRONMENT

- What's the best way to help someone with a severe physical disability, or dementia, or 'just' old age, always remain safe, informed, fed, reminded, engaged?
- How can Peter have a robotic wheelchair take him to any part of the house or garden using only one command, with HIGHCLIFF opening and closing doors and controlling lights as appropriate?
- How can Peter modify his immediate environment – temperature, lighting, music, artwork displayed on smart pictures throughout the house? How can he control the TV? Or AR? Or VR?
- How can everyone else have the same level of control?
- What's the best balance between individual safety and individual privacy?
- How does that vary for each person – say, Peter and Laura?
- What does it mean to be inside HIGHCLIFF's impenetrable firewall, with seamless movement of data across every device from in the kitchens to the library to the gardens to the doorbell?
- What does it *feel* like for a stranger to experience HIGHCLIFF's domain for the first time?
- How can the all-pervasive intelligent environment under HIGHCLIFF nevertheless feel unobtrusive?
- How can every interaction feel equally comfortable whatever someone's feelings about technology?
- Despite being a pioneering Applied AI Lab, above all else how can it be a wonderful *family home*?

## 2. THE HIGHCLIFF PROGRAM TACTICS

SIGNPOST SLIDE

To match our strategy the 8 original 'Augmentation' Missions of our research portfolio will be upscaled and 4 'Highcliff' Missions added



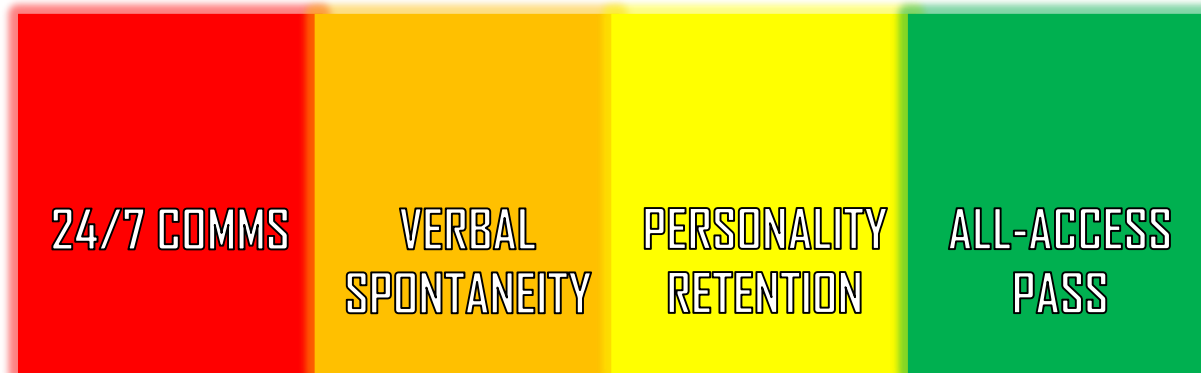
# THE HIGHCLIFF PROGRAM

## The eight original 'Augmentation' Missions will be upscaled

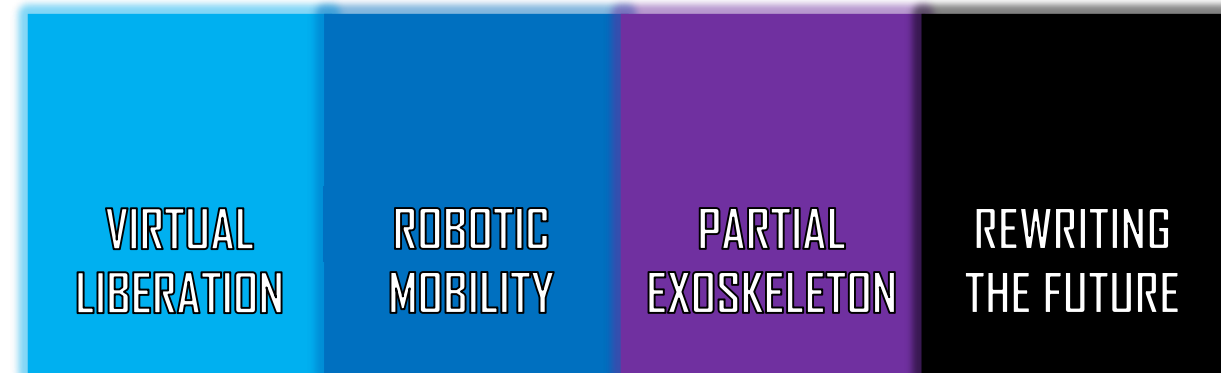
In addition:

- *24/7 Comms* will be split from *Verbal Spontaneity* to separate the distinct research of Eye-Tracking, BCI, etc from that of AI to speed communication
- *All-Access Pass (Cyber)* and *All-Access Pass (Physical)* will be combined to reflect the expected heavy overlap within Ambiguous Reality research

### 'AUGMENTATION' CORE MISSIONS



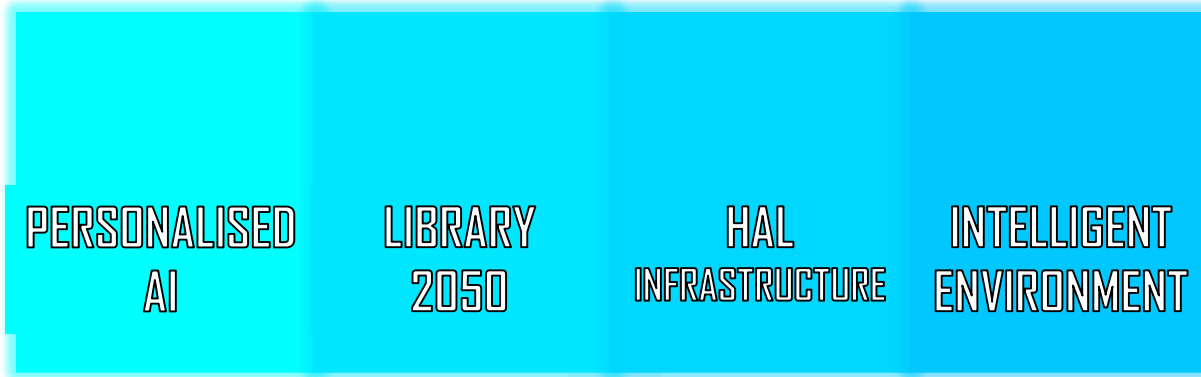
### 'AUGMENTATION' BOOSTER MISSIONS



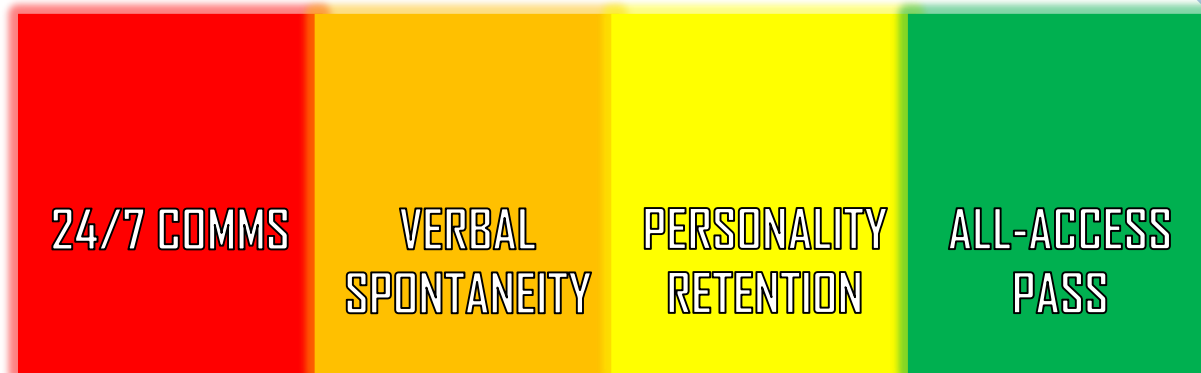
# THE HIGHCLIFF PROGRAM

Four new 'Highcliff' Missions will now catapult our moonshot forward

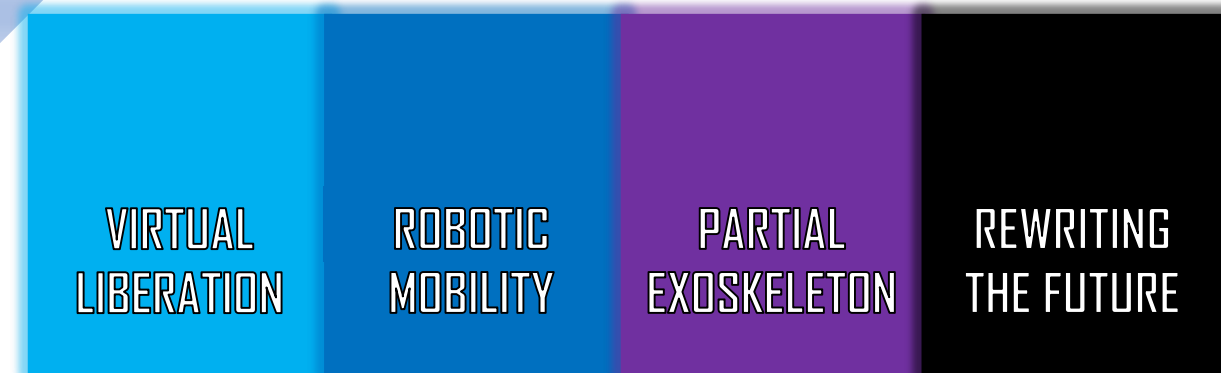
## 'HIGHCLIFF' MISSIONS



## 'AUGMENTATION' CORE MISSIONS



## 'AUGMENTATION' BOOSTER MISSIONS





# THE HIGHCLIFF PROGRAM

The four new 'Highcliff' Missions will catapult our moonshot forward

PERSONALISED  
AI

LIBRARY  
2050

HAL  
INFRASTRUCTURE

INTELLIGENT  
ENVIRONMENT









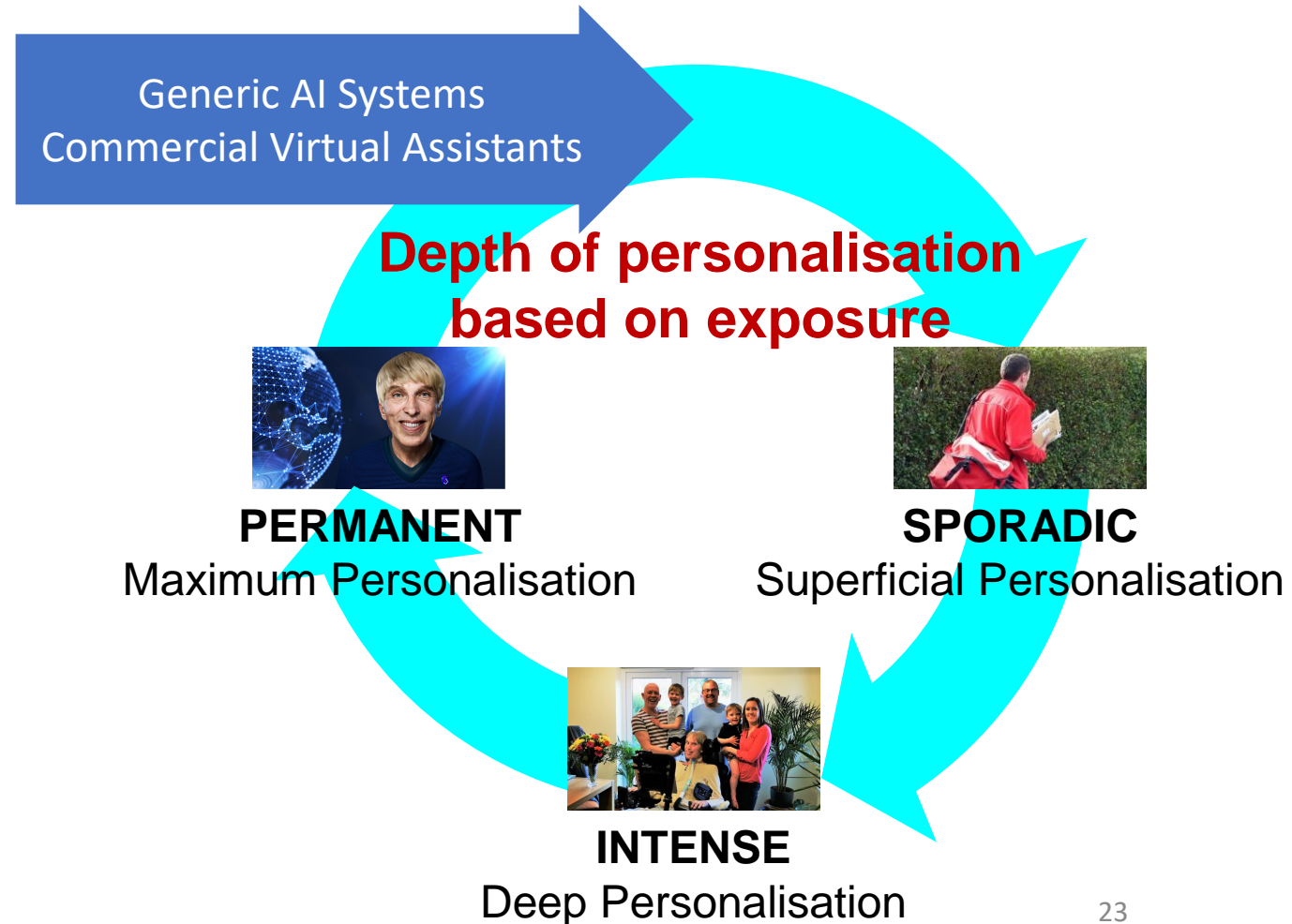


# PERSONALISED AI

## WITHIN THE DECADE

Like the perfect majordomo that he is, HIGHCLIFF is a bit of a chameleon, acting slightly differently to different people (just as an empathetic human does). Although much of HIGHCLIFF's personality and responses derive from cutting-edge generic AI systems and commercial virtual assistants, these are modified depending on the individual/s and situation.

Interactions with Peter are an extreme case because necessarily his every word and action goes through HIGHCLIFF; also because Peter's productivity can only be dramatically enhanced by AI second-guessing what he wants. But to lesser degrees, *everyone* gets treated personally.





# PERSONALISED AI

SUB-MISSION: K-9

## WITHIN THE DECADE

One of the many fascinating strands within this Mission is HIGHCLIFF partially melding with the family dog. In addition to potentially creating the worlds most intelligent pet, and an amazing companion, this is pioneering research to learn how to augment skills of guide-dogs for the blind, as well as dogs with pensioners living on their own.

When they move into their new home, the family wants to get a puppy, maybe a Labradoodle. But intelligent breeds love to be constantly stimulated. So, from the start HIGHCLIFF will be heavily involved with training, using his normal voice but also with ultrasonic transducers throughout the house and grounds similar to dog whistles.

Increasingly, HIGHCLIFF will become as indistinguishable a part of the dog as of Peter 2.0. And through its collar, just like Peter, the dog will remain in touch with HIGHCLIFF remotely if outside the gates. Just like a dog-lover, HIGHCLIFF will learn to recognise different vocalisations and body language, and the dog will be trained to convey messages to the family, guided by HIGHCLIFF.







# PERSONALISED AI

THREE-YEAR MISSION

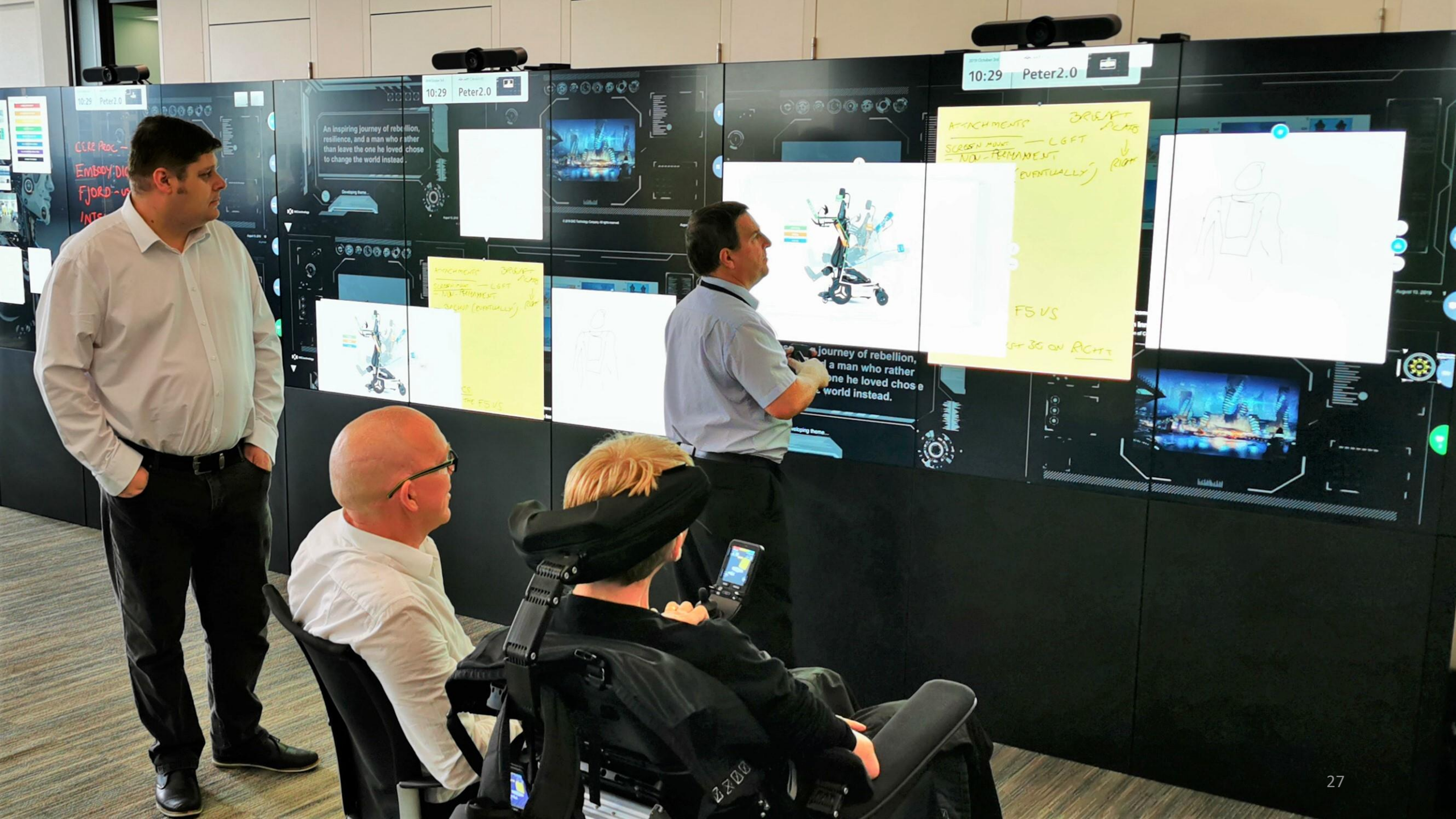
TO BE COMPLETED BY MISSION TEAM



# PERSONALISED AI

ONE-YEAR MISSION

TO BE COMPLETED BY MISSION TEAM







# LIBRARY 2050

## WITHIN THE DECADE

The Library at HIGHCLIFF is not just the most overtly futuristic space in the house, but also the most mind-bendingly spectacular. *It is straight out of 2050...*

It is a large room – the highest in the house – with a generous roof terrace and panoramic south-facing views through a variable-opacity window-wall of Tor Bay and the coastline across the water. Inside it is the far-future equivalent of a Victorian gentleman's private library.

Focused on extending Peter's powers from those of his chair-based interfaces, the Library demonstrates an extreme form of Personalised AI. It is a futuristic workspace fully controllable by Peter's eyes (or eventually BCI). Here he is in his element, able to be as productive as any able-bodied person. One wall is a superwide-aspect-ratio computer screen that when not split into three conventional widescreen wall displays covering different topics, transforms into an extremely long viewscreen showing the apparent live stream of an everchanging spectacular alien landscape.

On this wall screen, Peter can rapidly reposition items just as others would with a touchscreen or mouse. Context-specific AI, fine-tuned to his ways of working, anticipates what he wants to do. This is not just for apps like Word (ideal for a keyboard) but mouse-biased apps like PowerPoint and Chrome. Within the freedom of the Library, Peter can compose for the Disklavier piano downstairs, polish his voice and facial expressions for a speech, or interact with others remotely using a telepresence robot.



# LIBRARY 2050

## WITHIN THE DECADE (continued)

The Library is also an ultra-hi-tech museum housing 'The Rewritten-Futures Collection' – eclectic examples that symbolise when the future veered onto a new course. On ultramodern shelves is a collection of signed first-éditions of some of the last hardbacks ever printed. Incongruously for a Future Library is the ornately framed life-size painting of Peter's Victorian ancestor sitting on a chair in his own library, with the same physical chair on the floor of the Future Library below the picture. Elsewhere is a large floor globe. An armillary sphere. A brass microscope. A portrait of his Georgian ancestor who taught Wordsworth. The first example of Cyborg Art *Metamorphosis*. The large map of Salania he invented at 14. A big array of smart pictures that sometimes become a single large picture.

Yet another entire wall houses the sleek Cabinets of Curiosities filled with exotica ranging from fossils and ancient artefacts to examples of each level of computing from 1950 to a century later, items collected from far and wide, from the distant past through to apparently far into the future on other worlds, all exemplifying something ubiquitous that became extinct – a mammoth tooth, a pocket watch, a dial telephone, a mechanical typewriter, a thermal fax, an adding machine, a pager, an A-Z street atlas, a fountain pen, a wristwatch, a pad and pencil, an internal combustion engine. In clear sight throughout the library is a quote from Tennyson: "*For I dipt into the future, Far as human eye could see, Saw the Vision of the world, And all the wonder that would be...*"



# LIBRARY 2050

**THREE-YEAR MISSION**

**TO BE COMPLETED BY MISSION TEAM**



# LIBRARY 2050

ONE-YEAR MISSION

TO BE COMPLETED BY MISSION TEAM





Lenovo

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Model name / 型号/型號 : L18M3P71  
ASM P/N : SB10T83157  
FRU P/N : 5B10W13914

11.52V=Typical Capacity 4950mAh/57Wh, Rated Capacity 4830mAh/55Wh  
額定容量: 4830mAh 充電限制電壓(limited charging voltage): 13.2V  
For use with Lenovo personal computer



DANGER: DO NOT OPEN OR EXPOSE  
TO HEAT ABOVE 100°C  
FARA: OPPIA INTE BATTERIET OCH UTSÄTT  
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GEVAAR! NIET OPENEN, NIET BLOOTSTELLEN  
AAN TEMPERATUREN BOVEN 100°C  
FARLIG! MÅ IKKE ÅBNE ELLER UDSÆTTES  
FOR TEMPERATURER OVER 100°C

PELIGRO: NO ABRIU O EXPONER A TEMPERATURAS  
SUPERIORES A 100°C  
PERIGO: NÃO ABRIU NEM EXPO A TEMPERATURAS  
SUPERIORES A 100°C  
ATTENZIONE! NON APRIRE O RISCALDARE AD UNA  
TEMPERATURA SUPERIORE AI 100°C  
VORSICHT! NICHT REPARIEREN ODER ZERLEGEN  
MIT WASSER IN BERÜHRUNG BRINGEN  
ODER ÜBER 100°C ERHITZEN

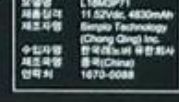
DANGER! NE PAS OUVRIR NI EXPOSER  
À PLUS DE 100°C  
FARE: MÅ IKKE ÅPNE ELLER UTSETTES  
FOR VÄRME ÖVER 100°C  
VAARA: ÄLÄ AVAAKKUA ÄLÄ KÄÄLUÄNEN  
SITÄ YLI 100 ASTEEN LÄMPÖTILAA  
PERIGO: NÃO ABRA OU EXPONH A  
AQUECIMENTO ACIMA DE 100°C

危険 発熱、発火、破裂の恐れがあるため。  
● 衝撃を与えないでください。  
● 衝撃を与えたバッテリー・パックは、使用をやめてください。  
● 発熱・破裂が起きたバッテリー・パックは新しいものと交換してください。  
● 分解・改造、火中への投下、100°C以上の加熱、  
および高温での使用・保管をしないでください。  
● 指定の充電方法以外で充電しないでください。  
● バッテリー・パックの金属端子をショート(短絡)させないでください。

위험 발열, 화재, 폭발의 위험이 있으므로. 危險 發熱, 發火, 破裂の恐れがあるため. 警告 發熱, 發火, 破裂の恐れがあるため. 警告 發熱, 發火, 破裂の恐れがあるため. 警告 發熱, 發火, 破裂の恐れがあるため.

▲M2xL5

制造商: 新普科技股份有限公司  
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Rechargeable Li-ion Battery / 锂离子电池组  
Made in China 制造地: 中国  
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# HAL INFRASTRUCTURE

## WITHIN THE DECADE

The entire house and grounds are not just a family home but also the HIGHCLIFF AI Laboratory (HAL) that members of The Scott-Morgan Foundation use for applied Human-Centric AI research. As such, the whole infrastructure is future-proofed. The house is not scheduled for a major overhaul until 2050, by which time (like for like) HIGHCLIFF's computing power will be 30,000 times greater – which has completely unpredictable implications. So, unusually for a domestic space, the physical infrastructure allows easy new runs of cabling and hardwired equipment, and the LAN is a very high baud rate.

HAL is a repository for all The Foundation's research and learning. It also provides unique insights to members (including academic bodies) about everything ranging from how the AI evolves, to the performance of the intelligent environment, to the preferences and social behaviour of the family. To be capable of sophisticated data mining over an unprecedented longitudinal study, HAL must archive substantially more data than HIGHCLIFF needs to function effectively – indeed, more than obviously needed for current research. Much of this is cloud-based. But anything Mission Critical (such as to do with Peter's safety or ability to function) is stored locally as well, in case of internet interruption.

Although everywhere throughout HIGHCLIFF's domain is data intensive, the Library is especially so because this houses the research into augmenting Peter's abilities to the maximum – whether through VR or BCI. So data runs are minimised from air-conditioned high-performance computers.



# HAL INFRASTRUCTURE

THREE-YEAR MISSION

TO BE COMPLETED BY MISSION TEAM

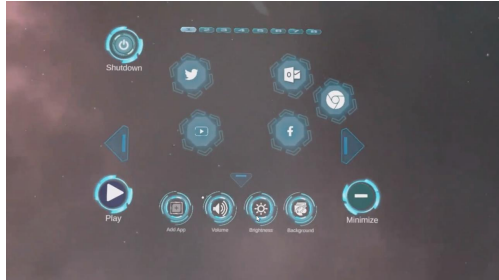


# HAL INFRASTRUCTURE

ONE-YEAR MISSION

TO BE COMPLETED BY MISSION TEAM





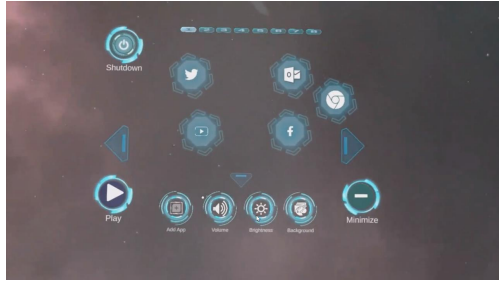
# INTELLIGENT ENVIRONMENT

## WITHIN THE DECADE

Although HIGHCLIFF (the AI) is the omnipresent interface to the whole of the Highcliff house and grounds (and beyond), his role truly is like a majordomo running a large household. Behind the scenes, HIGHCLIFF coordinates myriad automated systems: a few true cobots (cooperative robots designed to work *with*, rather than replace, humans), some dumb devices but many using AI, most with incompatible commands, all with different instruction manuals. This extraordinary complexity is completely hidden from the family and their guests; they only ever interact with HIGHCLIFF.

The entire house, gardens, drone, telepresence robot, autonomous vacuum cleaner, robotic lawnmower, self-drive cars, every automated device that HIGHCLIFF can access and control remotely (even in another country), Peter's chair, even Peter's partial exoskeleton, and even the melded family dog – *ALL* of these together constitute HIGHCLIFF's 'body'. In reality, ***HIGHCLIFF is a distributed giant cobot, keeping his family SAFE, making them STRONG, and helping them THRIVE.***

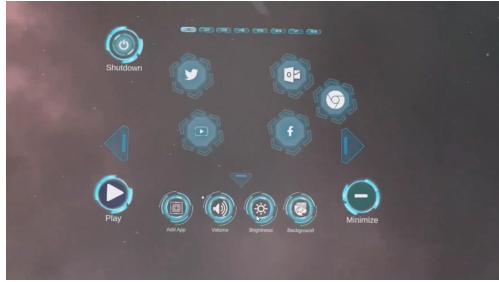
This has profound implications beyond system architecture. Peter can only speak, express his personality, interact with his environment, create, move around in his chair, move his body with his exoskeleton, experience feedback in virtual reality from the same exoskeleton, amplify his intelligence – indeed, Peter 2.0 can only *exist* – by biological Peter melding with HIGHCLIFF. By implication, ***HIGHCLIFF makes Peter into Peter 2.0. And, on occasion, Peter's new body can be HIGHCLIFF's...***



# INTELLIGENT ENVIRONMENT

THREE-YEAR MISSION

TO BE COMPLETED BY MISSION TEAM



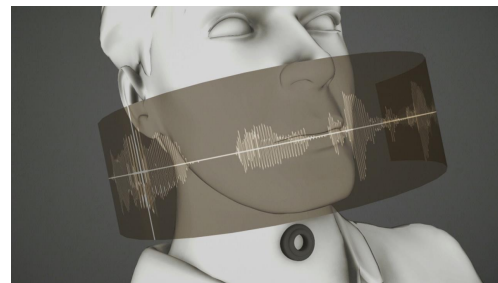
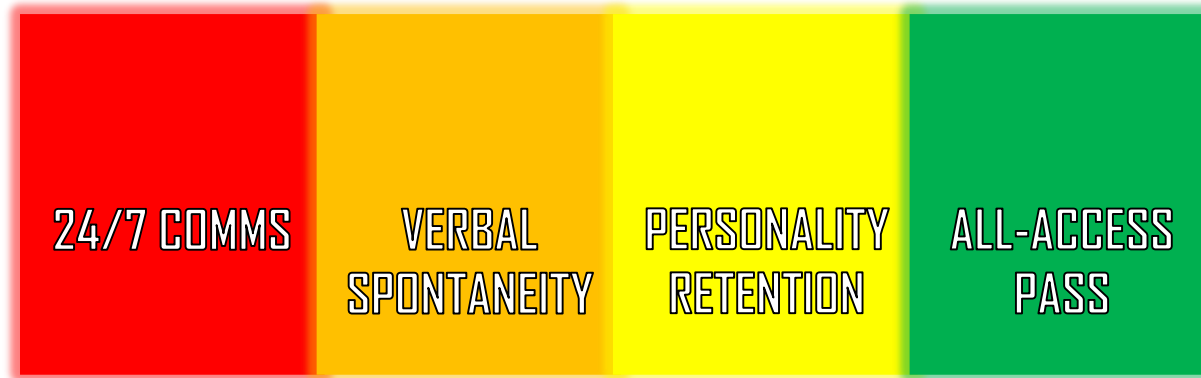
# INTELLIGENT ENVIRONMENT

ONE-YEAR MISSION

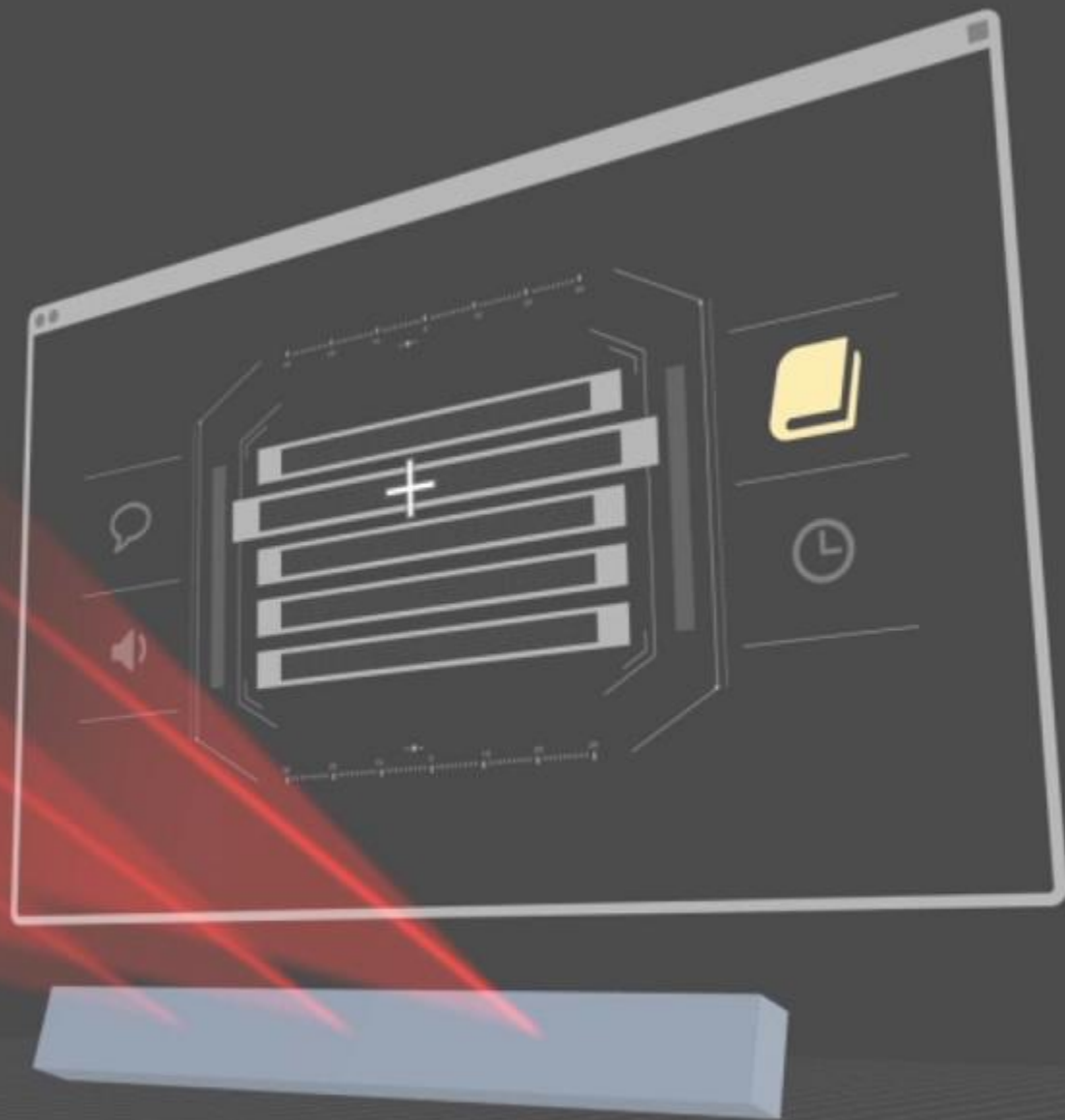
TO BE COMPLETED BY MISSION TEAM

# THE HIGHCLIFF PROGRAM

The four original 'Augmentation' Core Missions will be upscaled









# 24/7 COMMS

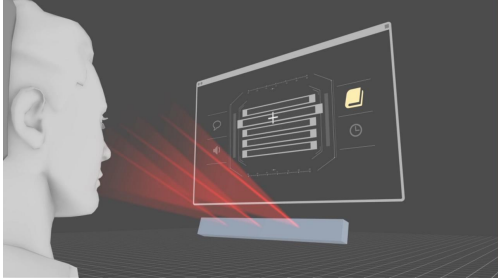
## A MESSAGE FROM PETER

*Uniquely in this pack, I have here chosen to communicate to you individual to individual. And I'm doing so while my recent trauma is still all-too-fresh in my mind – before my habitual positivity takes over.*

*For two days I couldn't communicate, merely because my eye-tracking system was inadequate. I'd long known this was commonplace for those of us with ALS/MND, severe brain trauma, stroke, and muscular dystrophy meaning we have to resort to eye-tracking. But this was the first time I could no longer mouth words. My facial muscles had given up earlier and faster than expected. So, when my foot went into excruciating cramp, I couldn't set off an alarm, couldn't explain what was wrong, or even that I was in pain. The person with me thought I was trying to mouth the letter O. I was Locked In.*

*I cannot express – even for someone as tech-savvy as me – how distressing and upsetting that is. Can you imagine what it must be like for the vast majority, overwhelmed by the technology and unable to work through every hardware, software, lighting and positioning variable to eventually hypothesise that hay-fever medication was drying my eyes – which turned out to be the case. It was the worst experience of my whole journey so far. All because of using gaming technology never intended for clinical use. But far more resilient technology exists. We owe it to the world of profoundly disabled people vastly more depressed and scared than I was (and I found it really hard) to solve this.*

*That is why this pack isn't a game, an intellectual challenge, something for us to fit in when we're not doing real work. We are the frontline. What we create stands between Triumph and, frankly, Terror.*



# 24/7 COMMS

## WITHIN THE DECADE

Ensuring input peripheral/s that allow an extremely disabled user nevertheless to be able to communicate with a computer is by far the most crucial of all the Augmentation Missions; without this, none of the other Missions make much sense. But commonly available commercial input devices, primarily eye trackers, are inadequate. We envision a suite of dovetailing solutions that together offer *any* user, even if fully Locked In, 24/7 input – whatever the time of day, situation, or ambient brightness.

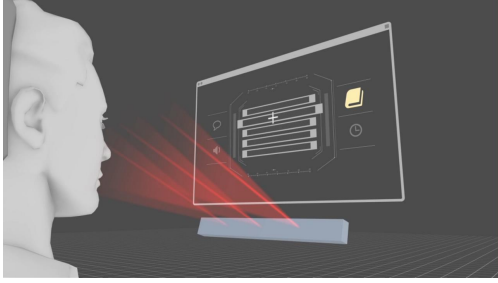
**BACKUP:** A totally different communication channel, maybe using a vestigial operative muscle to (in an emergency) set off an alarm, and (slowly) use scanning software as an alternative input device.

**LO-RES EYE TRACKER:** A system that requires nothing on, or close by, the user but instead uses a distant camera to interpret gross pupil movements (4 or 8 compass points and centre). On a remote screen, or projected onto a wall or ceiling, are a few phrases highly contingent on the current situation as interpreted by AI analysis – optional alternatives to spelling using a form of eye-position semaphore.

**HI-RES EYE TRACKER:** Similar to commercial AAC devices but with an interface tolerant of dry eyes and full sun. Hugely sophisticated contingent options allow a massive increase in communication rate.

**IMMERSIVE EYE TRACKER:** Identical UI to hi-res eye tracker but with AR and VR capability.

**BRAIN-COMPUTER INTERFACE:** Very slow (for first decade) defence against possible total Lock In using skull-cap and substantial second-guessing by AI of desired options based on current situation.

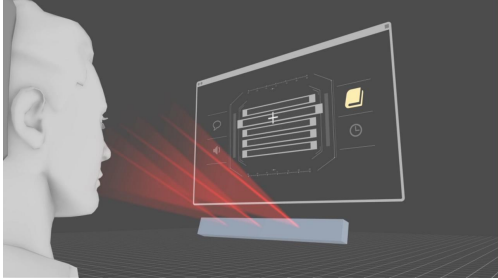


# 24/7 COMMS

## THREE-YEAR MISSION

## TO BE COMPLETED BY MISSION TEAM



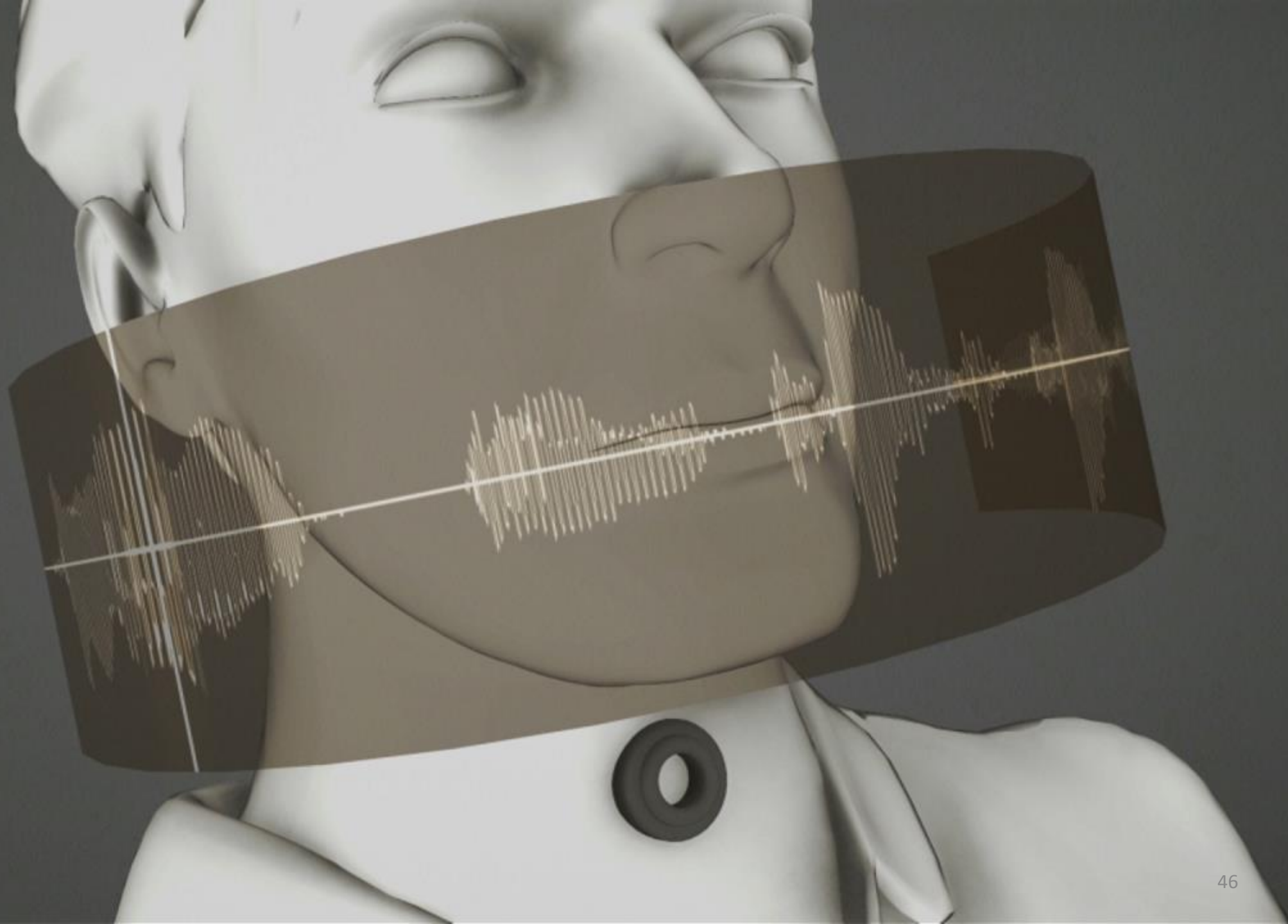


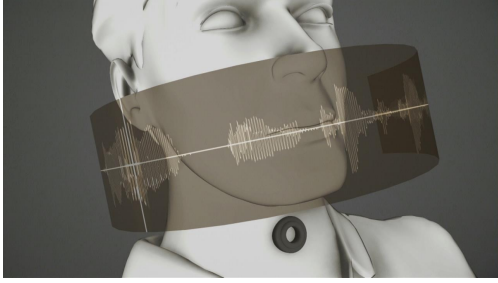
# 24/7 COMMS

## ONE-YEAR MISSION

- *URGENTLY* find solutions for **BACKUP**, **LO-RES EYE TRACKER** and **HI-RES EYE TRACKER**

**TO BE COMPLETED BY MISSION TEAM**





# VERBAL SPONTANEITY

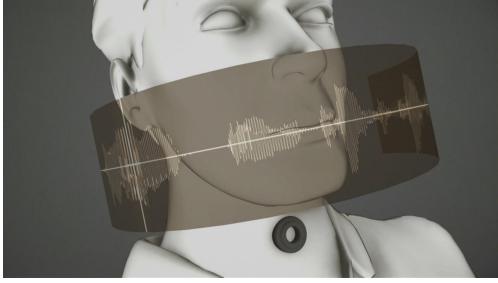
## WITHIN THE DECADE

We envision an AI system to listen to what is going on and then prompt the user, like a SatNav, with at least three alternative suggestions according to different criteria. Users will then kick off the response they want their own-voice synthesiser to use as a background subroutine while they are typing a customised insert to slot-in after the space-filler – using a hugely-predictive text engine customised to the current context and personalised to their individual style.

We also envision the AI system being clever enough to judge which synthesised emotions it should use for different words – conversational, loud, intimate.

What's more, some of the AI suggestions will often be very similar to what *any* domestic AI would say. Factual questions about the weather forecast, the date of some historical event, a definition, anything discoverable on Wikipedia, or indeed Google, should automatically be on offer.

Of course, what the synthesiser ends up saying may not be the response, the expressiveness, even the vaguely similar idea, the user would have said unaided. But part of our research will be to experiment with how users can use such collaborative Human-Centric AI technology potentially to make them appear cleverer, or funnier, or simply less-forgetful, than they were before. So, just as much as 'Verbal Spontaneity', read 'Intelligence Amplifier'.



# VERBAL SPONTANEITY

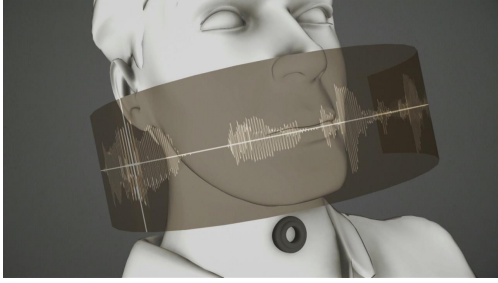
## THREE-YEAR MISSION

We are discovering that the long-term Verbal Spontaneity research challenges are especially problematic. So, rather than treat them as monolithic, let's think strategically and break the monoliths into building blocks – just as we would with a huge software challenge. This is more than simply being incremental. We can be clever and get feedback (especially in the form of self-learning of the AI) from the early research that accelerates the whole.

We should go after low hanging fruit; this is more than pure pragmatism, it's also a reframing of our research. Instead of struggling with what is overall very difficult, instead let's succeed with those components that are relatively easy. And learn from those. Already, making that refocus will teach us some helpful things. What is both easy and useful? Why?

We should also not be led astray (much) by the siren song of 'independence'. Yes, of course, it is the end goal. But realistically, for now at least, anyone with Extreme Disability always has someone around. So, that person can do whatever they can be asked to do. What they can't do is verbalize what is in their charge's brain. Verbal Spontaneity remains the key to those with Extreme Disability to action everything.





# VERBAL SPONTANEITY

## THREE-YEAR MISSION (continued)

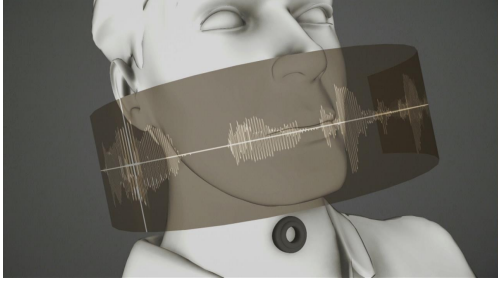
We should stop thinking like scientists and technologists for a moment, and spend some time thinking like an illusionist developing a breakthrough act. We do not need to create an AI system that can generate Verbal Spontaneity. We have to create a human-centric AI that when partnering with a human generates the *illusion* of Verbal Spontaneity.

What tricks can we try when we know that the human is always there to filter out the gibberish? What failures can we blag our way out of because the human can blame the AI – and vice versa? What ambiguity can we build in (like a stage psychic or a horoscope) that lets us be less specific than we appear – for instance, simply in a conversation repeating variants of “tell me more”?

Above all, how can we use existing commercial Intelligent Virtual Assistants to provide options of what to say?

And tap into massively-funded research into Strong AI.

## TO BE COMPLETED BY MISSION TEAM



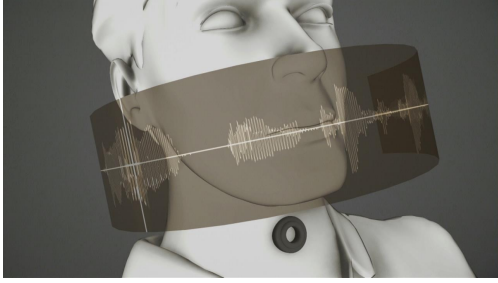
# VERBAL SPONTANEITY

## ONE-YEAR MISSION

### TEXT GENERATION

There are two applications of ACAT that for now dominate Peter's usage. Text generation (for email, documents, and books, currently all dictated) is about 80% of his usage. Conversational speech is the rest. But that breakdown is confused by the fact that for eight hours (watching TV, and maintenance routines with his care team) he currently has no means of using eye-tracking.

Fortunately, Peter's text style is similar to his speech style, so we have the chance to learn from 80% of his usage, without having to listen to both sides of a conversation. Let's use this to develop far more even than multiple word predicting (hugely useful though that will be). Unlike the time pressure of conversation, when Peter creates text he gets it right before he moves on. So, there will be no equivalent of him selecting a suboptimal offered phrase for reasons of speed. That means his AI can monitor exactly the process he goes through, what it gets right, how he customises, etc. And keep learning. Let's use this for everything from post-hoc contextual apostrophe insertion (for instance, changing "lets" to "let's" at the beginning of this sentence), to offering alternative phrases (exactly like he will eventually be offered when conversing).



# VERBAL SPONTANEITY

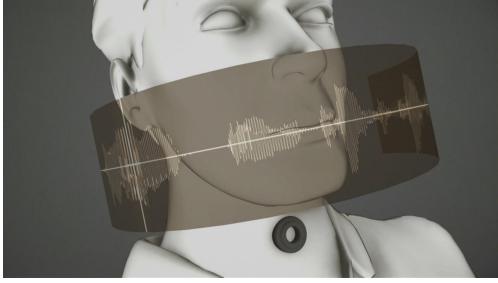
## ONE-YEAR MISSION (continued)

### REAL-TIME CONVERSATION

Let's not leave responding in real time to the other side of a conversation – by the AI listening to it – to a later Mission, just because it seems daunting. Some apparently minor challenges would be relatively easy to achieve but psychologically would carry disproportionate impact:

- Yes-No Challenge
- I Agree Challenge
- Go On Challenge

**Yes-No Challenge** This is where the AI listening to a conversation detects a question from another person. Of course, the question may be directed at someone else entirely, but options for answering should spring up to cover at least Yes, No and Don't Know. The AI doesn't need to understand the question, merely that it sounded like a question. What's more, the top proposals should randomly vary. The concept Yes should be covered variously by Absolutely, Definitely, Affirmative, etc.



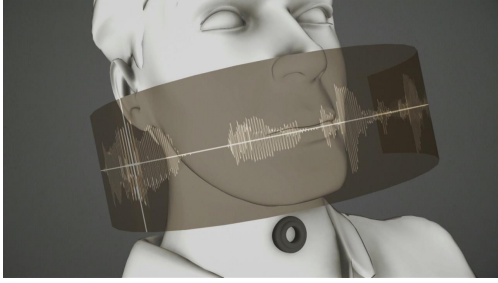
# VERBAL SPONTANEITY

## ONE-YEAR MISSION (continued)

**I Agree Challenge** The randomly varying responses used in this challenge may heavily overlap with the first – supplemented by Precisely So, That’s Right, etc – but the context is totally different. The AI here is listening to statements from the other party, and proposing alternative “verbal nods” to signify agreement. Again, the AI doesn’t need to understand anything other than, maybe, the other party has made a statement. And maybe wait until there is a momentary silence to instantaneously chip in, having been queued seconds before. This apparently spontaneous response, impossible to even trigger in real time using eye-tracking, would be psychologically far more impressive than Peter’s current approach that disrupts the other person’s flow by interrupting them.

**Go On Challenge** This is a variant of the previous challenge that provides the equivalent of a ‘verbal smile of encouragement’. As ever, the AI doesn’t need to understand anything other than, maybe, that the other party has been talking for a couple of sentences, has paused, but it isn’t a question. The response may have to be pre-recorded because the prosody of some of these verbal cues is complex and subtle. For instance, “really?!?” or “uh huh?”. This leads to the interesting challenges of using AI to propose many of the thousands of pre-recorded phrases Peter has.





# VERBAL SPONTANEITY

## ONE-YEAR MISSION (continued)

### INTELLIGENCE AMPLIFIER

It is absolutely crucial that we avoid getting trapped into creating something even partially-bespoke when it comes to proposed phrases, sentences, or even whole paragraphs of general factual information (ranging from the historical or geographical anecdotes to biographical insights). To do so would be to go down a research dead-end.

Instead, we must build an interface to one (or all) of the dominant Intelligent Virtual Assistants (IVAs), namely Google Assistant, Amazon's Alexa or Apple's Siri, each listening to every conversation *and monitoring every bit of text being composed*. Indeed, maybe three proposals of directions to take a conversation correspond with the (presumably different) offerings from Google, Amazon and Apple.

We should explore options that set us on a sustainably long-term path in which our research is always able to fully leverage commercial IVAs as well as more niche offerings as they become available (maybe proposed humorous retorts) plus heavily-funded one-off research into Strong AI.



**PETER 2.0**

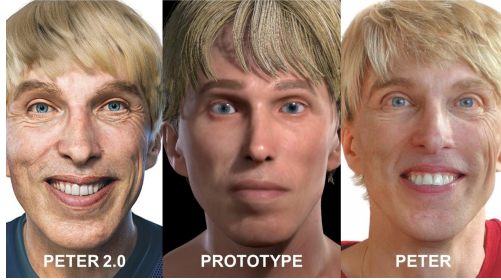


**PROTOTYPE**



**PETER**





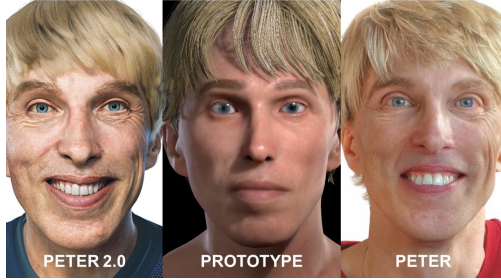
# PERSONALITY RETENTION

## WITHIN THE DECADE

We envision users with their *own* avatar. But we do not envision something that looks like a cartoon, we are envisioning something that every instinct tells you is a real human being. And we envision hardware and software that can deliver that in real-time. If initially we cannot quite reach photorealism in real-time, then at least from the very beginning we can achieve it for pre-prepared sequences.

We envision tight coupling of natural facial movements with own-voice synthesis as well as AI-generated facial body-language based not only on listening to ongoing conversations *and* things like sudden noises but also from *watching* what is going on, and detecting and interpreting movement.

We envision a user giving a speech where their avatar is shown on the auditorium screen (not an image of their almost-paralysed speechless body), or a Skype call or a podcast where their avatar is all that people see, or even holding a face-to-face conversation with someone who ends up interacting with the user's *avatar* software *not* their 'wetware' at all.

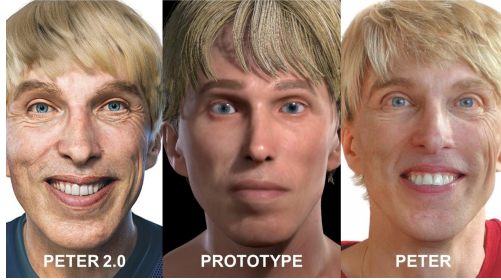


# PERSONALITY RETENTION

THREE-YEAR MISSION

TO BE COMPLETED BY MISSION TEAM





# PERSONALITY RETENTION

ONE-YEAR MISSION

TO BE COMPLETED BY MISSION TEAM







# ALL-ACCESS PASS

(CYBER)

## WITHIN THE DECADE [1-of-2]

We envision seamless access to anything electronic, with intuitive navigation across the whole of cyberspace. By a user tying into multiple sensory inputs, we envision that increasingly boundaryless control over their world will feel like control over a massively extended body that substitutes for their (potentially) paralysed biological body. Instead of interfacing with their environment, increasingly they will *become* their environment. Thanks to the plasticity of the brain, over time, cyberspace – and any of the physical world accessible through cyberspace – will feel like *the user*, sending an email or calling an elevator, just like raising a finger or raising an eyebrow used to be. It is not just they will no longer feel trapped in a paralysed body; *they will no longer be a paralysed body*.

We envision intuitive eye-driven control of everything previously accomplished by hand – such as controlling the TV and household appliances, or calling the elevator and opening doors. But naturally, because the user's AI will by this stage have full access to Machine Translation, there is absolutely no reason why any conversations cannot be in any language. Indeed, combined with our Verbal Spontaneity and Personality Retention work, we envision a user's Avatar holding a video Skype interview in Chinese *and* Japanese – at the same time.



# ALL-ACCESS PASS

(AMBIGUOUS REALITY)

## WITHIN THE DECADE [2-of-2]

Initially, we will experiment with telepresence robots that allow the user to interact with other people in remote locations. But we envision that eventually, whether a user is in physical reality, enhanced reality, or fully-virtual reality, will feel irrelevant; with *two* All-Access Passes (physical reality and virtual reality) all that will matter is the quality of Reality – even if it is Ambiguous Reality. A user can be hand-in-hand with their partner on a mountain peak, but maybe the user is safely at home and their partner is beside a synthetic doppelganger that electronically relays the user to the mountain peak and the mountain peak to the user. Or maybe their physical body is there, but on a four-legged walking machine. Or maybe the walking machine is another form of doppelganger and the user is at home. Or maybe their partner is using an ultra-portable relay that is primarily a drone that follows at eye level and lets the user feel as if they are together. Or maybe they are both at home.

We also envision users having the power to go back in time. Maybe they were physically there the first time. But they can relive it just the same. They can even *improve* upon the original – turn it into a ‘Best Of’ experience by rewriting history by cutting bits out. What is more, if the first experience happened to be in VR then they will be able to go back in time and *change* the outcome. Ambiguous Reality is not just an unbounded blurring of physical and virtual, not just past and present, but alternative timelines as well.





# ALL-ACCESS PASS

**THREE-YEAR MISSION**

**TO BE COMPLETED BY MISSION TEAM**



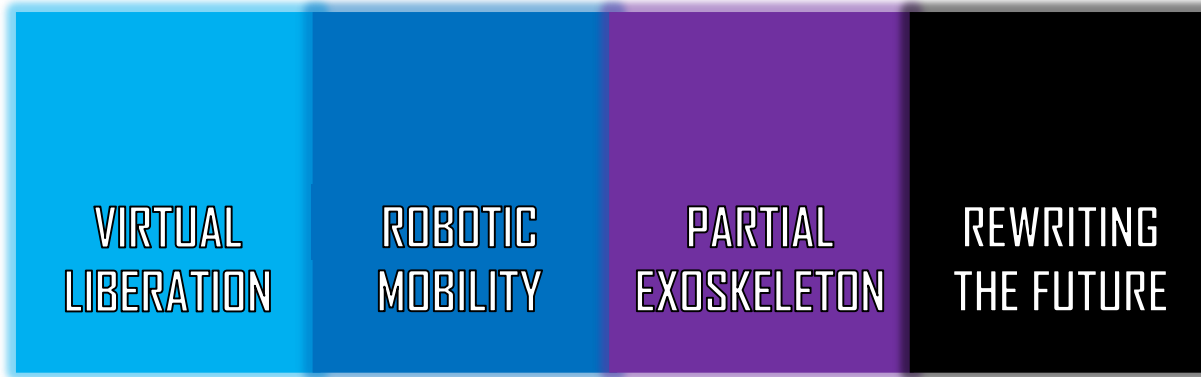
# ALL-ACCESS PASS

**ONE-YEAR MISSION**

**TO BE COMPLETED BY MISSION TEAM**

# THE HIGHCLIFF PROGRAM

The four original 'Augmentation' Booster Missions will be upscaled











# VIRTUAL LIBERATION

## WITHIN THE DECADE

We envision combining Verbal Spontaneity and Personality Retention with advanced Virtual Reality (VR). But even just combining these three research streams puts a huge drain on a user's ability to control everything via eye movement. Already, with just three streams, the user must control speech and emotion and body language and now movement (in virtual or physical space) – all at the same time. To pull this off, we envision resorting to the same trick that biological brains use: delegation. We will use such clever AI that at a conscious level the user only needs to kick off very-high-level commands (such as, “move over there”) and it happens without further intervention. That alone will grant a user the headspace to ‘teleport’ into and participate in a virtual or physical meeting anywhere on the planet (or, indeed, on any planet in the virtual universe).

We envision users being offered predictions of likely movements they may want to make in VR based on everything that is going on. But also, we envision making the VR feel closer to being inside a flight simulator or on a theme-park ride than a mere domestic computer game – by creating sensory effects such as warmth or breeze – and in the process pushing the boundaries of VR. Most people use VR as an opportunity to *change* their life. We want to use it to *reclaim* people's lives.



# VIRTUAL LIBERATION

**THREE-YEAR MISSION**

**TO BE COMPLETED BY MISSION TEAM**



# VIRTUAL LIBERATION

**ONE-YEAR MISSION**

**TO BE COMPLETED BY MISSION TEAM**







# ROBOTIC MOBILITY

## WITHIN THE DECADE

It is crucial to tackle the current huge barriers to Disabled Access so as to easily navigate a typically-hostile urban environment, go on a country walk, safely climb stairs, board a boat, traverse icy/snowy surfaces, take a commercial flight. As part of this major research challenge, we envision 'wheelchairs' taking on far greater responsibility – Robotic Mobility is in reality an *AI challenge on wheels*. We envision a user outside their house onboard their Wheelchair Accessible Vehicle using their eyes to click on an icon for 'Bedroom' and that is it – everything else is automatic until they are safely by their bed. Likewise, even in unfamiliar territory, they should be able to travel fast-but-safely thanks to a sophisticated collision avoidance system. We envision them being able to speed through an obstacle course or safely make their way through a showroom of porcelain vases.

We also envision a user speeding along with a VR visor obscuring their eyes. What they see is Enhanced Reality – their Intelligence Amplifier at full pelt. Or they will use the same system to teleport into a real-world meeting (not a VR meeting) occupying a remote telepresence robot. Or they teleport into a drone, looking down at themselves from their extra-terrestrial body. Or they move through their house as before, but they are in bed – experiencing through VR what they would if sitting in their wheelchair. We aim to change perceptions of what 'Reality' is.



# ROBOTIC MOBILITY

## THREE-YEAR MISSION

### Precision Autonomous Manoeuvring (PAM)

Initially, we should focus on solving the subset of Robotic Mobility that, even though it occurs on familiar territory, involves sufficient precision that it can be difficult/worrying/time-consuming for a human alone. This is analogous to Self-Parking that the automotive industry chose to offer first.

Crucially, the PAM Project can hold off from solving Robotic Mobility in unfamiliar (unmapped) locations – we will need to ensure we can easily migrate to *terra incognita* later, but not yet. Likewise, we need not worry yet about high speed, or coping with high-speed objects such as cars when crossing a familiar road.

An ideal initial focus is to master a combination of the most common and the most frequently frustrating manoeuvres. Solve these and (provided we always keep in mind how the PAM Project must eventually evolve to cover all the challenges we initially simplified) we will open up a range of opportunities both immediate and strategic – including future regulatory approval and pull from potential end-users. There are currently seven scenarios that the PAM Project covers. We may eventually conflate or split some of these, but the following list is roughly in ascending order of how difficult they may prove to be:



# ROBOTIC MOBILITY

## THREE-YEAR MISSION (continued)

### Scenario #1 – Positioning

Wherever the chair is within a pre-mapped room, clicking on a predefined icon causes the chair to move to a previously memorised position in the room (for instance, the perfect spot in front of the TV, or window, or computer, or ceiling hoist). Often the route will be unobstructed (except perhaps by a cat or human that gets out of the way), but sometimes the route across the room will require negotiating around furniture.

### Scenario #2 – Ramp

From a rough position in front of a pre-mapped ramp, clicking on a Ramp icon causes the chair to line up with the centre of the ramp and then negotiate the entire length of the ramp until the chair is entirely off the ramp again (or blocked by something, such as an entrance door). The ramp is of indeterminate length. It may go up. It may go down. It may do both. It may turn through 180 degrees. It may be slippery.



# ROBOTIC MOBILITY

## THREE-YEAR MISSION (continued)

### Scenario #3 – Garden

This is an advanced combination of Positioning and Ramp. Clicking on a predefined icon causes the chair to move to a preprogrammed spot in the garden, negotiating any moving or static objects. The terrain may gently rise or fall. Remember, this is Human Centric AI, so the user can contribute, for example by selecting from alternative possible routes (like a Sat-Nav) or deciding that a previously unmapped obstacle is likely to move.

### Scenario #4 – Parking

This is the 'empty chair' scenario. Similar to Positioning, with no user in the chair someone (maybe the user remotely) selects a predefined icon (maybe on the touchscreen) or issues a verbal command and the chair safely parks itself. This might, for example, be in the bedroom at night after the user has been hoisted out of the chair. Importantly, this manoeuvre should be reversible so that, for example, in the morning the chair can relocate itself back into the ideal position relative to the hoist. That Return position can be a pre-allocated Position (if this is how the chair got there in the first place).





# ROBOTIC MOBILITY

## THREE-YEAR MISSION (continued)

### Scenario #5 – Reversing

In many domestic environments (at least in the UK and Japan, less so in sensibly designed US homes) the only way to negotiate certain routes (for instance, out of an elevator) is backwards. Historically, this has always required someone other than the user, and even they are largely driving blind. This Reversing scenario involves safely going backward to a predefined Position, without any likelihood that the user can contribute in any substantive way, despite walls, furniture, people and pets potentially being in very close proximity.

### Scenario #6 – Tight Manoeuvring

This scenario involves executing a manoeuvre to a predefined Position that even a human operative might find difficult and stressful. A typical example would be a tight turn in a narrow corridor into a small doorway. If this involves a three-point turn, all the better – chairs like the Permobil F5 are extremely difficult to precisely control when their free-spinning rear wheels kick out totally unpredictably. Machine control ought to win hands down over a cursing human.



# ROBOTIC MOBILITY

## THREE-YEAR MISSION (continued)

### Scenario #7 – WAV

Possibly the toughest challenge, this scenario combines many of the other scenarios by requiring the chair to drive itself onto and up the ramp of a Wheelchair Accessible Vehicle (which in European and Japanese WAVs tends to offer very tight clearance), then manoeuvre into the predetermined stow Position. Obviously, this entire process then needs to literally be reversed, until the chair has safely emerged backwards off the end of the ramp.

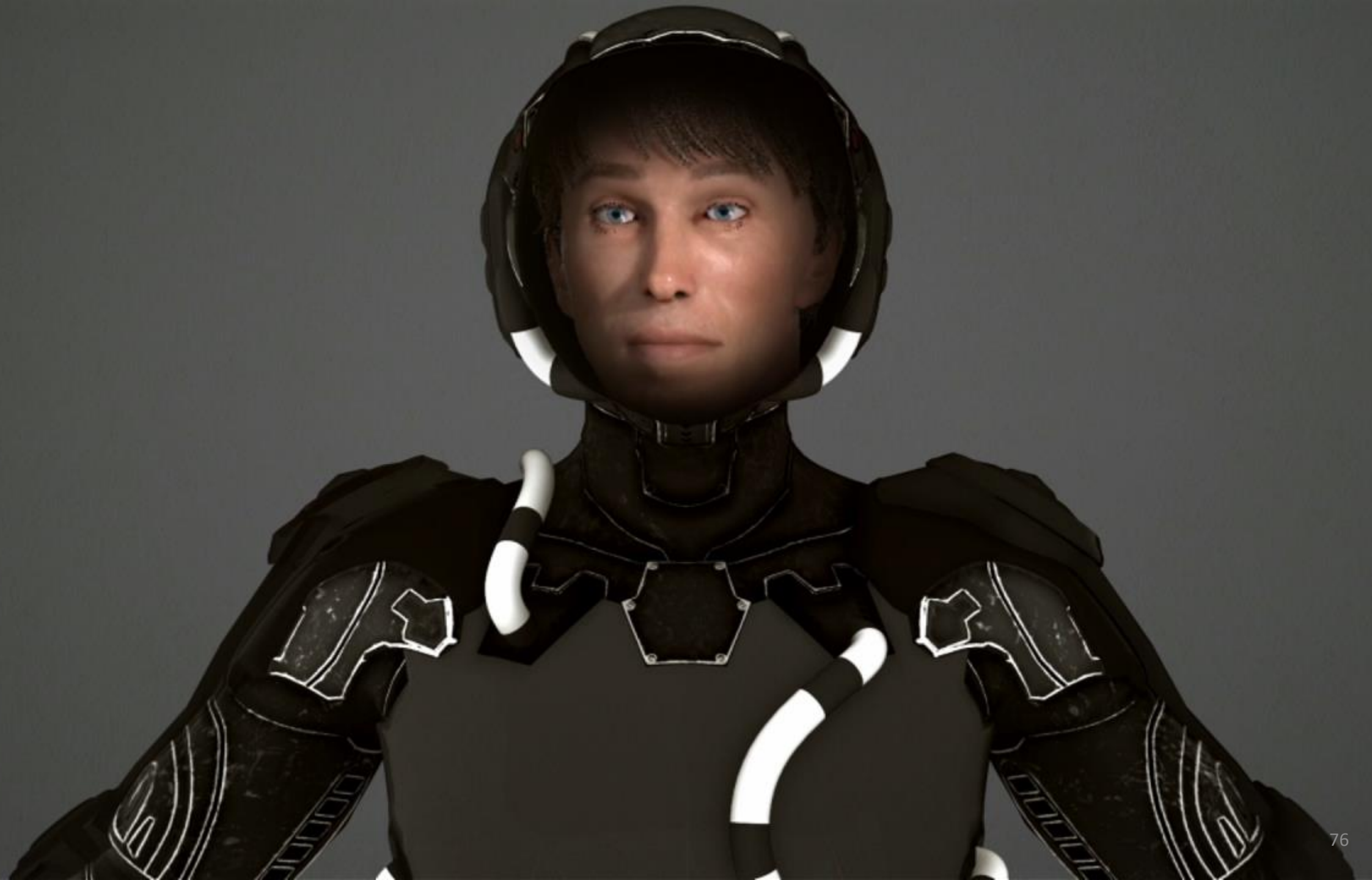
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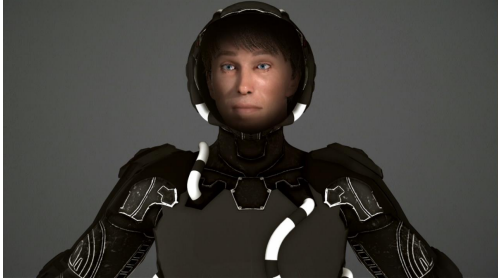
# ROBOTIC MOBILITY

**ONE-YEAR MISSION**

**TO BE COMPLETED BY MISSION TEAM**







# PARTIAL EXOSKELETON

## WITHIN THE DECADE

We envision some stylish exoskeleton arms and gauntlets (with gaps for fingertips and palms to touch surfaces and distinguish textures). We also envision an exoskeleton neck (tailored for a Vent Pump tube) that is capable of turning and nodding and looking around. As ever, we envision a user being offered options – exactly as when in immersive VR. Indeed, it will be *exactly* as when in cyberspace because they will be the *same* options. Why should it feel *any* different in the physical world? Whether a user is ‘escaping’ from a room by opening a door by turning its handle, or coordinating movement between both arms, or reaching out and touching someone they love, they will do them all in exactly the same way in cyber-reality as in physical reality. *Both* are their expanded reality.

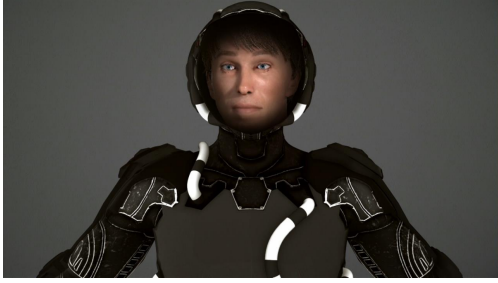
Most people assume that an exoskeleton’s only purpose is to interact with the physical world. But it will serve an equally important second role: It will allow a user to *feel* interactions in the Virtual world. If their voluntary muscles do not work, *their* sensations when their exoskeleton moves their arms, experiences resistance, hits something, is weighed down, bounces back – *will be identical whichever reality they are in*. Their innocuous exoskeleton is in truth the ultimate cyber suit that any futuristic VR gamer would also prize.



# PARTIAL EXOSKELETON

THREE-YEAR MISSION

TO BE COMPLETED BY MISSION TEAM



# PARTIAL EXOSKELETON

**ONE-YEAR MISSION**

**TO BE COMPLETED BY MISSION TEAM**







# REWRITING THE FUTURE

## WITHIN THE DECADE

Part of HIGHCLIFF's role is to pioneer what is possible for the physically and mentally challenged, change perceptions of what disabled living and old age can look and feel like, rewrite the future of extreme disability. But the Program also needs to rewrite the future for *all* HIGHCLIFF's occupants.

And together they represent *billions* of people. To rewrite the future for so many, cutting-edge Hi-Tech alone is not enough. If we only come up with brilliant ideas, we fail. If we only build amazing Proofs of Concept, we fail. If we only promote Hi-Tech that people don't access (they don't want it, aren't offered it, can't afford it, don't live long enough), we fail. *If we forever rewrite the future so that anyone, if they choose to, can THRIVE – even with Extreme Disability – only then do we succeed.*

So, in addition to devising Human-Centric AI systems, we also need to change attitudes through **Promotion** and **Publication**. We need to view our research as part of a major Change Intervention, stimulate awareness via conventional media and social media, and as necessary lobby governments and healthcare-communities. To *KEEP* rewriting the future, those of us researching in this field must constantly regenerate and evolve what we do and how we do it, constantly pushing back the frontiers of what is possible, constantly at the cutting-edge of applying Hi-Tech to Extreme Disability and beyond, constantly leveraging Moore's Law to translate research into user-tools, constantly striving to deliver more and more support to *everyone* who dreams of breaking free from their inadequate body.



# REWRITING THE FUTURE

THREE-YEAR MISSION

TO BE COMPLETED BY MISSION TEAM



# REWRITING THE FUTURE

ONE-YEAR MISSION

TO BE COMPLETED BY MISSION TEAM

### 3. THE HIGHCLIFF PROGRAM OPERATIONS

SIGNPOST SLIDE

We will upgrade The Foundation into an organisation that will rapidly keep improving

THE FOUNDATION WILL CREATE THE CONDITIONS TO

- BE A BEACON OF HOPE THAT ATTRACTS THOSE WHO LET US SHINE EVER-BRIGHTER
- TRANSFORM INTO A FULL LEARNING ORGANISATION THAT KEEPS ACCELERATING
- JUMP-START OUR TRANSITION BY TAKING SOME IMMEDIATE FIRST STEPS



## **The Foundation will create the conditions to be a beacon of hope that attracts those who let us shine ever-brighter**

- Priority goal of sustaining growing global media interest in ways that offer highly attractive PR opportunities to our corporate and individual members
- Explicit policy that those members that contribute the most gain access to the best PR and promotional opportunities designed to be attractive to them
- Extensive promotion of members' research achievements on Highcliff Program
- Extremely easy ways for commercial and academic bodies to trial cutting-edge hi-tech in a high profile setting that showcases their research
- Major push by members to recruit key peer organisations using social dynamics similar to those used for Band-Aid and Live-Aid
- Strong focus on pioneering (and newsworthy) hi-tech that although expensive will – by Moore's Law or Economies of Scale – be affordable within the decade

## The Foundation will create the conditions to transform into a full Learning Organisation that keeps accelerating

- A comprehensive living document of the Highcliff Program
- Creative tension between our shared aspirations and our current reality
- Permeable boundaries, flexible resources and minimal rules
- As much as possible made Open Source
- Willingness to reset prior research if to do so offers longer-term major gains
- HAL as repository for all Foundation research, learning, and data archive
- Human-Centric AI applied to HAL and to all Foundation research
- Ecosystem of diverse members like instrument sections in a jazz band that are encouraged to improvise within agreed themes but follow the conductor
- **The Foundation will maintain a network of researchers rather than a hierarchy – but Mission and Program Enablers will have unique roles**

## The Foundation will maintain a network of researchers rather than a hierarchy – but Mission and Program Enablers will have unique roles

|                         |  |                      |
|-------------------------|--|----------------------|
| <b>MISSION TEAMS</b>    | The Foundation is a meritocracy in which we recognise that hierarchies within member organisations may not be valid within our Mission Teams; at different times, on different topics, <i>anyone</i> may find themselves taking the lead. Representatives of each Mission meet to review progress.                   | Meeting every Monday |
| <b>MISSION ENABLERS</b> | Mission Enablers have the responsibility to do whatever it takes to create the conditions in which their Mission Team can best succeed. As such, they will tend to have a senior role in the organisation with most ‘skin in the game’ for that Mission. They meet to align and facilitate overall progress.         | Meeting every Friday |
| <b>PROGRAM ENABLERS</b> | Peter and Jerry (as Chief Scientist and Director of AI) are <i>ex officio</i> Program Enablers facilitating all the Program. A very few others – typically top executives of megacorporations able to make strategic decisions <i>and</i> influence their peers elsewhere – work with them to do whatever is needed. | Meeting as needed    |



# THE HIGHCLIFF PROGRAM

## MISSION ENABLER/S

<Name1> (for xxxx)

<Name2> (for yyyy)

<Name3> (for zzzz)





# PERSONALISED AI

## MISSION ENABLER/S

<Name1> (for xxxx)

<Name2> (for yyyy)

<Name3> (for zzzz)



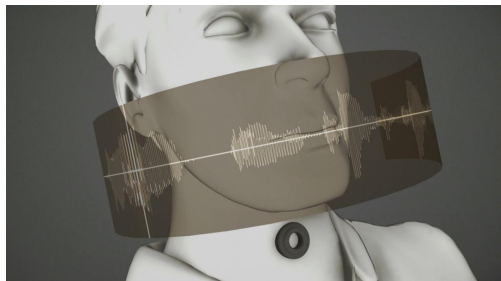
# LIBRARY 2050

## MISSION ENABLER/S

<Name1> (for xxxx)

<Name2> (for yyyy)

<Name3> (for zzzz)



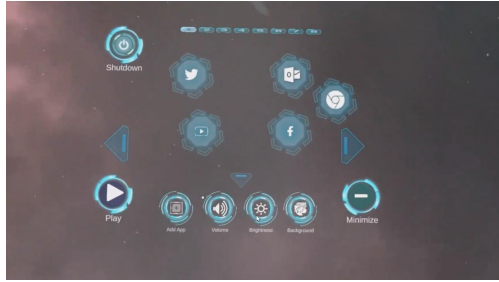
# HAL INFRASTRUCTURE

## MISSION ENABLER/S

<Name1> (for xxxx)

<Name2> (for yyyy)

<Name3> (for zzzz)



# INTELLIGENT ENVIRONMENT

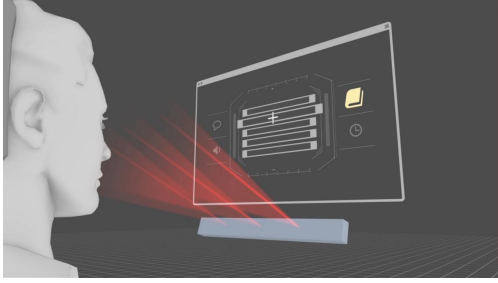
## MISSION ENABLER/S

<Name1> (for xxxx)

<Name2> (for yyyy)

<Name3> (for zzzz)





# 24/7 COMMS

## MISSION ENABLER/S

<Name1> (for xxxx)

<Name2> (for yyyy)

<Name3> (for zzzz)



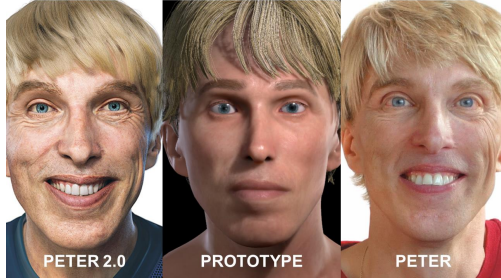
# VERBAL SPONTANEITY

## MISSION ENABLER/S

<Name1> (for Text Generation)

<Name2> (for Real-Time Conversation)

<Name3> (for Intelligence Amplification)



# PERSONALITY RETENTION

## MISSION ENABLER/S

<Name1> (for xxxx)

<Name2> (for yyyy)

<Name3> (for zzzz)



# ALL-ACCESS PASS

## MISSION ENABLER/S

<Name1> (for xxxx)

<Name2> (for yyyy)

<Name3> (for zzzz)





# VIRTUAL LIBERATION

## MISSION ENABLER/S

<Name1> (for xxxx)

<Name2> (for yyyy)

<Name3> (for zzzz)



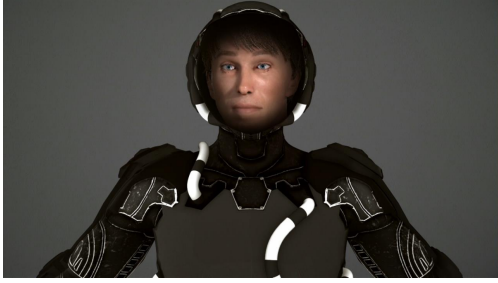
# ROBOTIC MOBILITY

## MISSION ENABLER/S

<Name1> (for xxxx)

<Name2> (for yyyy)

<Name3> (for zzzz)



# PARTIAL EXOSKELETON

## MISSION ENABLER/S

<Name1> (for xxxx)

<Name2> (for yyyy)

<Name3> (for zzzz)



# REWRITING THE FUTURE

## MISSION ENABLER/S

<Name1> (for xxxx)

<Name2> (for yyyy)

<Name3> (for zzzz)



THE FOUNDATION WILL CREATE THE CONDITIONS  
TO JUMP-START OUR TRANSITION BY TAKING SOME  
**IMMEDIATE NEXT STEPS**

SIGNPOST SLIDE



## IMMEDIATE NEXT STEPS



# IMMEDIATE NEXT STEPS

## 1. INTERNALISE PROGRAM

- Read thoughtfully
- Make a difference
- Be imaginative
- Commit Enablers

## 2. GET GOING

- Start working
- Align best fits
- Ease/Impact
- Highlight shortfalls
- Enrol others

## 3. REFINE PROGRAM

- Three-year missions
- One-year missions
- Within the decade
- Integration
- Keep improving



# 1. Internalise Program

## Read thoughtfully

- Circulate widely
- Circulate to extra people if you find they may have something to contribute
- Most readers will focus on the details of only a few sections

## Make a difference

- Which Missions can you transform?
- Where are the strongest areas of fit technologically with your organisation?
- Where are the strongest fits in terms of corporate image and PR?
- Where are the strongest fits in terms of corporate responsibility?
- Where are the overlaps of technology, PR, and altruism?



# 1. Internalise Program

(continued)

## Be imaginative

- Which areas is your organisation strong on that are aligned with The Highcliff Program, are currently missing, but could usefully be added?
- What other organisations have strengths that would fit?
- How could we be opportunistic by refining The Program to fit an existing body of heavily-funded research? Even if it means undoing some work?
- Who do you know that could make a difference?

## Commit Enablers

- Who are most appropriate to be Mission Enablers?
- Who has the best chance of being a successful Program Enabler?





## 2. Get Going

### Start working

- We need to begin practical research ASAP – avoid Analysis Paralysis
- Management systems need only be Good Enough – we will rapidly learn how best to improve them by trialling on real rather than abstract issues

### Align best fits

- Based on the capabilities and aspirations of Foundation members we have to carve up the overall Program
- Pragmatism trumps everything else
- One or more corporations can dominate – but the greater the dominance (with associated PR prominence) the greater the commitment must be
- Based on heavy consultation the final decision is by Jerry and Peter



## 2. Get Going (continued)

### Ease/Impact

Each Mission that is operational should prioritise where to focus resources based on an informed assessment of Ease and Impact





## 2. Get Going (continued)

### Highlight shortfalls

- Where are there glaring gaps in our expertise or resources?
- Where can we cope but are slow because of resource constraints?
- Where are we following an approach because of our history but a non-member has a superior approach?
- Where could we make a quantum leap if we were courageous enough to learn from our past research and start afresh?

### Enrol others

- Which Enablers have the greatest chance of success?
- Would an unprecedented multi-corporation approach work best?
- Think how Band-Aid and Live-Aid worked – and replicate that dynamic...



## 3. Refine Program

### Three-year missions

- Based on early work all Missions should optionally propose refinements
- Changes should improve Impact within 3 years (or, unusually, longer)

### One-year missions

- Based on medium-term goals all Missions should detail their work plans
- Of course we must remain dynamic but all 12 Missions are interdependent so our work plans are commitments to every researcher relying upon them

### Within the decade

- We may see exciting ways to enhance our moonshot goals
- These should always be *more* ambitious – never less!





# 3. Refine Program

(continued)

## Integration

- As in software engineering we have simple team interfaces (which is why the Missions are as they are) but ultimately all our work must fit together
- One or more organisations may explicitly take on the role of integrating all the Missions – but each Mission is also responsible for alignment

## Keep improving

- We must remain inherently flexible – but fundamentally coherent
- From the start we should create the Program as part of an IT-intensive virtual Learning Organisation centred on Highcliff and The Foundation
- We will keep refining and augmenting this Highcliff Pack so it remains the definitive single-source overview of the entire HIGHCLIFF PROGRAM

**Finally, throughout everything,  
always remember....**



# THE FOUNDATION'S PROMISE TO THE WORLD

*By 2030 we will rewrite the future of disability – whether caused by accident, disease or simply 'old age'.*

*We will make the vulnerable SAFE, the powerless STRONG, the unfulfilled THRIVE.*

*We will change perceptions of disability; change the reality of being trapped in an inadequate body; change what it means to be human. For everyone.*

*These statements are not a Vision Statement.*

*They are a Commitment...*