Ultra-secure communication Channel-'Liquidmorphium' Turing Phone

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Abstract: There's no denying that security is a real issue, and that our data isn't safe from prying eyes. Depending on who you are, keeping your digital life secure and private may be more or less important to you. Turing is betting that it will be of vital importance to everyone in the future, even if most are blissfully unaware of the dangers now. That's why the Turing Phone is filled with incredibly futuristic security software and protection. The unfinished software acts as a secure space in which Turning phone users can love their digital lives. It has email, messaging, and even its own social network. The normal Google Android operating system lives beyond the Turing security wall, though, which means you can use the phone like most normal, trusting folk do — if you're not too concerned with privacy and security.Much like security-conscious phones that have come before it, Turing Phone is designed to be the most secure phone ever—both in its hardware and software. Let's start with the former. This phone is made out of liquid morphium, which sounds like a next-level Terminator, but is basically just really strong metal—like 1.5 times the tensile strength of titanium. So dings and dents aren't even a question with this beast.Turing Phone gives you end-to-end encryption and authentication but though an offline private key, which Turing believes, is the most secure communication you can have between two devices. Basically, that means a key is generated and then the master key is stored offline, short of physically capturing the offline server, there's no way your communications can be compromised.

Keywords: *Turing Phone, Cipherphone, Liquidmorphium.*

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I. INTRODUCTION

"A protected communications network that is entirely nsulated from cyber-threats and privacy intrusions. Within this circle of trust, users can exchange sensitive data such as social security numbers or bank wiring instructions and know that the information will reach only the device intended."

"Liquid Morphium" : Let us understand this new term! Most of the smartphones are nowadays opting for metallic look however the outer body of this "Turing Phone" is made up of a combination of zirconium, copper, aluminum, nickel and silver.

The Turing Phone is built with a pioneering material called Liquidmorphium™, an amorphous "liquid metal" alloy tougher than either titanium or steel more resistant to shock and screen breakages. The Turing Phone therefore shouldn't bend or break easily, is much more stronger than steel and hence it gives a super protection to the phone in case it meets with any accidents in the day to day life and it will sometimes appear to have a mirror-like, reflective quality Further, the appearance of this alloy resembles glass,. If you apply enough pressure to the material, it will break, but it will not bend. The material also reflects light very differently from aluminum and stainless steel.

The phone is also covered with a nanoparticle material inside and out, so it's waterproof. When the phone is submerged, water enters the ports on the sides of the phone and covers the circuit board inside. But even the board is covered with the nanoparticle treatment, so water molecules bounce off. So what's in your hand is as strong as your privacy protection.

A common misconception about amorphic alloys is that they are locked in a "liquid state" hence the names "Liquidmetal" and "Liquidmorphium." The company that makes Liquidmetal and Liquidmorphium uses patents and research from CalTech.

The alloy was the end result of a research program into amorphous metals carried out at Caltech. It was the first of a series of experimental alloys that could achieve an amorphous structure at relatively slow cooling rates.Amorphous metals had been made before, but only in small batches because cooling rates needed to be in the millions of degrees per second. More recently, a number of additional alloys have been added to the Liquidmetal portfolio. These alloys also retain their amorphous structure after repeated re-heating, allowing them to be used in a wide variety of traditional machining processes.

Characteristics of liquidmorpium :Liquidmetal alloys contain atoms of significantly different sizes. They form a dense mix with low free volume. Unlike crystalline metals, there is no obvious melting point at which viscosity drops suddenly. Vitreloy behaves more like other glasses, in that its viscosity drops gradually with increased temperature. At high temperature, it behaves in a plastic manner, allowing the mechanical properties to be controlled relatively easily during casting. The viscosity prevents the atoms moving enough to form an ordered lattice, so the material retains its amorphous properties even after being heat-formed.

The alloys have relatively low softening temperatures, allowing casting of complicated shapes without need for finishing. The material properties immediately after casting are much better than those of conventional metals; usually, cast metals have worse properties than forged or wrought ones. The alloys are also malleable at low temperatures (400 °C or 752 °F for the earliest formulation), and can be molded. The low free volume also results in low shrinkage during cooling. For all of these reasons, Liquidmetal can be formed into complex shapes using processes similar to thermoplastics, which makes Liquidmetal a potential replacement for many applications where plastics would normally be used.

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Due to their non-crystalline (amorphous) structures, Liquidmetals are harder than alloys of titanium or aluminum of similar composition. The zirconium and titanium based Liquidmetal alloys achieved yield strength of over 1723 MPa, nearly twice the strength of conventional crystalline titanium alloys (Ti6Al4V is ~830 MPa), and about the strength of high-strength steels and some highly engineered bulk composite materials (see tensile strength for a list of common materials). However, the early casting methods introduced microscopic flaws that were excellent sites for crack propagation which led to Vitreloy being fragile like glass. Although strong, these early batches shattered easily when struck. Newer casting methods, adjustments of the alloy mixtures and other changes have improved this.

The lack of grain boundaries contribute to the high yield strength (and thereby resilience) exhibited. In a demonstration, a ball bearing dropped on amorphous steel bounced significantly longer than the same bearing dropped on crystalline steel

The lack of grain boundaries in a metallic glass eliminates grain-boundary corrosion — a common problem in high-strength alloys produced by precipitation hardening and sensitized stainless steels. Liquidmetal alloys are therefore generally more corrosion resistant, both due to the mechanical structure as well as the elements used in its alloy. The combination of mechanical hardness, high elasticity and corrosion resistance makes Liquidmetal wear resistant.

Although at high temperatures, plastic deformation occurs easily, almost none occurs at room temperature before the onset of catastrophic failure. This limits the material's applicability in reliability-critical applications, as the impending failure is not evident. The material is also susceptible to metal fatigue with crack growth. A two-phase composite structure with amorphous matrix and a ductile dendritic crystalline-phase reinforcement, or a metal matrix composite reinforced with fibers of other material can reduce or eliminate this disadvantage.

Liquidmetal combines a number of features that are normally not found in any one material. This makes them useful in a wide variety of applications.

II. DESIGN

But aside from its crazy-strong materials, the real appeal here is the design (Fig.1,2&3).The result is a future-looking phone that looks more like a scifi movie prop then something you'd actually carry around everyday.You'd think with all that heavy material this phone would be unbearably heavy, but it's actually not too bad and the 5.5-inch full HD screen feels pretty big but no more obtrusive than the screen . Some specs are a little dated, like the Snapdragon 801 processor and the pixel density, but the rear and front cameras are both 13- and 8-megapixels respectively and runs on 3GB of RAM with 16GB, 64GB, and 128GB options.

The only real ergonomic drawbacks are its hard, pointed corners that unmercifully dig into your palm. So yeah...you sacrifice looks for comfort, but that's basically the definition of fashion.

But once you get past the looks, you'll start to notice a few other oddities, specifically what's missing. First, is there is no 3.5-mm jack for headphones. Turing is equipped with bluetooth so your music-listening habits are not completely doomed, but forget about any kind of wires—this is the future we're talking about here. Also, and probably most frustratingly, the Turing Phone uses a proprietary charger, meaning all your useful microUSB cables have no power here. Instead, Turing Phone uses a MagSafe-like alternative because USB is too insecure (which it kind of is). Finally, there's also a fingerprint sensor, but it's actually on the left side of the phone, not bottom center like the iPhone or Galaxy S6. Chao says its more intuitive that way, and he may be right. The placement lined up perfectly with my pointer finger, making logging into the phone less of a weird hand dance. Oh...and it's also crazy waterproof, like IPX8 which is means under 10 feet of water for two hours thanks to nano-coating around the device.

Figure. 1: Design Sample 1

Figure. 2: Design Sample 2

Figure. 3: Design Sample 3

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III. FEATURE

3.1 Security

The first thing ,the Turing phone have is that it uses its own end-to-end authentication system. Every phone manufactured comes with a unique Turing key inside.

What is End-to-End encryption then,

Another stand-out feature is actually one that is ideal for those of you who are protective of your data, as all of it will be encrypted and stored on the device, meaning it'll stay secure. Turing Robotics built its own end-to-end, decentralized authentication scheme (also called end-to-end encryption), which involves a Turing Imitation Key. These keys use a complex system of encryption and are virtually uncrackable by hackers. App developers can get their own Turing key via a Turing API.

It's all kind of complex, but just know that Turing Robotics believes it's encryption is ultra-secure and makes it nearly impossible for malicious hackers to intercept or compromise your messages or sensitive data contained within Turing's own apps (the key is close to unhackable because it’s offline, among otherthings).

Because all Turing keys can recognize each other, it’s possible to establish a secure tunnel between the Turing phone and an ecommerce app, for example. There’s no need to work through a third-party encryption server to establish secure communications and/or transactions.

“A protected communications network that is entirely insulated from cyber-threats and privacy intrusions. Within this circle of trust, users can exchange sensitive data such as social security

numbers or bank wiring instructions and know that the information will reach only the device intended.”

The encrypted data can be exchanged only between the Turing phone users as the pre installed master key allows direct verification of their identities without having to be routed through a Key Distribution Center (which is a part of Cryptosystem).

The company’s goal is to protect its users from Internet supervillians.

“The private key is close to unhackable because it’s always offline, as opposed to the public key infrastructure that imposes a certificate of authority or a private key generator issues a key,” Those were at the root – they’re the poison — of cybercrime.”

The phone’s thick body makes room for a fancy, next-level fingerprint sensor on the side of the device, which adds another level of security to the phone. It’s got a MagSafe charging port that snaps on magnetically, and is more secure than the Micro USB(fig.4) most phone makers use.

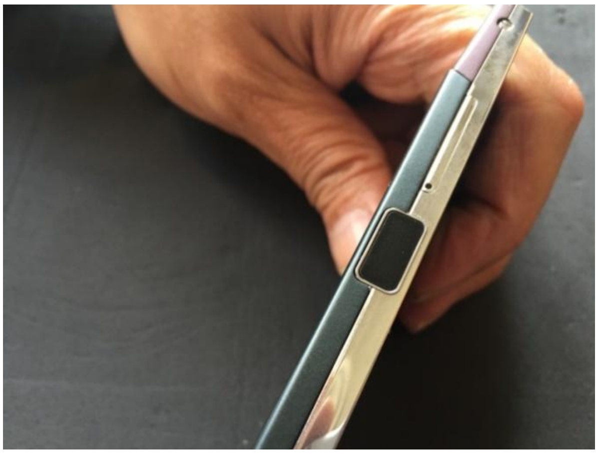

Figure. 4: MagSafe Charging Port

Another innovation is a side-mounted fingerprint reader. My thumb fit over the side sensor far more naturally and ergonomically than it does over the front-bottom mounted sensor on my iPhone"Building trustworthy communications on the mobile internet has been a challenge," said S.Y.L. Chao, CEO of TRI. "Ourvision with the Turing Phone is to help mobile users navigate within a circle of trust. We're beginning with the smartphone and planto rapidlyextend this technology into robotics and other domains linked to the Internet of Things, where security concerns are a huge impediment to innovation."
The Turing Phone also features a revolutionary design that is both tougher than conventional materials and more sustainable from a production perspective. The Turing Phone is molded from a single unit of Liquidmorphium

The Turing phone is covered with a “nanoparticle” material, both inside and out, which makes it waterproof. The phone can even be submerged in water. When the phone is placed underwater, water enters the ports on the side of the phone and covers the circuitboard. But the circuitboard itself is covered with the nanoparticle treatment, which causes the water molecules to simply “bounce” off of it.

IV. SPECIFICATIONS

The Turning Phone (fig.5) doesn't have a headphone jack or even a USB connector, and you charge it with a new plug (Wallaby Magstream) that looks a lot like Apple's MagSafe. It also has a fingerprint sensor.
Other specs include a 2.5GHz Snapdragon 801 chip paired with 3GB of RAM, a 5.5-inch Full HD 1080p display, 13-megapixel rear-facing camera, 8-megapixel front-facing camera, non-removable 3,000mAh battery, integrated NFC chip, Wi-Fi 802.11ac and Bluetooth 4.0 connectivity, built-in GPS/Glonass, and a range of sensors.

Figure. 5: Turning Phone

Also, the phone is fully waterproof due to a nanocoating (Binnacle Ocean Master IPx8), comes with Corning Gorilla Glass IV, and offers micro-SIM. As for the phone's size, it has the following dimensions: 151.80x 77.10 x 9.05mm
It is based on Android 5.1 and allows full access to Google Play and other popular apps.

V. ADVANTAGES

1.The actual production of this Turing Phone facilitates a much greener option as compared to the manufacture of traditional smartphones because it involves less waste.
2.The resultant “metal chassis” not only gives a darker metallic look but it is also much stronger than aluminium and steel.
3.The phone also has a fingerprint reader which helps users to unlock the device.
4.Hackers would have to specifically target your device to crack the Turing code.
High-end specs and special security features make it stand out from the crowd.
5.There is no 3.5-mm jack for headphones. Turing is equipped with bluetooth so your music-listening habits are not completely doomed, but forget about any kind of wires—this is the future we’re talking about here.
6. It’s got a MagSafe charging port that snaps on magnetically, and is more secure than the Micro USB most phone makers use.

VI. FUTURE SCOPE

In the future, as Scientists is studying new ways of using this exciting mobile technology in future devices, including next-gen iPhones, iPads and Macs.

VII. CONCLUSION

The Turing Phone is a revolutionary liquid-metal phone that not only redefines phone engineering, it also paves the way for trustworthy communication.

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