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EDITED BY MATT HAWKINS, FILIP SABLIK, & BRYAN ROUNTREE

## DEDICATED TO MY MUSE JENNI CHEUNG.



image

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$$\oint \vec{E} d\vec{\Lambda} = \frac{1}{z_0} q_{in}$$

$$\oint \vec{B} d\vec{A} = 0$$

$$\oint \vec{E} d\vec{A} = -\frac{d}{dt} \int \vec{B} d\vec{\Lambda}$$

$$\oint \vec{B} d\vec{l} = \mu_0 l_{in}$$

$$\vec{F} = q(\vec{v} \times \vec{B} + \vec{E})$$

$$i = \frac{dq}{dt}$$

$$p_{out} charge$$

$$E = \frac{1}{4\pi \epsilon_0} \frac{q}{r^2}$$

$$V = \frac{1}{4\pi \epsilon_0} \frac{q}{r}$$

$$V = \frac{1}{4\pi \epsilon_0} \vec{r}$$

$$V_{\tau} - V_{\tau} = -\int_{r}^{r} \vec{E} d\vec{s}$$

$$E_{\chi} = -\frac{3V}{3\chi}$$

$$C = \frac{q}{2}$$

$$V_{\tau} = \frac{1}{2} QV = \frac{1}{2} CV^2 = \frac{1}{2} \frac{q^2}{C}$$

$$C = \epsilon_0 \frac{A}{d}$$

$$C = \frac{Q}{V} \qquad V_{E} = \frac{1}{2} Q V = \frac{1}{2} C V^{2} = \frac{1}{2} \frac{Q^{2}}{C}$$

$$R = \frac{V}{I} \qquad P = VI \qquad P = I^{2} R = \frac{V^{2}}{R}$$

$$R = \frac{1}{R}$$
 $P = V_1$ 
 $P = \frac{1}{2}R = \frac{V^2}{R}$ 
 $R = \frac{L}{A}$ 

"SCIENCE IS A WONDERFUL THING IF ONE ROLL THING IF ONE ROLL THING AT IT."

~ALBERT EINSTEIN

M means 10 4 means 10-6

 $\mathcal{E} = -\frac{d\Phi}{dt} \qquad \mathcal{E} = -N\frac{d\Phi}{dt} \qquad L = \frac{|\mathcal{E}|}{|\mathcal{G}|} = \frac{N\Phi}{1}$ 

 $q = q_e e^{-t/T_c}$   $q = CE(1 - e^{-t/T_c})$   $i = i_o e^{-t/T_c}$   $i = \frac{E}{R}(1 - e^{-t/T_c})$ 

 $L = \frac{L}{R}$   $\pi_c = RC$   $\mu = NiA$   $\frac{1}{4\pi\epsilon_o} = 9 \times 10^9$   $\frac{\mu_o}{4\pi} = 10^{-7}$ 

 $u_{E} = \frac{1}{2} \epsilon_{o} E^{2}$   $u_{B} = \frac{1}{2} \frac{B^{2}}{\mu_{o}}$   $U_{B} = \frac{1}{2} L_{1}^{2}$ 

$$\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2} + \cdots$$

$$\frac{1}{C_{eq}} = \frac{1}{C_1} + \frac{1}{C_2} + \cdots$$

$$\frac{1}{C_1} = \frac{1}{C_1} + \cdots$$

$$\frac{1}{C_1} = \frac{1}{C_1}$$

$$\frac{1}{c} = \frac{1}{c}$$































































leaving academia far behind.

Why Think Tank? I want people to like Science. It's awesome and fun and not boring like people think. The idea for Think Tank came to me when I started hanging with some friends from college who had stayed in the science field. I've visited several Think Tanks including RAND and DARPA and have seen only the declassified stuff, but even that is fascinating. Just walking into one of these you feel like you're stepping into the future. I studied science for many years in college and have a few degrees but have only learned to love it recently, many years after

I'm not quite as smart as David Loren, but this character has a lot of me in it. I've always been interested in people who are conflicted and I feel that way myself all the time. With David we have a guy who loves what he does, but is troubled by how his creations are used. I would love to write about this character for 100+ issues but that all depends on whether I can find an audience for the book so if you like it please tell a friend! I love to hear from readers directly so feel free to pester me on:

#### Twitter @topcowmatt

Facebook Matt Hawkins (both actual and "likeable" author page)

Google + Matt Hawkins (for all you Google employees)

Warning; if you are easily offended you may want to pass, as I tend to speak my mind on these.

Anyway, wanted to give some thoughts and commentary on why I did some of what I did here and how a lot of it is based on real science. I'm happy to answer some questions in the back pages of future issues so hit me up!







### Predator MQ-9 Reaper (Drone)

Featured on this issue heavily is the Predator MQ-9 Reaper, the current workhorse of the Air Force and the one you see predominantly on those *YouTube* videos. The interesting thing about this Reaper is it's based on designs from over 15 years ago. What they have now is far more insidious! The Drones were originally exclusively used for reconnaissance but very quickly adopted weapons systems. Drone technology is getting smaller and smaller. Remote control bullets with facial recognition software are just around the corner. Pretty soon, if not already, they'll have insect sized Drones that can be remotely controlled and flown under doors or through small cracks in windows. The applications are endless. My father was in the Air Force and I will never forget when I was a kid he told me that the payload storage compartment on the top of the Space Shuttles was conveniently sized so that it could also hold an ICBM nuclear missile. I've never thought of the Space Shuttles as being weaponized, but you can see the potential.

#### CED

The Think Tank lab's corporate name is CED. I had a nice reason for calling it that, but I couldn't find it in my notes so I'll have to make something up by the next issue or so.

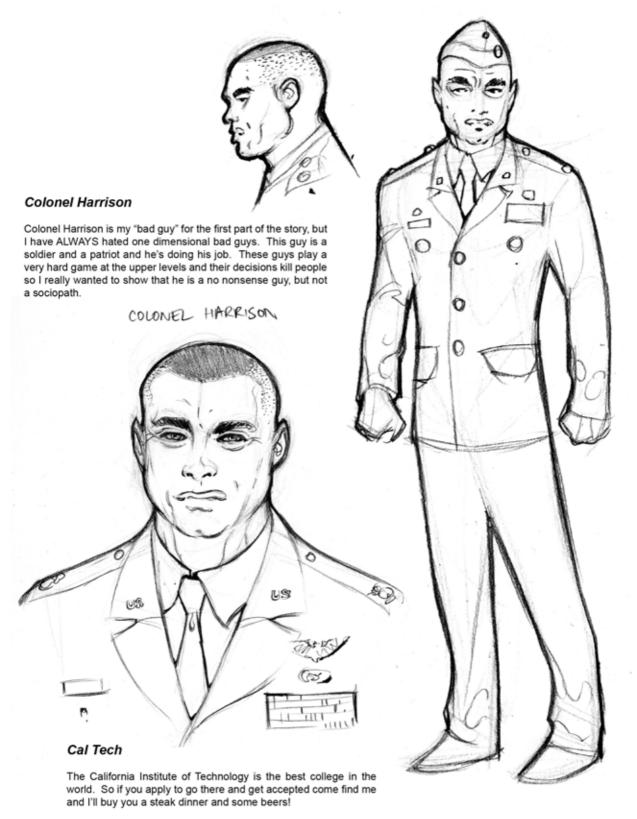
#### DARPA

DARPA is a real thing. Some of the stuff they do is pretty amazing and scary as hell. Google "DARPA" and scroll through and watch some of what pops up. First time I did that I lost a whole weekend. Also, the idea of Colonel Harrison is that most of these government funded labs are supposed to be autonomous of the military but they really aren't. Most of these military contractors ONLY make goods for the military so, as their one and only customer, the military basically "supervises" them. The DARPA wish list exists by the way, and it's pretty scary.

#### Think Tanks

Think Tanks are full of wonderfully smart men and women who are socially awkward and don't always leave their offices/labs for months at a time. I spoke with a guy last summer who admitted to me that he had not been to his house in almost 6 months. These people are either pure or applied researchers. The applied researchers tend to be more "normal people" and are often married with children, etc. Pure researchers are off in Never Never Land and are the ones I'm talking about. The easy way to explain the difference is that Applied research has a specific purpose, like an AIDS vaccine, and pure research has no specific goal other than curiosity or expanding knowledge. Pure research leads to Applied research. Physicists are





Running out of space for this issue – will continue in next but let me just leave you with the thought that, although I've taken some creative license, all of the technology in this book is possible now based on current technology. I'll get into the science of the surface though reader more next issue, I hope you'll come back for it.

Thanks for reading!

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