Why Bad Movie Science is Good for you!
BUNK WARS 7: THE DEBUNKING AWAKENS

BUNK WARS 8: THE LAST DEBUNKING

BUNK WARS 9: THE RISE OF REBUNKING
BUNK WARS 7: THE DEBUNKING AWAKENS
The images and facts in that first monologue seem to have a lot of errors?
The meteors take 15 seconds to get from first detection to impact, and you want to scramble jets after them?
That map shows Mars and Venus side by side, isn’t there a planet missing?
How do you plan to use Hubble to monitor this object?
“97.6…” what, and how does that map to being the size of Texas?
Saying “nothing would survive” is a touch over the top, I think bacteria would be okay?
If there is only 18 days until impact, why didn’t anyone spot this sooner?
Would a nuclear blasts actually change the direction of an asteroid?
If this was a rouge comet intersecting asteroid belt, would that explain the companion objects?
Would the impact “flash boil million gallons of water”?
How big and object would be required to create the “3 mile high tidal wave, traveling 22000mph, covering California” claimed?
If the objects is 1000km across, does that make it a rouge planet?
Could the Sun have masked it’s approach?
Is that really big enough to incinerate ⅓ of the worlds population?
Is the object size the halo or nucleus, and how does it compare to the Rosetta images?
Given the size and proximity of the object surely more than 9 telescopes can see it at this point?
At least the NASA chamber is real!
If they want to split and deflect it in 10 hours, what is the change in momentum needed?
How would drilling 80 feet on a 1000km object to crack it?
What do they mean by “Hard Iron-Ferrite”?
Could the fragments are moving at 30000mph?
Since when are the French Space Agency such a major player?
Were they correct in transferring control to Houston as soon as the shuttle clear the tower?
Isn’t detaching the boosters simultaneously and that close together a really bad idea?
What is going on with that Shuttle flight pattern?
Did anyone spend 18 months alone on MIR?
How did MIR use it’s rockets to simulate gravity?
Are those pipes really safe to move liquid O2?
Does that space station layout make any sense?
Why did that explode, and how?
Did they really get 90% of the fuel that quickly, and with all that going wrong?
Are they using VLA for as a communication array?
What is the shape of the object meant to be?
How do they know they overshot the landing site?
How is there a fire in a vacuum
What are those spikes meant to be?
How does the iron-ferrite detector work?
Why do they seem to be drilling at 45° angle
How and why would you use a Russian shuttle as a relay?
Does hitting a nuke have any chance of setting it off?
Why is there a pair of shades in a space suit?
Who though the extra weight of the Skull and LED gear stick was worth it?
Does jumping the rover remind anyone else of Phile’s landing
Why are there so many mini-guns?
What do they mean “He’s got space dementia”?
What the is the space wind meant to be?
Would the Paris impact not be a planet killer impact?
How is there methane pockets on this?
Why is there condensation in the space suit?
What is this made of that the rocks are explosive?
Did NASA really have time to made fancy graphics to show the end of the world?
Is that really an appropriate way to fix high precision equipment?
Is it raining on the object?
Why does it blow up like the Deathstar?
Did they really have jets ready to do an emergency flyover when landing?
HOW SCARY IS A ROCK FROM SPACE?
CHELYABINSK 2013
(20m)
METEOR CRATER ~50,000 YEARS AGO (100m)
SIMULATIONS TIME

(1KM)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
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<tbody>
<tr>
<td>Crater depth</td>
<td>158 m</td>
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<tr>
<td>Crater width</td>
<td>743 m</td>
</tr>
<tr>
<td>Burst altitude</td>
<td>2,644 m</td>
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<tr>
<td>Break-up altitude</td>
<td>75,085 m</td>
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<tr>
<td>Wind velocity</td>
<td>10 m/s</td>
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<tr>
<td>Richter magnitude</td>
<td>0</td>
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<tr>
<td>Sound pulse amplitude</td>
<td>72 dB</td>
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</table>

Click the map to place the crater...

http://education.down2earth.eu/
SIMULATIONS TIME
(1 KM)
FANCIER SIMULATIONS TIME
(1KM)
SO, HOW BIG IS THIS THING?
SO, HOW BIG IS THIS THING?
SO, HOW BIG IS THIS THING?
SO, HOW BIG IS THIS THING?
WHEN WOULD YOU SEE IT?
WHEN WOULD YOU SEE IT?
WHEN WOULD YOU SEE IT?
WAIT, HOW BIG IS THIS THING?
BUNK WARS 8: THE LAST DEBUNKING
Crater Width = 83km
Crater Depth = 2.1km

Trough Width = 2km
Trough Depth = 0.6km
Helium-3
83 Tonnes of $^3\text{He}$ per year to power current world demand. Lunar industries provides 70% of this = 58.3 tonnes

Transport cylinder volume = 31,416 cm$^3$

Liquid helium density = 0.125 g/cm$^3$

$\Rightarrow$ 4kg of $^3\text{He}$ per cylinder

14,846 cylinders per year, 41 per day

464,800 litres per year, 1/5 swimming pool!
Harvester Width = 58m
The Estimation of Helium-3 Probable Reserves in Lunar Regolith – E. N. Slyuta et Al. 2007

<table>
<thead>
<tr>
<th>Station</th>
<th>$^{3}$He abundance, ppb</th>
<th>Estimated regolith thickness, m</th>
<th>Region, Category</th>
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</thead>
<tbody>
<tr>
<td>&quot;Apollo-11&quot;</td>
<td>15.1</td>
<td>4.7; 4.6; 4.4</td>
<td>Mare region, Category I</td>
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<tr>
<td>&quot;Apollo-12&quot;</td>
<td>7.1</td>
<td>3.7; 4.6; 5.3</td>
<td>Mare region, Category II</td>
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<tr>
<td>&quot;Apollo-14&quot;</td>
<td>5.7</td>
<td>8.1; 8.5</td>
<td>Mare region, Category III</td>
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<tr>
<td>&quot;Apollo-15&quot;</td>
<td>4.4</td>
<td>6.0; 4.4</td>
<td>Mare region, Category III</td>
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<tr>
<td>&quot;Apollo-16&quot;</td>
<td>1.4</td>
<td>10.1; 12.2</td>
<td>Highland region, Category IV</td>
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<tr>
<td>&quot;Apollo-17&quot;</td>
<td>8.0</td>
<td>7.0; 7-12; 8.5; 6-8</td>
<td>Mare region, Category II</td>
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<td>&quot;Luna-16&quot;</td>
<td>7.9</td>
<td>4.0; 4.0; 1.0-5.0</td>
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<td>&quot;Luna-24&quot;</td>
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<td>2.0; 2.0-3.0; 3.9</td>
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</table>

13,250,000,000 tonnes of regolith

1,104.17 km² per year to meet quoted level

Cut of 58 m wide, 1 m deep = 2.03 mph
BUNK WARS 9: THE RISE OF REBUNKING

FLASH GORDON
FLYING BRIAN
FLYING BRIAN

Wingspan vs Mass

Mass (kg)

Wing span (metres)
Dear Brian,

There is no easy way to ask this, but how much did you weigh in 1980?

Our apologies if this seems a somewhat unexpected question to be asked by folk from the Royal Observatory Edinburgh, but there is a tremendously humorous reason for such silly speculations: honestly!

We three astronomers are currently showing some jelly little films about the imaginative ways in which space might kill all of humanity. We show the film at a local cinema (the renowned Camera in Edinburgh) and then give a wee talk about the scientific ideas it raises. Thus far we have considered jelly aliens attacking us in 1953’s War of the Worlds and a preposterously large mole careening our way in Armageddon. On July the 6th, we will be considering that brush with death inflicted upon us by dear old Emperor Ming. And then, yes, we really are going to (try and) discuss their science of the film!!

One of the things we’re not sure about is whether your wings were large enough to keep you aloft? Please note that we certainly aren’t questioning the scientific accuracy of the film, we plan to show that of course you could have flown, but perhaps the gravity might have needed to be a tad different to make it possible! However, to make this calculation it would be terribly useful to know how much you weighed when the film was made.

If you were willing to tell us, it would clearly be rather awesome.

Royal Observatory Edinburgh, Blackford Hill, Edinburgh. EH9 3HJ. Tel: 0131 66 88 100
FLYING BRIAN

Wingspan vs mass

Mass (kg) vs Wing span (metres)

Graph showing the relationship between mass and wing span for different animals.
HOW DOES THEIR WORLD WORK?
OPTION 1: PARALLEL UNIVERSE?
OPTION 2 : PLÁNETÁRY NEBULÁ
OPTION 3A : IN A GAS GIANT
OPTION 3B : NEAR A GAS GIANT
LESS GRAVITY, MORE FLOATING
What did we learn from all this?

• Basic Debunking: Easy to do, lots of examples out there.

• Advanced Debunking: Bit more involved, do some maths.

• Rebunking: A lot of fun, good way to explore advanced concepts
www.roewhatsup.blogspot.com
Twitter: @auldreekieastro
Facebook: Auld Reekie Astro

www.roe.ac.uk/vc
Twitter: @RoyalObs
Have we got time left?
EXPLOSION TOO BIG
EXPLOSION TOO BIG
THEY ARE ALL ON DIFFERENT APPROACH ANGLES
WHAT IS THIS A MAP OF?
 THAT ISN’T HOW HUBBLES SOLAR PANELS ARE LAID OUT
THESE ARE FOR ASTRONOMY NOT SPEAKING TO SPACECRAFT (OR ALIENS)
WHAT PURPOSE DOES THIS BURNER SERVE?
WHAT HAS HE CIRCLED?
SHIP 1 NEARLY KILLS SHIP 2 WITH IT’S BOOSTERS
SPACE SHIPS DON'T FLY LIKE JETS

THIS ISN'T MIR
YOU’RE THRUSTING THE WRONG WAY
YOU’RE THRUSTING THE WRONG WAY ... AGAIN
NO RETRO ROCKETS OR BRAKES?
A 500mph landing on skids is called a crash.
YOU HAVE SKIDS AND WHEELS?
“WE ARE NOT HAVING GRAVITY”
YOU DINNAE GET ICICLES IN SPACE
THIS ISN'T WHAT IT LOOKS LIKE
BITS SHOULDN'T BE "FALLING"
THE NUMBERS ARE WRONG (WE CHECKED)
WHY ARE THEY DRILLING AT 45°?
WHY IS THERE A GATLING GUN ON THE ROVER?
THIS MUCH OIL AND FIRE?
HOW DOES MILITARY GUY 8 KNOW HOW TO NASA GUY 5’S JOB?
NASA HAS A FAR BETTER GENDER BALANCE THAN THIS
WE ALL HATE ANIMAL CRACKERS