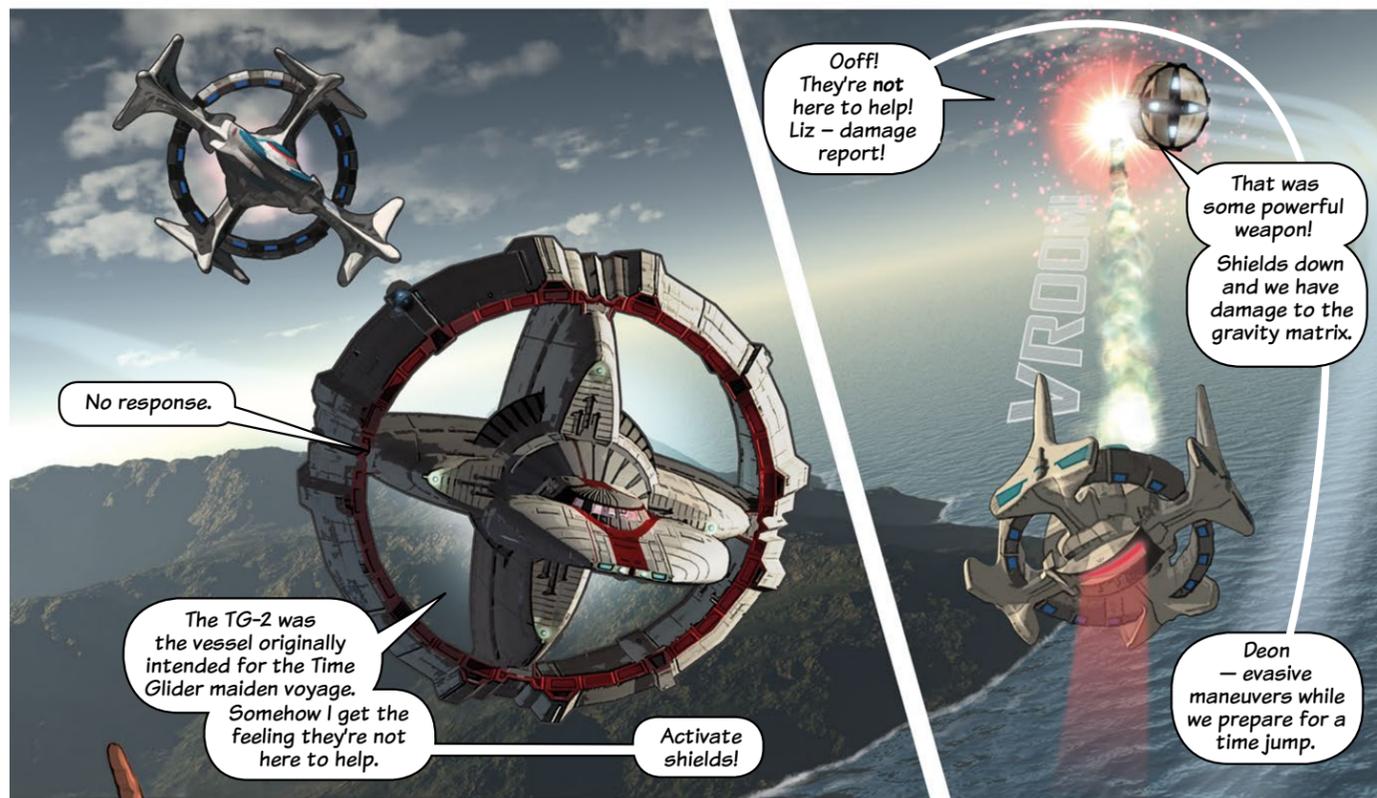




The TG-2? But that is Mr Wang's vessel!

Hail them - all channels open.



No response.

The TG-2 was the vessel originally intended for the Time Glider maiden voyage. Somehow I get the feeling they're not here to help.

Activate shields!

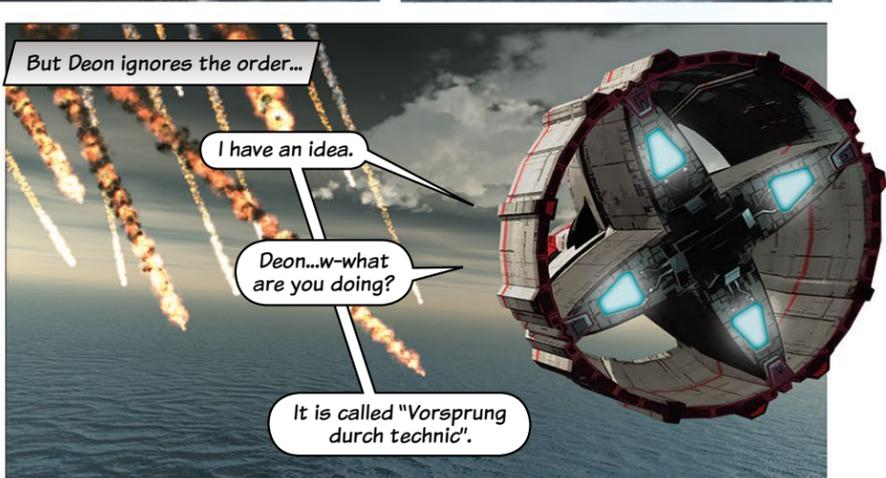
Ooff! They're not here to help! Liz - damage report!

That was some powerful weapon! Shields down and we have damage to the gravity matrix.

Deon - evasive maneuvers while we prepare for a time jump.



Blast! And now we're in for more trouble. Deon, avoid that meteor shower dead ahead.



But Deon ignores the order...

I have an idea.

Deon...w-what are you doing?

It is called "Vorsprung durch technic".



I'm gonna lose this parasite behind us. Hang on!

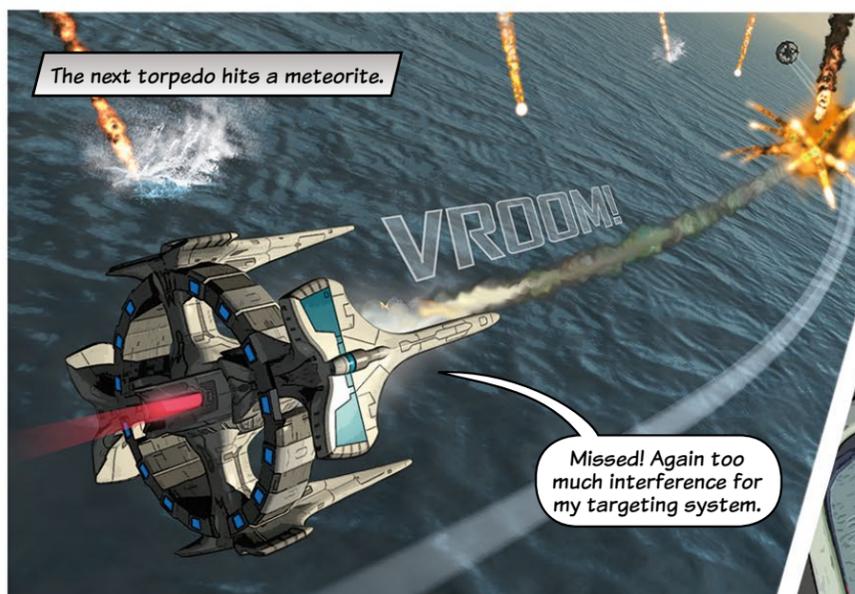
"Vorsprung durch..." what? Don't be a fool, Deon!



You'll get us all killed!!

Well, we're busy losing him, aren't we?

Err... yes, but it looks like he's trying to find a way around the meteor shower.



The next torpedo hits a meteorite.

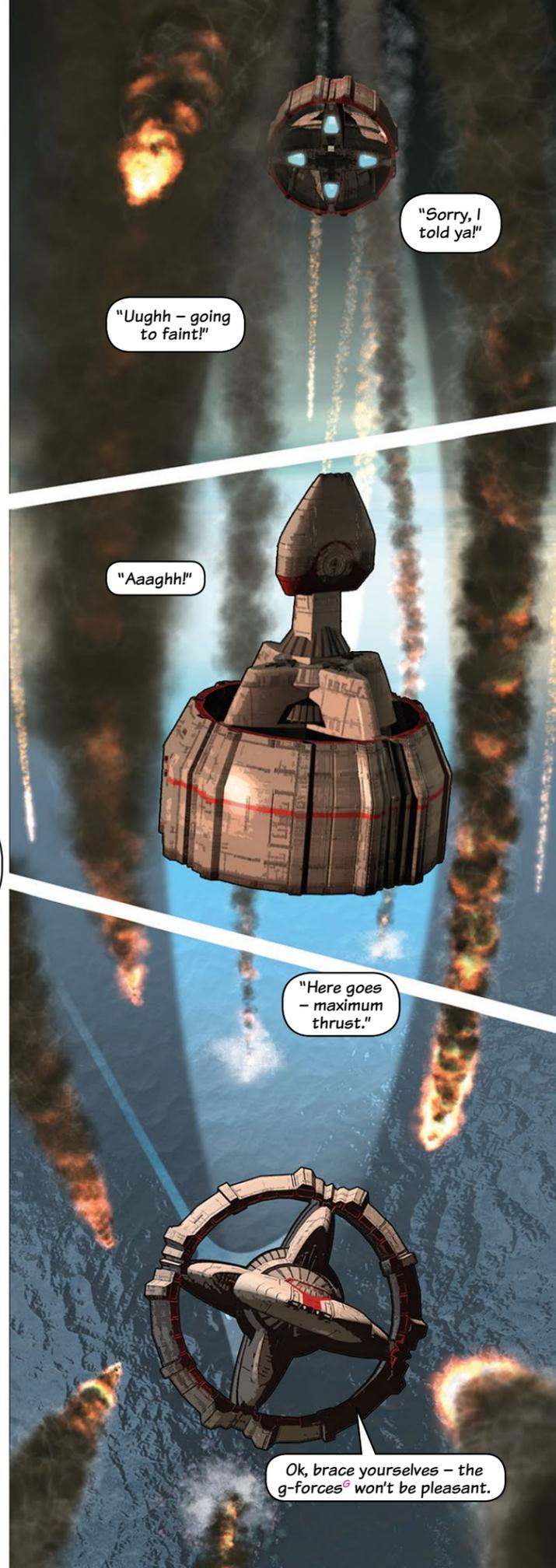
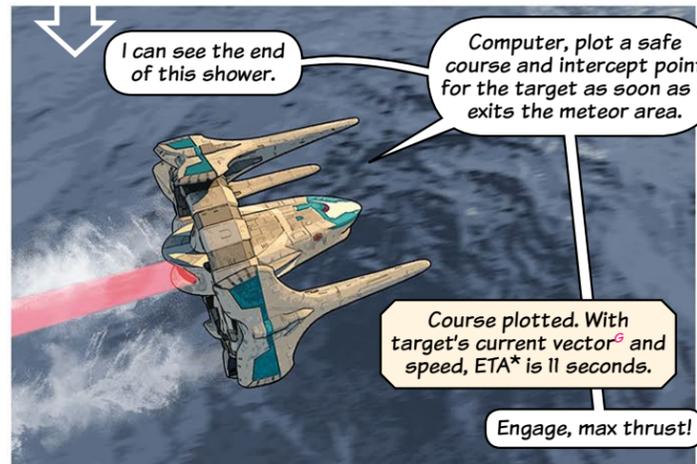
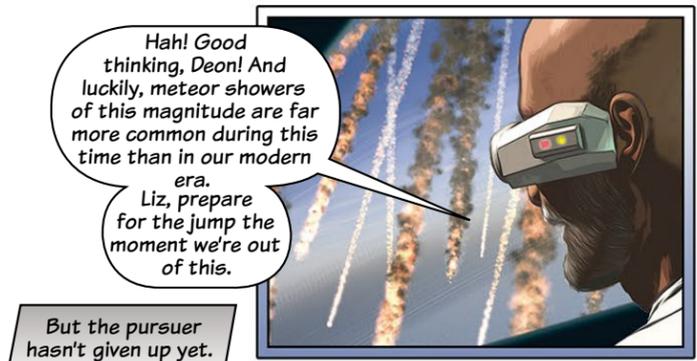
VROOM!

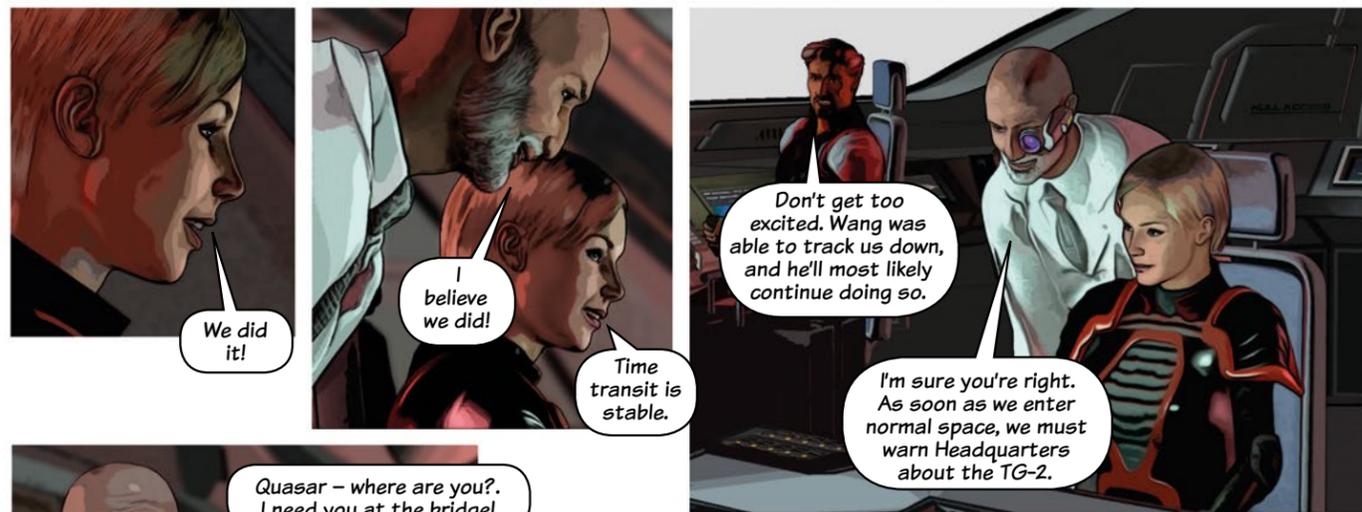
Missed! Again too much interference for my targeting system.

Deon, forgive me for judging you too soon!

If Branco's inside that vessel, as I suspect, I knew he wouldn't follow.

He's an engineering genius - but a lousy flyer. And he knows it!





# G L O S S A R Y

**Antimatter** - Matter composed of subatomic particles that have properties opposing that of normal subatomic particles. Antimatter is the opposite of normal matter. A particle and antiparticle has the same mass but opposite electric charge. When they collide, they annihilate each other and release energy.

**Black Hole** - An extremely dense region in space in which the gravitational field is so strong that not even light can escape its pull. At its centre lies a singularity - an infinitely small and dense point in space-time. Here, normal laws of physics break down. The Big Bang started with a singularity.

Albert Einstein's theory of general relativity predicted the existence of black holes, although he resisted the idea! Black holes have been indirectly detected by, for instance, their gravitational effects on neighbouring stars.

**Coalesce** - To come together to form one mass or whole.

**Cretaceous Epoch** - Following the Jurassic epoch, in geologic time, this is a period that began 145.5 million years ago and ended 65.5 million years ago with the mass extinction of the dinosaurs.

**Doppler Effect** - An increase or decrease in the frequencies of sound or light waves as their source and the observer move closer or further away from each other. This is especially noticeable in the change of pitch in a passing siren. The light spectra from distant stars or galaxies moving away from us, shift towards red. If they move towards us, it shifts to blue.

**General Relativity** - A well-established theory of physics that has been confirmed experimentally regarding the relationship between space, matter, energy and time. Published in 1916, Einstein expanded upon his special relativity theory of 1905, which had reconciled the physics of moving bodies developed by Galileo and Newton with the laws of electromagnetic radiation. It implied that space and time are intertwined (from there the term "space-time") and that the speed of light is constant irrespective of the observer's motion that measures it.

General relativity included gravity and Einstein used the mathematics of geometry to relate the geometry of space-time to the amount of energy that it contains. Matter does not simply pull on other matter in space (as Newton thought), but rather distorts (or warps) space-time, which in turn affects matter. The amount of distortion is determined by the density of an object. This effect explains gravity - the force of attraction between objects that includes all celestial bodies like planets and their moons that orbit stars.

**Genus** - A group of related animals or plants used in biological classification (also called taxonomy) that includes several or many different species.

**G-forces** - Anything with mass that is under acceleration experiences an increased perception of weight. It is produced by mechanical force and not

gravity. The g-force that an object experiences is due to the vector sum of all forces (except gravity or electromagnetism) acting on its freedom to move. These are also called surface-contact forces between objects, causing stresses and strains on them, and can be measured with an accelerometer. In aviation it is commonly measured in "g" to describe the increased forces that pilots must overcome to remain conscious. For instance, a jet fighter pilot must be able to sustain up to 9 g's which is 9 times their body weight pushing against the side of the cockpit or canopy!

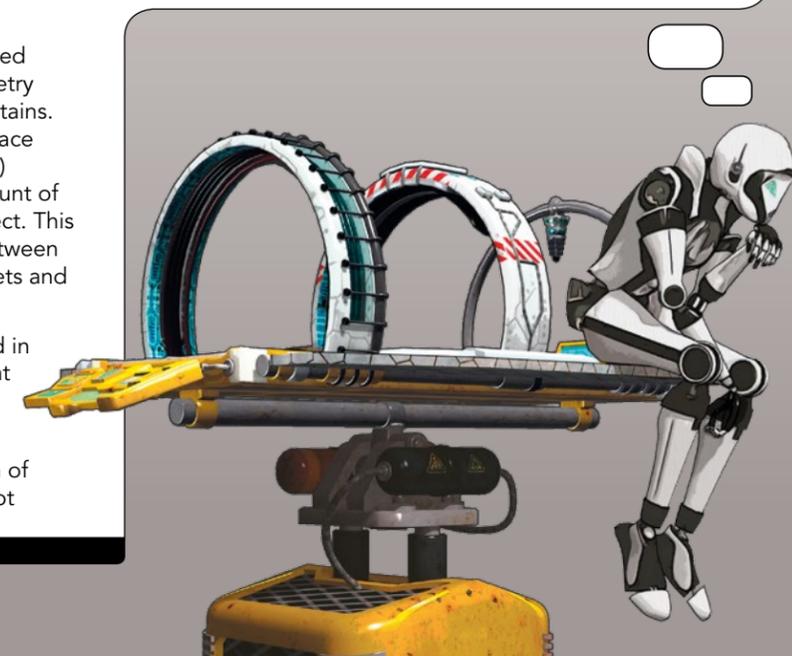
**Inflation** - The theory of the exponential expansion of space in the early universe lasting from  $10^{-36}$  to sometime between  $10^{-33}$  and  $10^{-32}$  seconds after the Big Bang.

**Inertia** - Isaac Newton's first law of motion; it refers to the resistance of an object to any external force to its state of motion (whether it is moving or stationary). If too much of an external force is applied too quickly, its structure may be damaged or it can be thrown off-balance.

**Laws of Physics** - Mathematical equations that describe the behaviour and motions of things in nature. These laws are based on repeatable scientific experiments and observations, and are universal (i.e. they appear to apply throughout the Universe). There are two categories for these laws: classical physics that deal with the observable world and atomic physics that describe the interactions between elementary and sub atomic particles (see "particle").

**Neural** - Generally refers to the nervous system, the part of an animal's body that transmits electric signals and coordinates actions between its body parts. Vertebrate species with a backbone or spinal column, have two parts - the central nervous system (CNS) that contains the brain and spinal cord, and the peripheral nervous system (PNS) - connected nerves that reach to every part of the body.

Neural design principles are being replicated in computer science, because artificial neural networks



# G L O S S A R Y

(ANNs) hold promise for self-learning (instead of programming). This is the future for artificial intelligence.

As you might have guessed, Quasar's ANN has a specialized interface in one of his fingertips, enabling him to connect with biological neural networks as well! This feature makes the Time Glider team somewhat uncomfortable, with Prof Patel eager to find out if it was part of Quasar's original design.

**Particle** - An extremely small portion, piece or fragment of a larger object (see "subatomic particles").

**Plate Tectonics** - A scientific theory describing the large-scale motion of plates under Earth's crust and upper mantle. Where the plates meet, their relative motion may cause earthquakes, volcanic activity, mountain forming and oceanic trench forming. The concept of continental drift (i.e. how the Earth originally had one super continent that split over time into all the main continents of today), builds on this model.

**Protoplanetary Disk** - A rotating circumstellar disk of dense gas surrounding a young newly formed star. "Proto" means "before", thus implying that planets are yet to form.

**Quantum Physics** - Describes in mathematical format the behaviour of atoms and subatomic particles (see "subatomic particles"). It even explains nuclear fusion processes inside stars.

**Quetzalcoatlus** - A flying reptile that existed 220-65 million years ago. It had an estimated wingspan of 30-35 feet (the size of a typical World War 2 fighter aircraft!).

**Radiometric Dating** - Also termed radioactive dating, this is a technique to determine the age of Earth materials such as rocks or objects of organic origin (that contain carbon). Radioactive elements have different established decay rates, so the amount of a decaying element that is left in a material can help determine its age.

There are various dating techniques - each relevant for a specific type of material or situation. Some of the common ones are: Carbon-14, Uranium-lead, Potassium-argon, Uranium-thorium, etc.

**Sauropods** - Dinosaurs that had very long necks, long tails, small heads in comparison to the rest of their body, and thick, pillar-like legs. They are notable for their enormous sizes. Other well-known sauropods are Apatosaurus, Brachiosaurus and Diplodocus.

**Solar Nebula** - Our solar system began forming within a cloud of interstellar dust and hydrogen gas. The cloud contracted under its own gravity and our Sun formed in the hot dense center. The remainder of the cloud formed a swirling disk called the solar nebula, out of which planets, moons, etc. formed.

**Subatomic Particles** - The smallest units of matter, smaller than atoms but without the chemical properties of the atom. There are many different types such as electrons, protons, and neutrons.

**Supernova** - a stellar (or solar) explosion that can briefly outshine an entire galaxy, before fading from view over several weeks or months.

**Tachyon particle** - A hypothetical subatomic particle that always moves faster than light. Physicists like Albert Einstein and Richard C. Tolman noted that if faster-than-light particles existed, general relativity implied that they could be used to communicate backwards in time.

**T-rex** - Tyrannosaurus Rex, "king of the dinosaurs". One of the largest meat eating dinosaurs of the Cretaceous epoch, measuring 12 meters (40 feet) and weighing 4-7 tonnes. It has been outclassed in terms of size by newer fossil finds such as Spinosaurus and Giganotosaurus.

**Troposphere** - The lowest portion of Earth's atmosphere, extending up to altitudes ranging between 11-12 miles (17-20 km). Here, all weather takes place.

**Vector** - A quantity possessing both magnitude and direction. It may also be used to indicate a "trajectory", the course followed by an airplane or missile.

**Wormhole** - These are hypothetical "bridges" or shortcuts in the structure of space-time that potentially link parts in the universe that are far apart. Einstein's theory of general relativity (see "General Relativity") predicted this phenomenon.

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