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Video Podcast **Episode 7: Uncovering the Veil Nebula** **Supernovae – exploding stars** **Dropping the veil** **FOR IMMEDIATE RELEASE 15:00 (CET)/9:00 AM EST 31 July, 2007**		
00:00 **[Visual starts]** **[Narrator]** **00:00** The NASA/ESA Hubble Space Telescope has recently revealed magnificent sections of the Veil Nebula – the shattered remains of a supernova that exploded some 5-10,000 years ago. The new Hubble images provide beautiful views of the delicate, wispy structure resulting from this cosmic cataclysm. **00:19** **00:35** **[Woman]** This is the Hubblecast! News and Images from the NASA/ESA Hubble Space Telescope. Travelling through time and space with our host Doctor J a.k.a. Dr. Joe Liske. **00:48** **[Dr. J]** Welcome to the Hubblecast! Today we will take a closer look at one of the most violent events in the Universe – a supernova explosion. It is the debris from one of these cosmic explosions that we can see with unprecedented detail in these brand new images from the Hubble Space Telescope. Although we don't usually think about it, the stars twinkling in the night sky do not shine forever. How long a star lives depends on how big and heavy it is. The bigger a star, the		Pan on the Veil Nebula Image explosion Hubblecast Logo + web site Presented by ESA and NASA TITLE Slide: Episode 7: Uncovering the Veil Nebula Nametag Virtual studio: Dr J on camera Veil Nebula in bg. Night sky

shorter its life. Now a star shines because of the nuclear fire burning at its center. And when a star significantly larger than our Sun runs out of fuel for this fire, it first collapses and then blows itself apart in a gigantic explosion that we call a supernova. A supernova releases so much light that it can outshine all of the stars of an entire galaxy put together. The explosion sweeps out a huge bubble in its surroundings, and at the fringe of this bubble we find the actual debris from the star as well as the material that has been swept up by the blast wave. It is this glowing, brightly-coloured shell of gas that we see as a nebula, and that astronomers refer to as a 'supernova remnant'. Now the remnant can remain visible for a very long time after the actual explosion itself has faded away.		Star death, supernova explosion and remnants 60 second zoom into Cygnus/Swan constellation
02:17 **[Narrator]** Astronomers have pointed Hubble towards the constellation of Cygnus to observe the Veil Nebula in the wing of the Swan. Located at a distance of 1,500 light-years from Earth, the Veil Nebula, which is also known as Cygnus Loop, is one of the most spectacular supernova remnants in the sky. The entire shell spans some 3 degrees, corresponding to about 6 full moons. [music]… One of the most remarkable parts of the remnant is the so-called Witch's Broom Nebula. The bright blue star – dubbed 52 Cygnus is unrelated to the supernova explosion. It can be observed with the naked eye on a clear summer's night. The small regions captured in the new Hubble images provide stunning close-ups of the Veil. Fascinating smoke-like wisps of gas are all that remain visible of what was once a Milky Way star.		Full nebula; full-moon comparison Witch's Broom Nebula New Hubble close-up Ancient civilizations gazing at the sky
03:28 **[Dr. J]** Scientists estimate that the supernova explosion occurred some 5-10,000 years ago. Now what that means is that it could have been witnessed and recorded by ancient civilizations. What they would have seen is a star increasing its brightness roughly to the brightness of the crescent Moon.		Pan on DSS2/NOAO/Panther images
03:50 **[Narrator]** The intertwined rope-like filaments of gas in the Veil Nebula result from the enormous energy released as the fast-moving debris from the supernova explosion ploughs into the surroundings and creates a shock front. This shock, driven by debris moving at 600,000 kilometres per hour, heats the gas to millions of degrees. It is the subsequent cooling of this material that produces the brilliantly coloured glows. The Hubble images of the Veil Nebula are striking examples of how processes that take place hundreds of light-years away can sometimes resemble effects we see around us in our daily lives. There are similarities with the patterns formed by the		Supernova explosion animation Analogies: cirrus cloud, swimming pool Cirrus clouds on Mars/Neptune

interplay of light and shadow on the bottom of a swimming pool, rising smoke or wispy cirrus clouds. **04:41** **[Dr. J]** So why are astronomers interested in studying supernovae and their remnants? The reason is, that they are extremely important for understanding the history of our own Milky Way. Although only a few stars per century in our Galaxy end their lives in this spectacular way, these explosions are more or less directly responsible for creating all the elements in our universe that are heavier than iron. For example, all the copper, mercury, gold, iodine and lead that we see on Earth around us here today were forged in these violent explosions billions of years ago. The expanding shells of the supernova remnants eventually mixed with other material in the Milky Way and this became the raw material for the next generation of stars and planets including our own solar system. So the chemical elements that constitute the planets, the Earth, the plants and animals around us – and indeed our very selves – were built deep inside ancient stars and in supernova explosions. So the green in the grass and the red of our blood are in fact the colours of stardust. This is Dr. J signing off for the Hubblecast. Once again nature has surprised us beyond our wildest imagination … **06:01** **[Outro]** Hubblecast is produced by ESA/Hubble at the European Southern Observatory in Germany. The Hubble mission is a project of international cooperation between NASA and the European Space Agency. **06:17 END**		Virtual studio: Dr J on camera Images of copper, mercury, gold,… Stars, planets, earth, people fly by