Space: Above and Beyond– ship building

Roswell: UFOs and Aliens

Gundam live action: fx

THE DIGITAL MAGIC OF SPACE: ABOVE AND BEYOND

AN INTERVIEW WITH TIM MCHUGH AND GLENN CAMPBELL OF AREA 51

WES SARGENT

n the fall of 1995, the Fox network treated viewers to one of the most stunning television space drama's since Star Trek. Although the series, created by Glenn Morgan and James Wong, only ran twenty-four episodes, Space: Above and Beyond continues to gain notoriety in syndication due in no small part to fantastic visuals delivered by the talented artists at L.A. based Area 51. Among its many credits, Area 51 has produced effects for Star Trek: the Next Generation, The X-Files, Millennium, Dark Skies, Wishmaster and the critically acclaimed mini-series From the Earth to the Moon.

Wes Sargent: Tim, you received a credit for producer on **Space: Above and Beyond**. Just how extensive was *Area 51*'s contribution and when did you first get involved?

McHugh: I had been recommended to Jim Wong through a friend of his. Jim called me up one night and said, "We're doing a space show. Do you want to come in and talk to us about it?" The strange thing about it was that I was kind of reluctant. I'd done **seaQuest DSV** and it was just an immense amount of work to crank out a weekly series in CGI. To me it was like trench warfare. So I was feeling rather beat up from the six or so months I'd spent on **seaQuest**. I really wasn't excited about doing another TV show. I wanted to go back and do more feature work. But it was Jim Wong and Glenn Morgan from **the X-Files** and I really liked their work. David Nutter was directing and I was a fan of his work too and so I thought, this would be great! I went over and talked to them and it's funny because I think the fact that I was somewhat disinterested in their project made them want to get me even more. So instead of trying to sell myself I was kind of talking it down saying, "Well, you know, maybe I could do the pilot but I really don't want to get back into series television." I guess what happened was they took that as a challenge to get me involved. We had some talks about what the show could be about; what we envisioned for **SAAB**. We actually talked in very general terms about the series more than the effects themselves.

They had been told there was no way they could afford computer generated imagery. I was looking at their script and said, "Gee, from the way it reads I don't think you have a choice. I think you have to go CGI." So I laid out a budget. I gave it to them and Charlie Goldstein who was the vice-president in charge of production at *Fox*. For whatever crazy reason, they thought my idea was good and then went with it. I had a few people working with *Area 51* who were basically independent contractors. So after they hired me, I set up a whole production staff to do the pilot.

WS: Glenn, you ended up being the Visual Effects Supervisor on **SAAB**. What had you been doing prior to joining *Area 51*?

Campbell: I was at *Sony Image Works*. I just finished up **Johnny Mnemonic** and we were doing some very early preliminary tests for **Starship Troopers** (the movie). We'd actually tried to convince them, before they'd completely abandoned the idea, that you could do the *power jump suits* that were in the book. We'd done a test for another project where we had these giant humanoid robots. We'd done animation tests and composited them into some live action. So we took a robot and comped it into a live action scene, made it human size and had it stand around, pointing at things and interacting with the environment. Then the jet boost activates and then it lifts off into the air. We sent it off and they went, "Gee, this is pretty cool," and then promptly threw it away and went with a bunch of guys with machine guns.

**WS: Space: Above and Beyond** ended up being *Area 51*'s first project?

McHugh: It was our first big project. We had worked on **VR 5, Unsolved Mysteries** and others, but **SAAB** certainly was the first large scale effects show we had done for television. I found out after the fact that everybody had been vying
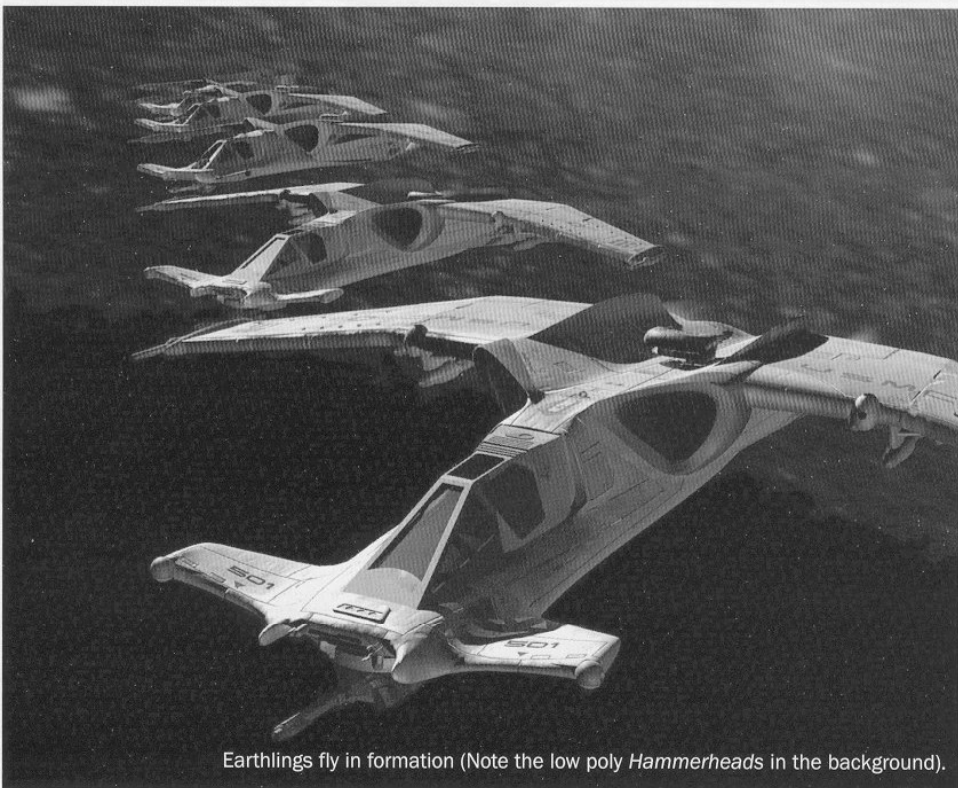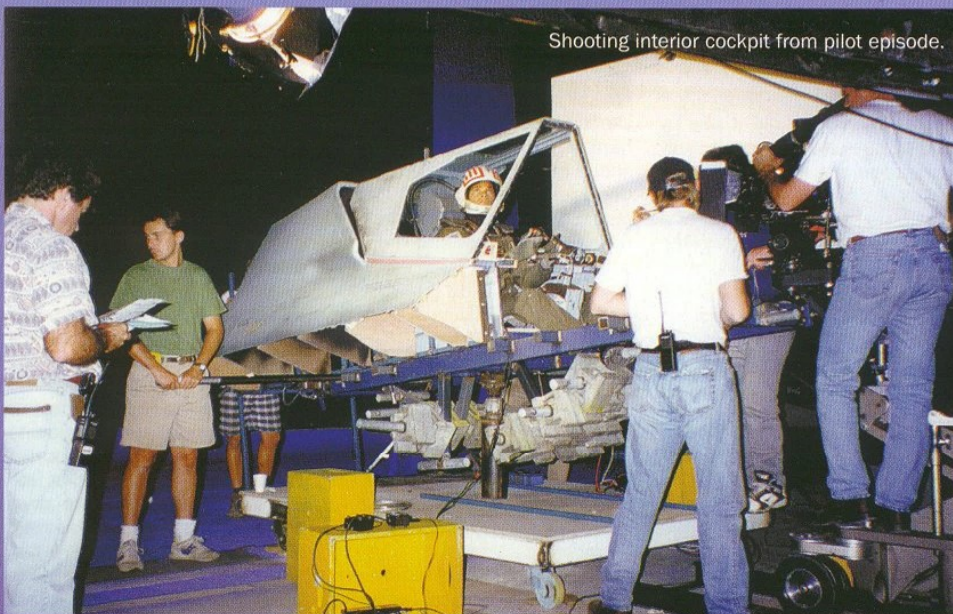

Earthlings fly in formation (Note the low poly *Hammerheads* in the background).
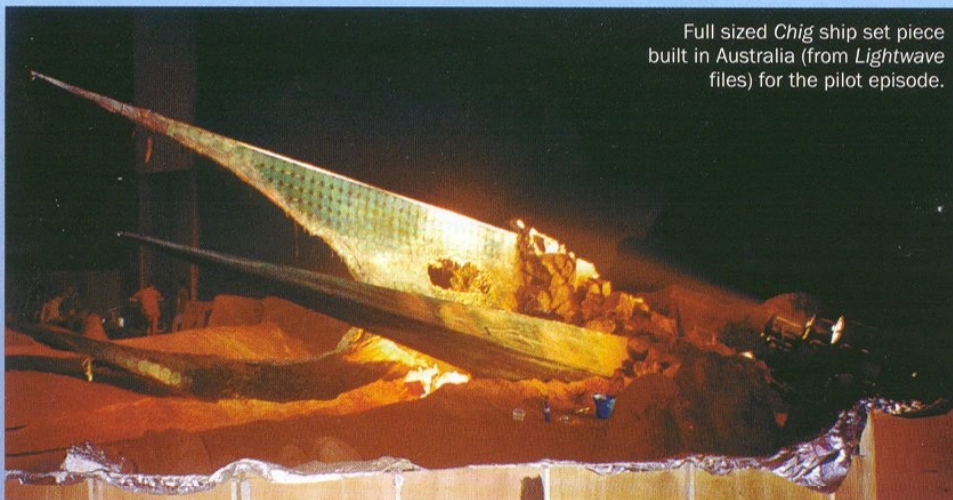
Full sized *Chig* ship set piece built in Australia (from *Lightwave* files) for the pilot episode.
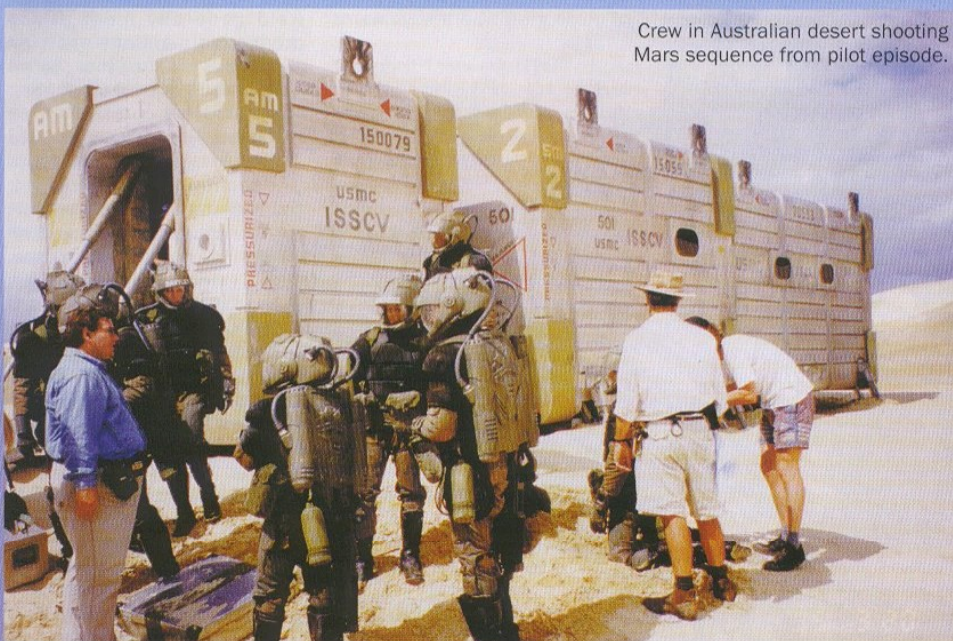
Crew in Australian desert shooting Mars sequence from pilot episode.

Shooting interior cockpit from pilot episode.

for it. I saw a stack of bids from just about every effects house in town after I signed on. Everybody was trying to get the show.

WS: How did things progress design-wise once you got into the pilot?

McHugh: Well, it's interesting. The first problem we had on the show was that we couldn't get a production designer. They hired one fellow who had worked on **Stargate** (the movie) but he was only going to be available for a couple of weeks. As I recall, he came up with the basic design of the *hammerhead*, which we then refined quite a bit. Then they hired a second person who designed the *Chig* ships and the *Chig fighter*. Just before we went to shoot, they hired Bernard Hides and he became the production designer who stayed with us. Bernard is an Australian fellow. A very cool guy. He took what the other two production designers had done and compiled it all together, did his own sketches and essentially refined everything. He'd run off to Australia and, in what looked to me like absolutely no time, whipped all this stuff together and got the pilot ready to shoot. It was an absolute pleasure working with him.

Bernard and I thrashed a lot of things around. His approach and mine was very much, 'form follows function'. We had the idea that **SAAB** was going to be a show where people had pockets and zippers, pens and drawers. It was the real world. It wasn't that sort of strange mylar jump suit kind of world you often see in other science fiction shows. Everything we built had to have some kind of function. As an example, we had been discussing the idea of the cockpit on the *hammerhead* that would separate into this little pod. Glenn was rather involved with that and Bernard was trying to design the whole thing. We really didn't have the budget to build everything but we could build a bunch of cockpits (real set pieces). We assumed that in space you would need to have the ability to break free or eject if something went wrong. You can't casually step out of your spaceship, stand on the side of the road and hope to get picked up. So that was the kind of thought that went into the show. We also were working with the idea that the series was set less than a hundred years into the future. We wanted to get across this feeling that everything that we found in space had only really

recently been brought there. So everything had a very modular, kind of military re-issued look to it.

WS: As artists, can either of you credit any previous works that might have influenced that sense of style you brought to **SAAB**?

Campbell: That's a good question. I grew up watching all those TV shows and movies that came before. Anything from **Fireball XL5** and **Supercar** to **Star Trek**. Those were all things that made an impact on me as to what looked cool or what looked cheesy. Certainly you try to imitate the things you thought looked nifty or things that you always thought were okay but wanted to improve on. It's like, "Oh boy, too bad they didn't have the ability to do x, y and z. That would have looked really cool." Now we actually have the ability to do that.

McHugh: I wanted to stay as far away from science fiction as possible. Our look for the show to me was that of the **Flying Leathernecks;** something that had a real World War II feeling about it. In fact I remember very early on while we were trying to design the *hammerhead*, I was really insisting on a pounded brush metal feel. Something like a *corsair* airplane. We wanted to see the rivets and everything else. If you look at the show, especially the pilot, a lot of the effects are damn near black and white. We knocked the chroma down to where it's barely in color at all. If there is any color it's only used as kind of a accent. That was a real specific feeling that we worked with Jim Wong, Glenn Morgan and Bernard Hides on. We tried to make everything very monochromatic so that even though it was set in the future, the stories and the look had this very World War II retro feel about them. You might remember Jim Wong and Glenn Morgan started some of the earlier episodes with parables or stories from World War One or the Civil War. They told some of those same stories set in space.

WS: Very different from **Aliens** which was similar to **SAAB** in some respects, but with a Vietnam flavor.

McHugh: Yeah, it's true. I guess World War II was our point of reference and obviously since I didn't live through World War II, it

all came from watching World War II movies.

WS: Back in '95, with the exception of **Babylon 5** and **seaQuest**, a series like **SAAB** which depended so heavily on CGI for its effects was rather unique, wasn't it?

Campbell: Technically, no, because those two had set the ground work for us. The other shows that were heavily using effects were the **Star Trek** shows. They were significantly mired in doing model work but that's because they were more comfortable with it. They really weren't that thrilled with the look of CGI. To them it was represented by **Babylon 5** which many people didn't like. However, **Babylon 5** deserves credit for blazing the path for CG effects on television.

Original sketch of *Saratoga.*

One of the ways it did it was by figuring out ways to economically make things look as close to photo-real as possible. That meant using texture maps that were kind of a cheat but, at the same time, got the job done. Unfortunately, people who were used to dealing with real models could tell the difference and didn't like it. But what people associate the **Babylon 5** look with was something that was working backwards from the limitations of the computers of the time. They were fully capable of making stuff look better. They just didn't have the resources so they came up with cheats because it was often a matter of quantity versus quality.

WS: From the beginning, were you

confident you could make the effects come together with the degree of realism that finally made it to the screen?

McHugh: (laughs) No. ...I knew that, when we did the pilot, I basically had nine months to R and D everything; to set it up, to build it, to animate it. I think we started in late December and probably delivered around the end of August, early September. I was confident that we would get something that looked pretty good. I had gotten through **seaQuest** and I had helped set up what became *Ambling Imaging.* So I knew we could do it technically but it was always a battle to see if we could do it artistically or not. I think we achieved a lot of what we wanted in the pilot. Although, I'm one of those guys who always wants

to go back and do it over again. There are some shots from **Blade Runner** I'm still not happy with and would like to fix. Looking at the pilot, it's hard to remove myself from the shot. I know I can do better now. Considering we did close to one hundred and fifty shots for the pilot over nine months, and then we sometimes did half that much for a weekly episode, it was an enormous undertaking.

WS: On average, how long did you have to deliver the effects for one episode?

McHugh: Well, we'd always do at least three shows at once. We'd have one in pre-production, one in production and one in post. So we were constantly leap-frogging ourselves from show to show. We'd generally average about two and a

half to three weeks an episode.

WS: Is that standard in the industry?

Campbell: Pretty much. Once a show wraps live action, you know within a month or so it's on the air when you're on a TV schedule.
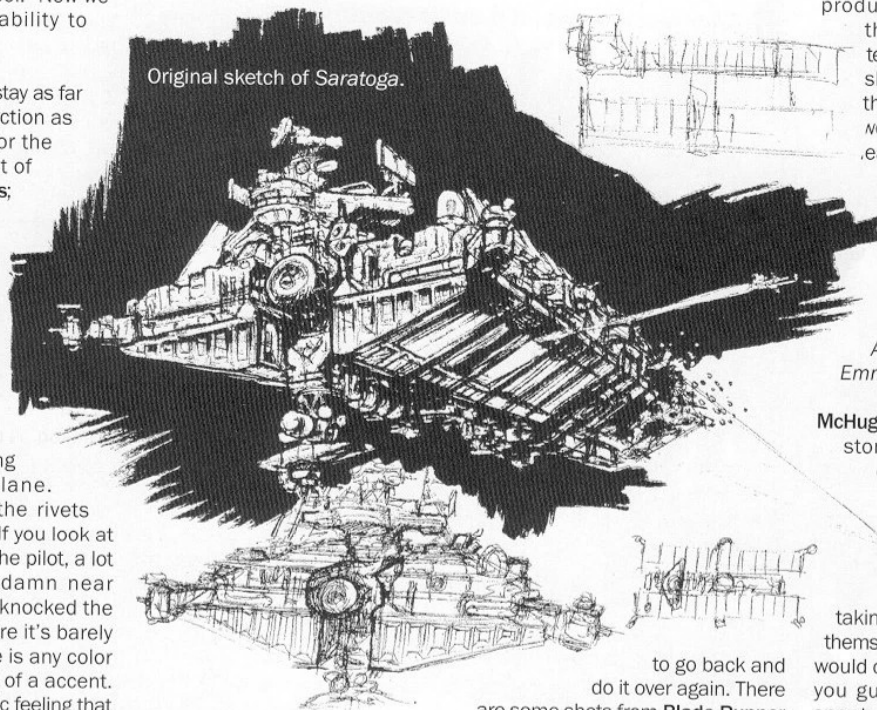
McHugh: It's also hard to say, too, because at the time there weren't a lot of things to compare it to outside of maybe **Star Trek**. On their shows they always used two separate teams. One team would do the odd shows and one team would do the even shows. Then they would jump back and forth. We did it differently. We had Glenn working on set and shooting the effects. I would essentially be back at the shop doing all the CGI work. Then we'd generally meet at the production meetings and plan things out together. So we tended to overlap on the same shows rather than leapfrog them. Although, sometimes I would take the CGI artists and leapfrog them. It would give an individual artist maybe an extra week on an episode he normally wouldn't have. That's if there was a heavy build for the show.

WS: Your work on **SAAB** got *Area 51* nominated for an *Emmy*, did it not?

McHugh: It did. That's an interesting story. For some reason they didn't tell us. The nominations were listed and we were not among them originally. So we said, 'Ah, that's too bad." We watched everyone taking out their big ads, thanking themselves in *Variety.* Then people would call and say, "Hey, we heard you guys were nominated." We spent two or three days saying, "No, no, it's a nasty rumor! Why are you rubbing it in like that?" Only when we finally had someone call the *Academy* did we find out we had been nominated. That was very strange. They blamed it on a computer glitch, of course. We had about a week before the actual awards so we all had to run out and buy tuxes. We had fun and then promptly lost to **Gulliver's Travels.** In those days, there was only one category for visual effects so the shows we would bang out in a week or two were in the same category as a multi-million dollar Robert Halmi production that took years to make. They have since changed that but unfortunately it didn't help us that year.

WS: Why did you decide to use

Lightwave as your primary animation package?

McHugh: I guess just my experience with *Lightwave*. I'd been using it ever since I'd been back at *Apogee*. I think it was one of the earliest versions of *Lightwave* we used over there. We used it as kind of a test to produce an **Unsolved Mysteries** episode. Since then, I've never come across a shot I really couldn't do in *Lightwave* or *Lightwave* combined with something else. The program was not designed for blue screen compositing, so we would go to outside facilities to do that. Most people are shocked to learn that on our demo reel, every single shot was composited in *Lightwave*. It isn't the only tool we have, but it certainly is the most versatile.

WS: Readers will be interested to know about some of the various ships built for the series. From sketch to screen, can you start by giving us some background on the *hammerhead*?

McHugh: Well the *hammerhead* is kind of interesting. I'm trying to remember and I hope I don't slight anybody by a bad memory. I recall the initial sketches being done by our very first production designer. Bernard Hides then took the sketches, sat down with myself, Jim Wong and Glenn Morgan and Ken Stranahan who built the model. We'd thrash the design back and forth, but the basic idea I was trying to get across was something like a *corsair* airplane. It kind of looks like it, just upside down and backwards. It has the gull wing front. We reversed that and put the big wings on the back.

It was important that it look functional in outer space and also inside an atmosphere. The reason being that we had this idea that in the future, certainly the first pilots we have in outer space will all have been trained on Earth. So they'll be used to flying with a horizon which is why you see our guys always flying in a certain pattern or formation. There's very much of a terrestrial feel even though they are in outer space. I remember we had built a rather sleek cockpit and Bernard, the production designer, had to build a full scale version of it. One day, he comes to us and goes, in this very distinct Aussie accent, "Guys there's a big problem with the *hammerhead*. The pilot's got no room for his bum," And I said, "What?" He goes, "Where do his legs and bum go?" (McHugh laughs) And sure enough, we had not actually put enough depth in the cockpit for the pilot to sit down. So we had to go back and put a little more seat room into it.

Campbell: We knew it was going to be the star of the show. If it went to series or even in the pilot, it meant that we were going to be seeing it with a lot of detail and different angles. So we knew it had to stand up to close scrutiny. Unlike most of the other ships it did get a lot of attention. Model wise, it's fairly straightforward. The real trick came with the textures. Those were originally started by Richard Payne and then Karl Denham took over. Really, it's ninety percent Karl Denham's as far as textures.

McHugh: Karl did do the lion's share of it. It probably took longer to texture it than it did to build it.

Campbell: That's one of the reasons the *hammerhead*'s one of the best CG ships that's ever been done because it has so many custom texture maps. With the *hammerhead*, every single individual portion of that ship had its own custom texture map. The wings, the wing flaps, the fuselage, etc. Each had a custom color map, specular map and a custom bump map. Karl Denham, by hand, aged and weathered every single section. That's why, when you would look at that ship, get even the equivalent of a foot or two away from it, it would still look photo-real. It's because of the construction and particularly because of those textures.

WS: Were various versions of the *hammerhead* required?

Campbell: Initially, there was only one physical version of the actual ship as far as the way it looked on the show. There were no different types of *hammerheads*. They were all stock. We did use different nose art for a while. Each guy had his own symbol on his or her plane. *Nathan* the hero's ship actually said, "*Above and Beyond*". *Cooper* had a hand print with "*Pag's Payback*" scrawled beside it. Later we realized, after the editors pointed it out, if we had custom shots like that then they couldn't re-use the shots. The editors couldn't take a *hammerhead* flying left to right and say, "Oh, I'll just use that in this particular case," because it would be too distinctive. So we removed all of the nose art and they just became generic planes.

Now within that, there were three types of *hammerheads* that essentially looked the same. There was a low poly one that we used for quick programming and layout. There was one that was a self contained. It was photo-real but all of the parts were non-moving. They were all joined together into one giant plane that we physically could load in as a single solid model. Finally, there was the custom hero *hammerhead* that actually had individual parts for things like the wings and nose tip. The wings could flap, things could move or turn and that sort of thing. So, depending on where we were in the shot, if it was a close up we'd obviously use the hero *hammer*. If there were a couple of planes in the background which might be cruising in formation or going from left to right, we'd use the full size self contained model. We actually had a name for it but I can't remember what it was. Then, if the ships were way off in the distance, we'd use the low poly *hammerhead* that more or less looked like the others.

WS: Given that the full size *hammerhead* was built by a different team in Australia, how were both of you able to coordinate over the ship's design?
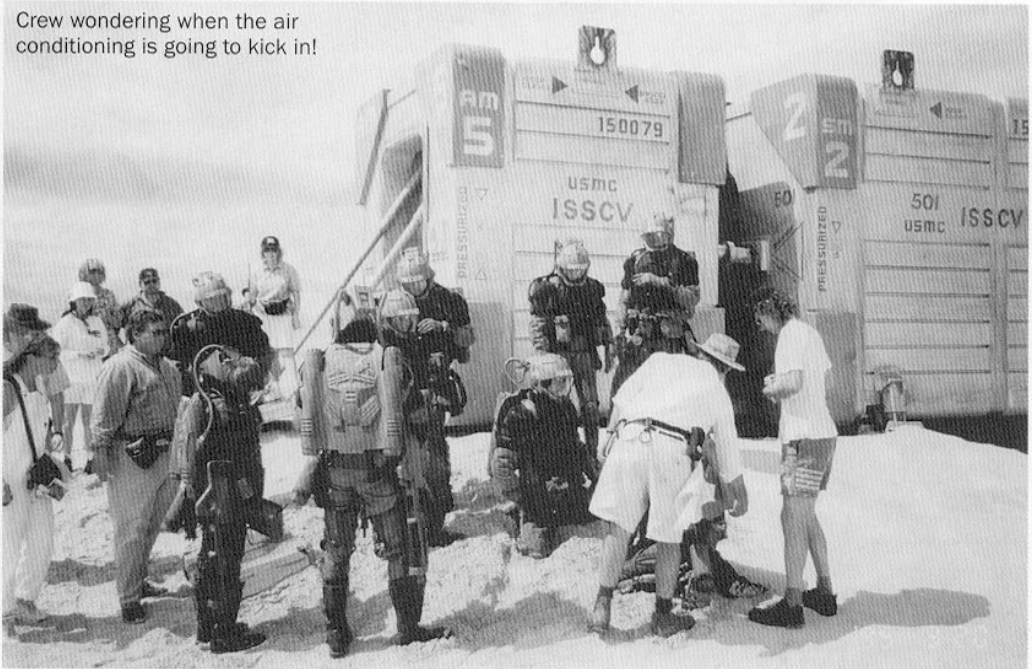
Campbell: Bernard Hides and his art department put the full size *hammerhead* together. He was directly responsible for supervising the construction.

McHugh: The interesting thing was that Bernard came out and saw our computer generated model. He saw the wireframe and his eyes lit up. He asked, "Do you think you guys could send me that file? If I do cross sections of it, I'll have some blueprints for building." So we jumped on the modem and sent out those files. He took it into his office, blew it up and made blueprints. They were really as literal as you could get to a 1:1 copy of the CGI model blown up to full size from the *Lightwave* file.

WS: I understand the CG model and full size model may have differed somewhat?

McHugh: You couldn't take Bernard's home on a floppy.

Campbell: There were a couple of minor things that were slightly different in the physical construction. Sometimes they would find that it was too difficult to follow a certain curve exactly. So they might have sharpened something a little, simply because it was easier to do or vice versa. For the most part, they were virtually identical.

Crew wondering when the air conditioning is going to kick in!

Cockpit pods lined up on flight prep deck.

and things. I don't know who did the original sketch but it's one of those things where we actually built the *Saratoga* from a very vague drawing. It was a rear, three quarter angle if I recall. I remember Bernard's team redid it in Australia and they didn't tell us. All of a sudden we were getting ready to finish the pilot as the series was going into production and we noticed in Bernard's office, hanging on the wall, there was this very different *Saratoga* from the one we had just built. So we went back and, in about a week and a half's time, rebuilt the *Saratoga* from scratch and then re-textured it. The one that appears in the

WS: There's a story about the *hammerhead* and the Soviet Union which is an interesting testament to the ship's designers. Care to tell us about it?

McHugh: I believe Bernard told me this story. As I understand it, when the pilot sold the decision was made to have production happen in the U.S. After they packed up his *hammerhead* they popped the wings off, folded them up and then stuck the whole thing on a boat somewhere. While docked, apparently there was a lot of activity among the Russian trawlers. They were suddenly coming by and taking lots

Campbell: I'd like to think that somewhere they're building them going, "I don't understand it! They don't fly very well? How did those guys get it to work?"

McHugh: It got by the real spies. That's pretty cool.

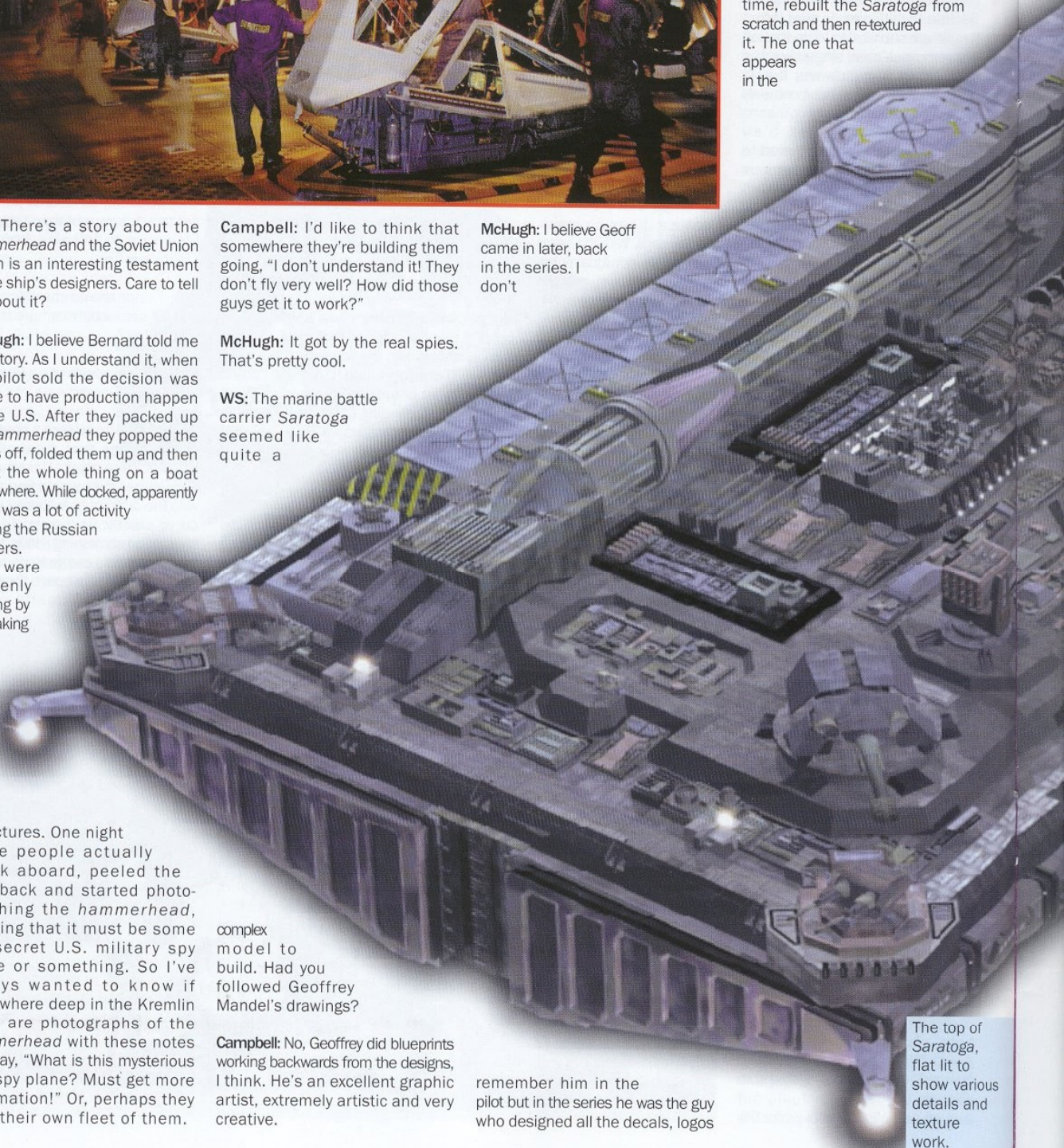**WS:** The marine battle carrier *Saratoga* seemed like quite a

McHugh: I believe Geoff came in later, back in the series. I don't

of pictures. One night these people actually snuck aboard, peeled the tarp back and started photographing the *hammerhead*, thinking that it must be some top secret U.S. military spy plane or something. So I've always wanted to know if somewhere deep in the Kremlin there are photographs of the *hammerhead* with these notes that say, "What is this mysterious U.S. spy plane? Must get more information!" Or, perhaps they built their own fleet of them.

complex model to build. Had you followed Geoffrey Mandel's drawings?

Campbell: No, Geoffrey did blueprints working backwards from the designs, I think. He's an excellent graphic artist, extremely artistic and very creative.

remember him in the pilot but in the series he was the guy who designed all the decals, logos

The top of *Saratoga*, flat lit to show various details and texture work.

...

pilot is actually fairly rough. We don't get terribly close to it so we had only really detailed out the areas that got seen in the pilot. Then each week, as there was a new area

it is." So we said, "But you can't have it on the outside like that!" So he asked why and we said, "It's like one of those medieval knights who walks around in a full set of armor but without the cod piece. It's

models but, with the exception of the large carriers in the foreground, we never really got a good look at them all. Were they significantly detailed in anticipation of doing close-ups?
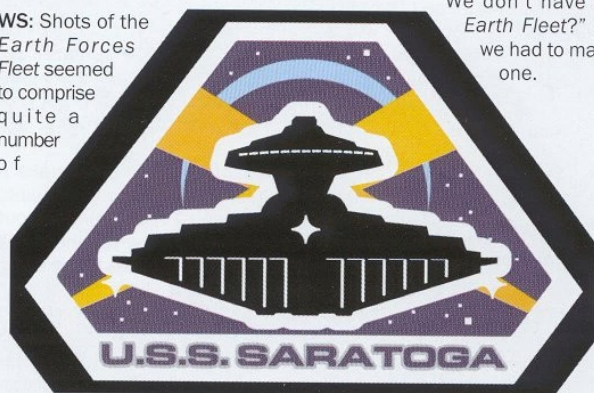
McHugh: My general rule of thumb is that you want to plan for the close ups. The reality of television is that we would build fairly minimally until we had to do a close up. Then we'd spend a day or so getting the model ready for its big moment; applying the make up to it, so to speak.

Because of the speed at which we had to crank out those shots, we tended to be rather loose unless we had to fly right up to something. Then it would spend a couple of days being cleaned up. So the models were in a constant state of improvement.

Campbell: There were a handful of ships designed for the *Earth Fleet*. All the guys would pretty much put their own ships together. There wasn't a lot of time to really work all that out. However, *Fox* received letters from people saying, "How come we don't get to see anybody other than the *American Fleet* cruising around fighting the good fight?" The story was actually designed to expand and the producers were definitely responsive to the needs of the show and to the fans. So that was a criticism that they said, "Yeah, we should rectify this as quickly as possible. Then suddenly we'd get a script that said, "The *Earth Fleet*, destroyers, cruisers, battleships and everything approaches Planet X," and it's like, "*What Earth Fleet*? We don't have an *Earth Fleet*?" So we had to make one.

kind of like saying, "Go ahead! Just don't kick me in the nuts!" So we told him that would be the worst possible place to put a reactor because all the bad guys have to do is blow it up and the ship hangs in space like a giant target." So he said, "Well, what do you think it is?" We came back with, "A gun! A really big gun." We decided it was the planet buster. Without telling anyone, when the *Sugar Dirt* episode opened and they bombard the planet, that was the first time anyone including Jim and Glenn saw that giant tube put to use. (Campbell laughs) So we had this thing wailing on the planet and everybody went, "Oh, okay, fine."

McHugh: Yeah. I mean, it's an aircraft carrier. It even looks like a ship with kind of a triangular bow to it. The theory being that each of those separate sections were somehow launched into space and some guy showed up with a giant wrench and screw driver and put them all together. So that was the approach we took when we built it.

we had to photograph, we'd go texture it and build it out. It was an ongoing process for probably the first ten or twelve episodes before we finally finished the *Saratoga*. It was pretty much Karl Denham's baby, certainly texture wise. He also modeled quite a bit of it.

WS: Were you fairly clear from the start about how the *Saratoga* was supposed to look?

Campbell: We do like to take credit for one thing on the *Saratoga*. In the design there's a huge, long tube that runs the length of the ship off to the right of the bridge. It's really cool looking but we never knew what it was supposed to be but we built it because it was in the drawings. One day we asked Bernard what it was. Bernard said, "It's the atomic reactor. It runs the length of the ship because it has to supply power, fuel and the whole bit. That's what

WS: Shots of the *Earth Forces Fleet* seemed to comprise quite a number of

U.S.S. SARATOGA

Mars: Earthlings visit the red planet.

WS: Was there a rational behind building the alien *Chig Fleet* based on seemingly simple geometric shapes?

Campbell: It wasn't based on, "Let's make things look like a box or let's make them like pyramids." Both fleets weren't designed from the point of view; should this look like Ron Cob's **Alien** or should it look like John Burke or any of the particular designs from old science fiction or art. It was just form following function. We'd ask, "What's this supposed to be or what's it supposed to do? Well, it's supposed to be a battleship or a cruiser. It should have these kind of guns or it should be small and speedy." By default, ships would have a certain look or at least have certain attachments to indicate what their function was. We basically worked backwards from what you'd expect to find in a real fleet. That's really how the ships evolved.

WS: It's not difficult to notice that a lot of fore thought went into choreographing the many effects sequences in **SAAB**. Can tell us about your approach to motion and lighting?

McHugh: There were two theories that we liked. One was, as far as the battles go, you're really there. The action is probably too big to catch on your TV set as it's being filmed. We wanted to get across the feeling that these things are being shot by an operator who's hanging out the helicopter while his assistant is grabbing on to his belt. So we always wanted the camera to have to correct. We wanted to make sure it looked very hand held; not like computer art where everything is centered in the frame and looks very polite. So we would let the *hammerhead* go out of frame and have the camera adjust to bring it back in. The impression we wanted you to get was that you were never quite sure where these things would be going next.

As far as the lighting goes, the rule I had was, no matter where you are in the universe, you are back lit. You'll notice that no matter where the sun is somehow, miraculously, even when we did a 180 degree pan, the shot would always take you from back light to back light. The reason we lit it that way was because the textures would look so beautiful. You'd see all the shiny detail, the scratches and the scarring. If you'd front light a shot, you'd get very ugly CG models. It's a complete cheat even though you'd have to really study it to realize how we did it.

Campbell: That's absolutely true in real life as well. Most bad looking photography comes from somebody who takes a sun gun and points it at a subject from the front without any side lighting or modeling. Basically, we followed the rules of good photography.

McHugh: Our philosophy for CG models is the same as our philosophy for models we build to shoot motion control. They're not designed to look good on your desktop. They're designed to look good moving on the screen. That was kind of the key to building everything.

WS: Did you transfer your work to film?

McHugh: No, it went directly to video. The one thing we did make sure of was that we did all our animation at twenty-four frames a second and then we inserted a 3:2 pulldown, the same way you treat live action. So our shots did not look like video cut into film.

Campbell: Many people make a the fatal mistake when they think, "Well, it's for TV so I'll render it out at thirty frames per second." Well the problem is, unless you're doing a video taped show, film is shot at twenty-four frames per second and then, for television, it's expanded artificially to thirty frames per second. Film has a very distinctive

look on TV. We come from a film background so, of course, we know what film looks likes and we know how to emulate the look of film. A self-taught kid may know how to push buttons and that's great, but if he's never touched a camera and doesn't understand what film is you can be sure things will probably not look right. Ultimately, if you think about what we do in visual effects, whether it's for television or for a movie, the big picture is always this: you are adding synthetic elements to a main pallet that was shot on film. Therefore, your elements have to look like they were created on film and that means understanding what film looks like.

WS: You used motion blur and film grain on pretty much everything?

McHugh: Motion blur yes. I don't think film grain was available back then. Certainly time-wise, we probably wouldn't have been able to do it in those early days.

WS: Was anyone particularly responsible for doing all the explosive effects?

Campbell: Well, in some cases it does work that way. Some studios actually break it down where one guy models, one guy does the effects and one guy does this or that. In our case, everyone knew how to do that stuff and the guys that didn't were taught. When you got a shot at *Area 51*, that was your shot. You'd maybe get a storyboard that said, "Ship goes from A to B and this happens". You could read the script, look at a rough cut of the show and then see how it fit in with everything else. Then off you would go. Lay it out and do your explosion. What Tim stressed constantly, over and over, was the concept of the gestalt of dailies. Everybody's shots were screened. Tim, of course. was the final arbiter and I would be number two as far as looking at a shot saying, "I think that needs to go a little faster." Then, as a shot approached finality, everyone would comment on it. Everyone would pitch in. A major reason the shots do look good is not only because we had Tim at the helm maintaining their consistency, but also because, underneath it, you had a lot of people rolling up their sleeves and combining their talents and experience.

WS: Did you shoot any explosive footage especially for the show?

McHugh: I was not a big fan of particle explosions. At least at the time I thought they all looked pretty terrible. On **Buck Rogers** we had a

bunch of explosions that were already shot. There was gasoline and everything else for zero-g explosions. I tracked down as many of those original elements as I could find. We finally ended up with explosions mostly from *Universal*. Then we bought the *Pyromania* CD. We would mix and match them. Turn them upside down, print them inside out and everything else each week. We'd stick a bunch of lens flares in them. In some cases you're seeing the same explosions over and over again, but we tried to hide that a bit. In the end we put together a very cool library of explosions.

Campbell: That's another thing. When you see bad CG explosions or really bad use of *Pyromania* explosions it's because you're looking at people that, again, don't understand film. So they take their spaceship. They move it from left to right and at a certain point they pop off the ship and pop on an explosion. But what they often don't understand is how light reacts on film. There are certain phenomena that occur when a bright light source is exposed into a dark piece of film. I take great pride in the fact that our stuff looked pretty nifty and it's because we always added those phenomena and imperfections that happen when film is overexposed.

WS: Perhaps we can address some specific effects that were produced for **SAAB**. During the episode *Sugar Dirt*, there's a sequence reminiscent of a strafing attack in the film **Tora, Tora, Tora**. There's a field of ships that gets torn up by enemy fire. One of the *hammerheads* goes rolling, head over tail, in a ball of flame and it all looks very cool. It's not often that you see those kinds of effects on TV.

McHugh: It was really a shot that Glenn had designed in his mind, probably during the pilot. It's a really cool shot he thought we should do for the show and, finally, after about seventeen episodes, Jim Wong and Glenn Morgan wrote an episode that it would fit in.

Campbell: In a series, a title sequence usually consists of a shots from episodes one through three because that's all you have completed by the time you get around to doing the titles. So, that's great for episode one but by episode six you've seen those same shots over and over and you're bored with them. So I came up with an idea and I went to the guys and said, "Listen, how about if we made up some shots to put into the title sequence. They don't exist in the series but they look really cool. That way, people will be thinking that

there's more cool stuff coming up. They'll eventually see episodes one through three and recognize all those shots but if we give them a few that don't exist, they'll have something to look forward to." Jim and Glenn said, "That is a cool idea. What did you have in mind?" I said, "I don't know, maybe we'd see a *hammerhead* trying to take off and it crashes and a bunch of people are running away. Maybe it was a trainee who couldn't fly, maybe it was sabotage, who knows? It would just look really cool." So they replied, "Yeah, it is a cool idea but, ahhh… No." It was one of those things where the idea was bouncing around in the back of my mind but we really had no place where we could put it.

Then *Sugar Dirt* came along. In that particular show we had a certain number of shots budgeted for the ground assault which we called the *Iwo Jima* sequence. In it, the marines are landing and putting up the big flag. Then there were a certain number of shots budgeted for the **Tora, Tora, Tora** attack. As it happened, the director and the producer decided to slide some of the shots around and they wanted to add some more Iwo Jima shots showing this massive landing at the airbase with lots of troops. We were going to do split screens of soldiers running up and down. We took the troops and put them out on the landing field in different places. Then we were going to have a whole bunch of *APC*s and *hammerhead*s cruising around and just do this big gigantic money shot that says, "Wow! There's a huge landing going on at this airbase." So when they thought about cutting the budget they said, "Well, we're going to lose a couple of shots here and

then we're going to slide a few… ," I pointed out to Tom Wright who was directing that episode, "You know, if we're going to cut a shot, it'd be better to cut one or two shots from the Iwo Jima sequence because how many shots do we need to see to say, "Wow, there's a lot of ships landing? I mean, who cares? We've made our plot point that, yes, the air forces are now on the ground. But on the other hand, every shot that we don't waste on Iwo Jima is an extra shot for the big **Tora, Tora, Tora**. Let's blow somethin' up and have some fun!" So they thought, "That's a great idea," and I said, "While we're at it, I've got this great idea for shot!" I brought up the, "Let's run away from the tumbling *hammerhead*," and they said, "Cool!" It was great because Tom said, "Fine, that's your shot so off you go." So I took a camera and set it up on one side of the airfield while they were shooting the other action in the same sequence. I got a couple of people and we rehearsed it. We had no idea who we should use in the foreground so we just grabbed the first two actors that were near by. It turned out to be *Cooper* (Rodney Rowland) and *Damphousse* (Lanei Chapman). Those two characters wound up being the guys running away from the *hammerhead* simply because they were available when we were set up and ready to go.

WS: The big effects shots certainly did stand out. Were there any that viewers may not have readily picked up on. Are there any of those that you're especially proud of?

Campbell: We worked backward from scientific accuracy. The ships actually did have thrusters that you saw. We did actually have little

burns where you would see them re-orient themselves and straighten out. Most people would never take the time to do that kind of thing. In **Star Wars**, for example, the ships bank and turn as though there's air and you just accepted it because it looked cool. Our ships did the same thing but you also saw the burners and attitude adjustments firing to justify that motion. In fact we got a nice compliment. There's a scene in the *Chiggy von Richtofen* episode, *Never No More*, where *Shane* (Kristen Cloke) is flying along and she sees that *Chiggy* is sneaking up behind them. She does a one-eighty flat spin in mid air, turns around and fires at the guy. Well, it was kind of nice that people wrote in and said, "Say, I noticed you guys actually worked out the physics on it," because as she turns you will notice she cuts one engine while the right thruster is burning. As she spins around, you see the forward thrusters kick in to stop her spin. It's a cool action moment where she spins around and fires the missiles saying, "There he is!" But if you look at it, we actually did work out all the correct physics for what her ship should be doing.

McHugh: The interior of the *MacArthur* from the episode *Dark Side of the Sun*, was our first full 3-D matte painting. Scott Wheeler built the interior and we were able to shoot different plates by moving the production camera around. Then, by moving the CG camera around in *Lightwave*, we were able to seamlessly composite about nine different shots. All done from the same CG model.

Campbell: You got the feeling that at any time we could pan the camera

around and you could see more set. So it was subtle but it really made a difference in selling the environment. Since the entire show was a bottle show, and by that I mean it all took place on a handful of sets in one setting, we knew we had to make it visually interesting.

**WS:** In the pilot, how was the illusion of the Martian landscape achieved?

Campbell: It was partially a set in a very large sound stage where a full size *Chig Fighter* is buried in the ground. The exteriors on the surface of Mars before night time, before the ship crashes, were actually shot just near Sydney, Australia, in a large desert-like area. After the fact, *Encore* went through and keyed the color of the sand to make it a darker red and the skies were turned to yellow. In reality the sand was kind of a whitish yellow. They just basically did a blue screen key as it were. The interesting thing is before we got that far, we tried to come up with cheaper ways to do it. We knew we wanted to make everything look red but, of course, we wanted the peoples' faces to look normal. I had an idea for a technique I'd read about from an old movie called **Red Planet Mars**. What they did to make the movie look cool, because it was a low budget film, is they shot the actors and the Martian sequences on infra-red film. Because infra-red makes things look a little different, they used special make-up on the actors so that their faces looked normal but everything else looked weird and other worldly. So I used the same concept and I suggested that what we could do is paint the actors green. Then we'd

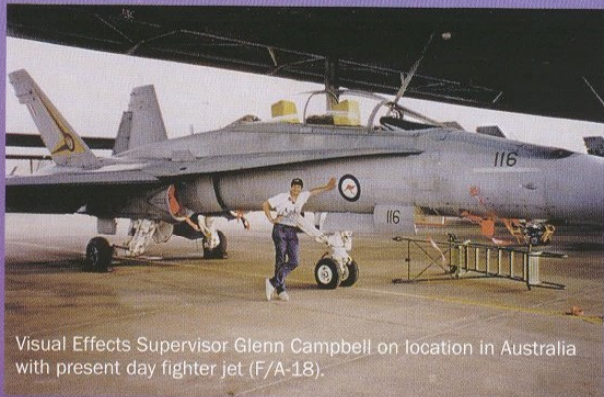Product shot of *Hammerhead* fighter (see cover).

Peeling off to attack (Note the low poly *Hammerhead*s in the background).

WILD CARDS

EXPECT NO MERCY
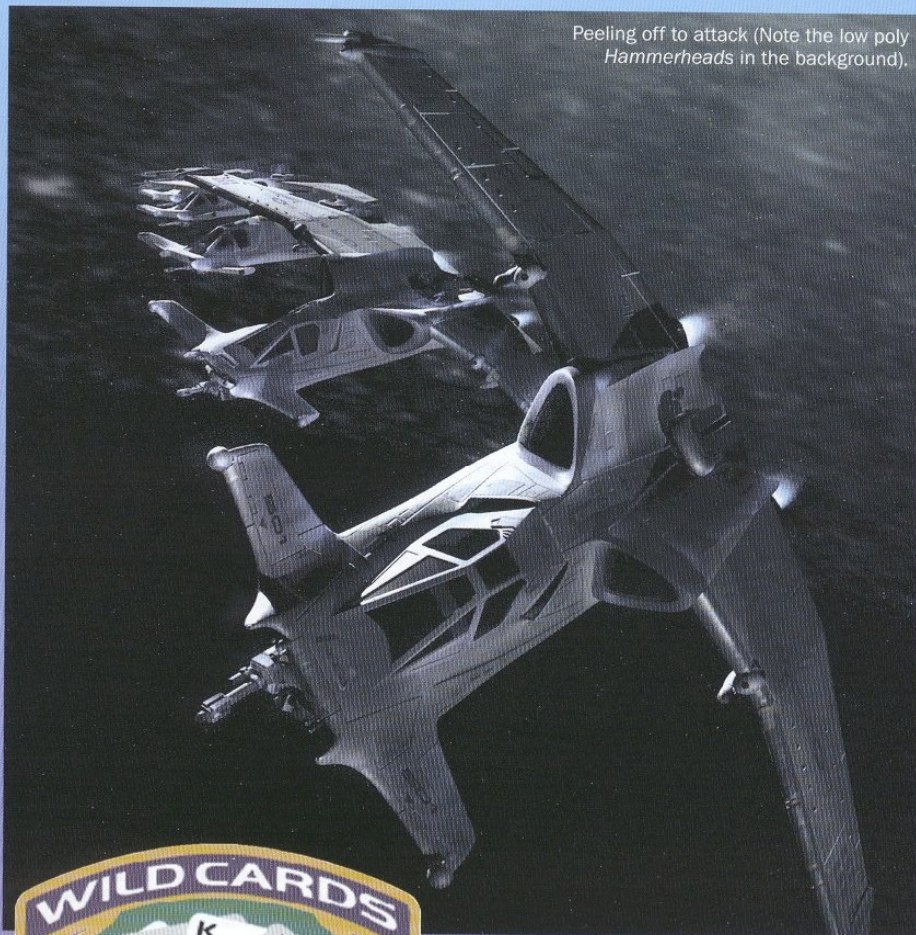
do a color correction that would remove the green and turn their faces back to normal flesh tone. To get rid of green you just add more red. Everything else around them would start getting more red and that would give us Mars. Everyone thought that was kind of an interesting idea and so I did a test. They had taken an actor on location in a crude space suit and filmed him on the desert saying. "This is the Martian location. Here's what it's going to look like." So I took that picture, brought it into *Photoshop* and tinted the guy's face green. I did an overall color correction, brought him back to normal, which also turned everything red. I showed it to David Nutter, Jim Wong and Glenn Morgan and they all thought it was a good idea. I can't remember who it was but somebody sensible then said, "Okay, that works on all the Caucasian actors but what are you going to do about *Damphousse*?" I said, "Oh, well you've got a good point there." As it turned out, it would have been a bad idea anyway because we were going to be out in the hot desert. People would be wearing all these heavy space suits and we'd barely be able to see their faces anyway. So, logistically, it became a big problem. It sounded like a cool idea on paper but it was wisely shot down. That left the alternative of, "Well how *do* you make the sand red and the sky yellow?" It meant rotoing in some cases and also doing a lot of special secondary color corrections. Which is exactly what *Encore* did for quite a long sequence.

WS: Would you hope to do another show like **SAAB** in the future?

McHugh: It's not like we specialize in those kind of shows but I would

Visual Effects Supervisor Glenn Campbell on location in Australia with present day fighter jet (F/A-18).

love to do another show like that. For whatever reason, nothing like it has hit my desk since. I hope it's not the end of an era as far as that type of series goes. I would have killed to be able to do a second and third season of **SAAB**. Unfortunately, it was not in the cards as far as the people who make those decisions.

WS: Before we close, is there anything you'd especially like to make mention of?

Campbell: I think we had an exceptionally talented team that came together and really gave a lot in terms of input and creativity. It was very much appreciated by Jim Wong and Glenn Morgan. A lot of times Jim and Glenn left us alone and the script would simply say, "And a big battle takes place," and so the choreography would either come from Dave Duncan, myself, or internally. Often the animators themselves would have ideas for shots. Tim was able to say, "How about if we make the camera go over here and swing around while this happens." All of us were really given the chance to be creative and contribute to the show. Everybody who worked at *Area 51* really gave their all and appreciated the fact that, if they had a good idea, it got used. It wasn't like, "Well, there's a good idea but since I didn't think it up, we're not going to do it." If it was good the response was always, "That great! See if you can make it happen." That's really what made the show successful! It's that attitude that was reflected in how everyone felt who worked on the show, in every department.

McHugh: Yeah, that's what I'd like to stress too.

Further installments in Wes Sargent's unique series of articles covering the design and execution of the digital FX for Space: Above and Beyond, together with Tim McHugh and Glenn Campbell's comments on the World of Visual FX, will appear in future issues of Sci-Fi and Fantasy Models International magazine, beginning next issue.