THE MAKING OF...

ASTER

Under attack from Taito's Space Invaders, Atari responded with its own take on interstellar combat. To mark Asteroids' 30th anniversary, Paul Drury spoke to Ed Logg, Howard Delman and Lyle Rains about the game's creation

IN THE KNOW

» **PUBLISHER:** ATARI

» **DEVELOPER:** IN-HOUSE

» **PLATFORM:** COIN-OP

» **RELEASED:** 1979

» **GENRE:** SHOOT-'EM-UP

» **EXPECT TO PAY:** £500+ FOR AN ORIGINAL CABINET

ROIDS

I't's late-summer 1979 and engineer **Ed Logg is preparing for a trip to Old Sacramento, California. He packs the retrofit kit for** *Atari Football*, **designed to upgrade the plays and prolong the game's arcade life. Joining him on the journey is colleague Collette Weil, but Ed decides to take another companion along for the ride: the project he's being working on since the spring.**

Once at the arcade, his baby is carefully placed among the rows of blinking cabs. There's no fancy silk-screen and the cabinet art is incomplete but the lighted panel clearly displays the name of this newborn: *Asteroids*. The proud father stands back and waits.

"A guy walks over and puts in his quarter," smiles Ed, "and he died three times in about 20 seconds. Then he reached out and put another quarter in. I thought, okay, if he's dying three times and still putting in another quarter, he must think it's his fault, not that the game has got it in for him. He died again, almost instantly. He put in quarter after quarter after quarter…"

He was to be the first of many. *Asteroids* epitomised the 'easy to learn, difficult to master' philosophy of game design and Atari shifted a staggering 75,000 units, making it its biggest selling coin-op. "I heard people saying we only made about half of the machines out there," adds Ed. "I've certainly seen counterfeit boards…"

Success breeds imitation, though the journey to that first field test in Sacramento actually began almost a decade before, thanks to a little inspiration from the daddy of all space shooters. "I'd played four-player *Space War* back in the early-Seventies on a PDP machine in the Stanford Research Lab," recalls Ed. "Down on campus in the Stanford Forum, they had two machines linked up and you could play for a quarter. Was I any good? Oh no! The other guys would cream my ass over and over again."

Though no maestro on this makeshift multiplayer cab, Ed undoubtedly knew what made a good game. His work on *Super Breakout*, released in 1978, proved he knew how to revisit an idea and add his own unique signature without losing the original appeal. But when his boss, Lyle Rains, called him into his office the following April, it was to discuss a game's failure to launch.

"Lyle was talking about an older game I remember seeing once and playing but it was just not fun," recalls Ed. "You were trying to shoot the other player but this asteroid was in the way. Players tried to shoot it – I know I did – even though it couldn't be destroyed. He said everyone just seems to shoot the rock, so let's create a game that lets you blow it up"

"I don't really remember what that old game was," explains Lyle of

> ## " I suggested the Asteroids idea more as a creative exercise than a full-blown project "
>
> LYLE RAINS ON WHY EXERCISE IS GOOD FOR YOU

that pivotal first meeting. "It may have been something I had seen in the labs and subconsciously picked up on the asteroid theme. I think of *Computer Space* as being more of the inspiration for the two-dimensional approach. You see, the biggest hit videogame at that time, perhaps of all time, was *Space Invaders*, which was predominately one-dimensional player control – left and right – with all the threats approaching from above. It was basically *Breakout* with moving bricks and a gun, instead of a ball and paddle. I was seeking a more satisfying two-dimensional game with a similar addictive gameplay theme of 'completion': eliminate all threats.
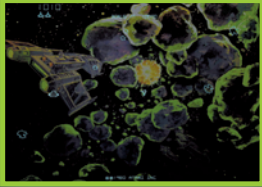
I believe I described the concept to Ed in a few sentences: little flying ship as in *Computer Space*; big rocks becoming little rocks; fly and shoot till they all go away. There was no great detail."

» Ed poses with a special version of his famous creation.

ROCK ON – ASTEROIDS SEQUELS

ASTEROIDS DELUXE (1980)
Dave Shepherd took Ed's code and added a shield and new enemies. Ed: "I was busy being a supervisor and had no involvement. I find it a little too hard." We agree. The killer satellite is just vicious.

SPACE DUEL (1982)
A colourful reworking by Owen Rubin, with inventive co-op play and wonderful spinning shapes. Ed: "My initial reaction was that it was very abstract, perhaps too abstract for the casual player."

BLASTEROIDS (1987)
Ed Rotberg added power-ups, ship morphing, branching levels, bosses and the ability to dock your ships in multiplayer for added firepower. Best played on an original cab with spinner controllers.

Though both men quickly agreed on the basics of the gameplay and indeed the name *Asteroids*, which emerged at this concept stage, they initially disagreed on the format of the project. "Lyle wanted to do it on raster and I said no, no, let's do it on vector," says Ed. 'I'd had some experience of working with vector technology. The higher resolution meant you had more control of where you were aiming, not just this blob."

Lyle chuckles: "Ed wanted to fool around with the new vector, or XY hardware before starting his next project. I suggested the game idea more as a creative exercise than a full-blown project. Obviously it took on a life of its own."

And the giver of life was hardware engineer Howard Delman. Howard had worked on many of Atari's post-*Pong* successes, including *Super Bug* and the first simultaneous co-operative arcade game, *Fire Truck*. Game development in those pioneering days of the mid-Seventies was not clearly divided into software and hardware roles, meaning that Howard had a handle on both of these emerging fields. Having joined Atari in 1976, he also remembers a project that had been floating around for quite a while…

"There was this old game that had been worked on for a long time because no one could quite make it fun," he laughs. "It was originally called *Cosmos* and then became known as *Planet Grab*, a two-player game where you were trying to claim planets in space. The more you claimed, the

more you scored, and you could steal planets from your opponent, too. As the game was being tweaked and people were trying to make it fun – because it really wasn't fun – someone made it so you could blow up the other guy's planets. And suddenly it was fun. Forget trying to steal his planets, just blow them up. You can see where this was heading… When they saw the vector hardware we were working on, they said 'Oh my God, that would be great for *Asteroids'*. Ed must have been the third programmer on that project. He came to me, I hooked him up with a board and he got to work."

And Howard still has that very board in his workshop, a mass of chips and wires and hand-scrawled notes. He's clearly proud recalling the story of how he came to be in charge of handling Atari's first steps into the shining light of vector game development.

"In early-1978, vector games started to emerge, but not from Atari," he begins. "Atari had a research-and-development group in Grass Valley. They came up with an XY display system, or at least laid the groundwork for one, and came down to show it to us. It was really cool

and we wanted it. They left it with us but it wasn't done, nor was it a platform to do games on. It was the basic hardware concept and I was given task of turning that into something we could use to ship a game. It was like I took this rough bit of clay and made it into something real."

Howard was tasked with not only shaping this fascinating technology into something useable, he also had to decide on a game idea to showcase this great leap forward. He settled on *Lunar Lander*, which became Atari's first vector game, released exactly a decade after the historic moon landings. He was joined on the project by Rich Moore and also one Ed Logg, who worked on the distinctive alpha-numeric character set used for the on-screen text and scoring. Thus when Ed received his customised *Lunar Lander* board, bolstered with extra RAM and some bespoke 'jumps and cuts' from Howard, he had some knowledge of the new hardware.

"Man, that thing was tiny," chuckles Ed. "This little four-by-four inch board with five buttons and wires coming off it, linked up to a screen. I started by getting the ship on screen. I wanted to see it flying around…"

» [Arcade] *Asterock*, one of the many bootleg versions of *Asteroids*.
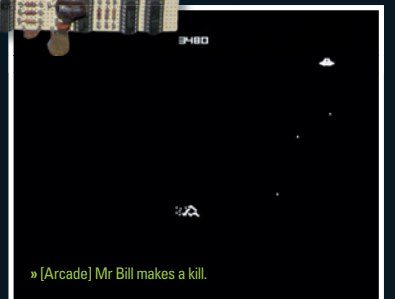
ASTEROCK BY SIDAM
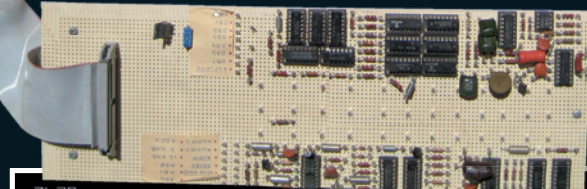
» A **Retro Gamer** exclusive, the modified Lunar Lander board created by Howard, which Ed used to develop Asteroids. The smaller board at the bottom contains those 13 sounds.
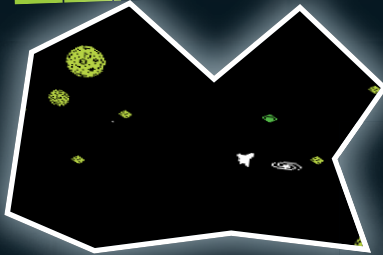

» [Arcade] Mr Bill makes a kill.

SEND IN THE CLONES

ASTEROIDS (ATARI 5200)
The VCS version was passable given the limited hardware, but this upped the ante with a smoother, more authentic experience.

MINESTORM (VECTREX)
Okay, we're pushing it here as this doesn't even feature any rock blasting, but it's clearly inspired by *Asteroids*, has beautiful vector graphics and is utterly ace.
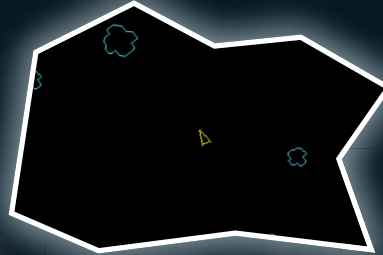
MOONS OF JUPITER (VIC 20)
An impressive effort for the expanded Vic and much better than Simon Munnery's version for Bug Byte, famously described as "a pile of wank" by Jeff Minter.

METEORS (BBC MICRO)
Acornsoft had a knack of producing superior arcade clones and this had schoolboys praying for wet lunch breaks so they could play it on the school's computers.

And what a thing of beauty it was, that graceful inertia as your tiny triangular ship thrusts through the blackness of space. Yet it wasn't always so. Ed had toyed with having no friction to decrease the forward movement of your ship (which meant you spent most of your time desperately trying to stop yourself), and with no inertia at all (which made the game too easy) before arriving at his happy medium. It was typical of Ed's approach to the game's development: experimenting with different settings, many inspired by those early battles on *Space War*, to see which delivered the best experience and always on the look out for fortuitous side effects.

"It was all ad hoc at this point," explains Ed. "There was no design document. How did I get those cool vapour trails? That was just a property of those old monitors. They have phosphor and phosphor glows. You put that much electrical excitement into the phosphor, it takes a while for it to cool down and not glow, so it seems to leave this trace behind it."

With your ship in motion, Ed sketched out different asteroid shapes and had them drift across the screen in increasing numbers. As you blasted them into smaller pieces, strategies began to emerge. Should you concentrate on the smaller rocks or take out the largest first? Should you stay put in the centre of the field or weave through the debris? The former felt like the safest option, so Ed decided the player was going to need an incentive to get them moving.

"I always wanted two saucers," he recalls. "A big one that fired randomly like cannon fodder to get you used to the concept that when you got down to fewer rocks, a ship was going to come out. The little saucer was about making you move. Run away, you're going to die if you stick around!"

Players developed a love-hate relationship with that little blighter. They loved the 1,000-point reward for shooting it, but cursed its deadly accuracy and increasing speed. Ed also employed a timer that steadily decreased, meaning respite between saucer attacks became ever shorter. "I wanted to discourage you from not shooting stuff. Get rid of those small rocks so I can send a new lot of bigger rocks out there, because more stuff on screen means more chance of an unfortunate collision."

Of course, if you were really in a tight spot, you could hit hyperspace and take your chances. On re-entering the playfield, there was a random chance of your ship exploding, its three constituent parts torn asunder and gently fading in one of gaming's most lonesome deaths. "You know, I should have put some algorithm in so that if there were lots of rocks on screen you didn't have much chance of blowing up, but with only a few it was a much higher chance," concedes Ed. "And I still have regrets about the placement of the hyperspace button. It should have been nearer my right thumb, so I didn't have to take my hand off thrust to hit it. You know, with hindsight I should have put a shield in instead. If you got hit it was decreased so you had a few chances. That would have given you some more strategy…"

It's the only time Ed questions his design choices, but then he was getting positive daily feedback from his peers. The Atari labs were open-plan affairs, long halls with room for two or three games in development at any one time. Half a dozen staff would be based in each room, and engineers would wander between labs, passing comment and stopping to play as they went. "Some engineers walking by would see a couple of asteroids floating across
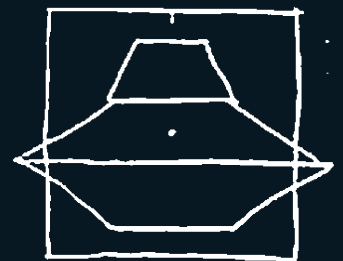
Explosion picture
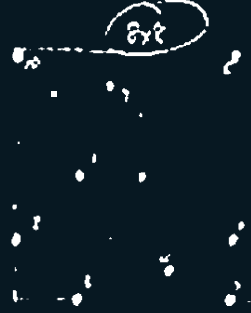
» Designing the large saucer wasn't proving straightforward…

Starship picture

Saucer

ship explosion pictures

8x8

TURTLE POWER

In light of its huge success, it seems surprising that Ed never revisited *Asteroids* nor did he produce another vector game. He cites the unreliability of the colour vector technology and his desire to work on something new, though he does reveal the little-known tale of *Turtleroids*. "Every year, Atari Coin-op had an off-site brainstorming session where we discussed new game ideas. For many years the idea of *Turtle Races* was proposed. This was a game where you raced your turtle by continuously increasing your voice to get your turtle to move. Increasing too quickly caused the turtle to go into its shell for a while. The idea was always shot down. I'm not sure if we turned every game idea into turtle this or turtle that, but one year Frank Ballouz got up in front of everyone and said 'no more turtles!' Of course, we took it as a challenge. We had waiters bring drinks with wind-up turtles in and did everything we could think of in the way of turtles. Someone suggested we change the Gold Asteroids in the lobby of Coin-op Engineering in Sunnyvale to have a turtle instead of a saucer, so I changed the graphics and burned a special program to do this. Hence, *Turtleroids*."
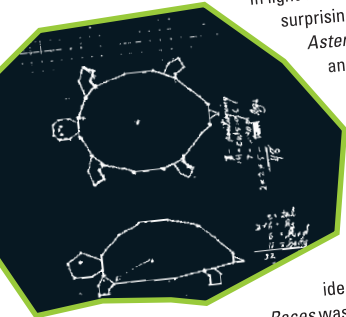
» Ed's original sketches for the different rock shapes.
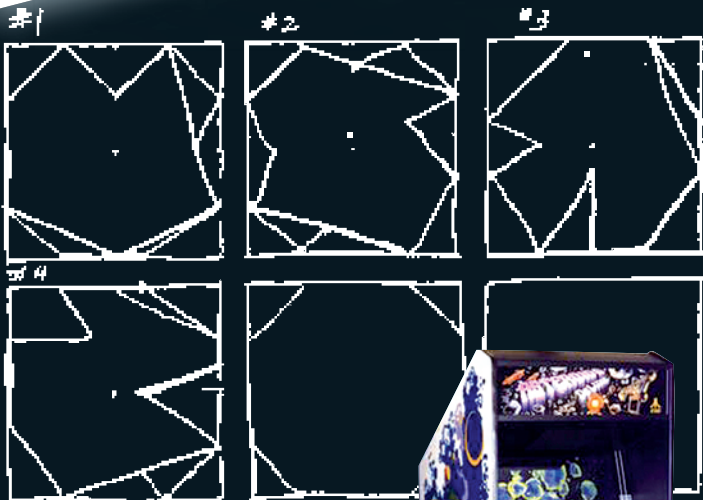
my screen and start humming the tune to Lawrence Welk's *Tiny Bubbles* just to tease me," chuckles Ed. "A lot of colleagues would come by and ask 'when are you leaving?' 'When can I play this game?' And you realise, okay, that's a good sign… Management would come in and check on progress. Lyle was certainly interested. He was, like, let's do a focus group, let's do a field test."

Yes, feedback from outside the company was overwhelmingly positive, too. Atari organised two focus groups in June 1979. On the 14th, they gathered together seven older players, veterans of *Space War*, and then on the 20th they tested *Asteroids* on nine children aged between 15 and 17, all *Space Invaders* fans. Ed and his fellow engineers observed proceedings through one-way glass and player comments were noted down meticulously. Ever the archivist, Ed has held on to these four pages of detailed feedback and it's fascinating to read how players first struggled to get to grips with the thrust button, requesting a joystick instead, and how the younger group, accustomed to taking shelter behind a base in *Space Invaders*, noted that you don't get a break in this game.

Ed is more circumspect when it comes to the value of these written responses. "I just look at their play and see what's going on. I always believe that if they don't get wowed immediately, you have a problem."

Players also commented on the way the sound effects built the tension, something Howard is especially proud of contributing. "That thump, thump, thump… I was really trying to do a heartbeat," he explains. "I sensed as the game sped up and you became more tense, your own heartbeat would speed up and I really wanted to keep them in sync. We didn't have sound chips back then so I created a hardware circuit for each of the 13 sounds by hand and wired them onto Ed's board myself."

Such was the intimate nature of creating videogames in those frontier days, and *Asteroids* stands as one of the period's crowning achievements. Released in November 1979, it went on selling for years, earning Atari an estimated $150 million in sales and a further $500 million in revenue from countless enthralled gamers.

While nothing can truly detract from the game's enormous success, issues did arise post-release. Some were clearly technical: accumulate too many extra ships and the game slows to a crawl, and on some machines, if you got down to just your ship and a single asteroid, the display would fade out. "That's the spot killer," declares Ed.
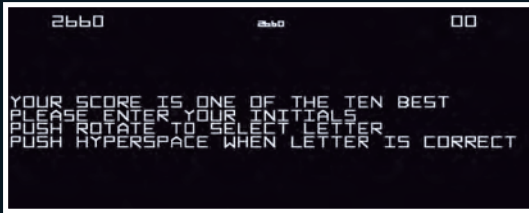
"If the game dies, the vector beam would just point at wherever you last pointed it and burn a hole in the screen," he continues. "We had a piece of circuitry so that if you don't move the vector enough it shuts it down. I wasn't given any technical numbers, so I put the score at the top and the Atari copyright at the bottom and thought that, along with the ship and at least one asteroid, that would be enough to disable the spot killer and the video display wouldn't be turned off… turns out it wasn't. As for the slowdown, if you have hundreds of ships, the game can't draw everything at 60Hz per frame. I wasn't clever enough to limit it to ten ships or something. Anyway, I thought Mr Bill would come out and blow you away…"

For our non-American readers, Mr Bill and Sluggo are characters from US variety show *Saturday Night Live* and became the unofficial names for the two saucers. The fact that Ed Logg received a cease and desist letter from their copyright holders, despite there being no reference to the Play-doh pair in the game itself, is an indication of how *Asteroids* had entered popular culture. And that was partly due to Mr Bill not doing his job…

#1   #2   #3

#4

» Ed in 1983, after *Asteroids* and *Centipede* but before *Gauntlet*…   » The devilishly difficult *Asteroids Deluxe*.   » Scott Safran, whose *Asteroids* record still stands after 27 years.

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2660              2660              00
YOUR SCORE IS ONE OF THE TEN BEST
PLEASE ENTER YOUR INITIALS
PUSH ROTATE TO SELECT LETTER
PUSH HYPERSPACE WHEN LETTER IS CORRECT
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» [Arcade] Ed took the idea for a high-score table from Exidy's *Star Fire*.

» An arcade flyer for the fancy cocktail cabinet.

ASTEROIDS MEMORIES

Owen Rubin
(CREATOR OF SPACE DUEL AND MAJOR HAVOC)

"*Asteroids* was being developed in a lab near mine. I used to go in and play late at night, sometimes until I filled up the high score table with my initials. Ed Logg would come in next morning, reset it, work on the game and come in the next day to find 'ORR' was in every spot on the table again. So he put in a check for 'ORR' and all other combinations of my initials so they'd be replaced with his. I sent a note telling him there was a bug till he told me what he'd done…"

Irene
(WIFE OF ED LOGG)

"*Asteroids* was my first experience of videogames. I did house sitting for some friends and they happened to have a machine. I'd play it when I was there and thought it was kinda fun and when they moved they gave it to me as a gift. Years later, I was introduced to Ed at a party by Ed Rotberg who said he'd like to introduce me to the best. No, I was not a groupie! I think Ed was supposed to sign my control panel. He still hasn't got round to it."

Tim Skelly
(VECTOR GAME PIONEER AT CINEMATRONICS)

"When I saw *Asteroids* at an AMOA show in Chicago, I thought, 'why didn't I think of that?' Its strength was that it allowed you to work out your own ways to win the game. Every player was free to break rocks and shoot saucers any way they pleased. It was an inspiration to me and to decades of game designers. When I was briefly working for Gremlin/Sega, the team there created a variation on it called *Space Meatball* or *F*** Your Buddy*, depending on the prototype. My point is, flexibility is fun, and *Asteroids* introduced wonderfully flexible gameplay."

"Asteroids is a man-against-machine game. However good you got, it was always one step ahead "

HOWARD DELMAN RAGES AGAINST THE MACHINE

"Originally, the small saucer used to come out and shoot instantly," explains Ed. "If you were right next to him he'd nail you. People said it wasn't fair, so I said okay, I'll give you a second before he takes his shot so you can see where he's at. Unfortunately that opened the big fat window to lurking."

Ah, the ancient art of lurking, where the proficient player leaves a solitary asteroid on screen and then hunts saucers for hours, sometimes days, accumulating mammoth scores. It reached its zenith in November 1982 when 15-year-old Scott Safran played a single game for an entire weekend setting the current world record of over 41 million (see **Retro Gamer** 28 for the full story) and the widespread use of the technique led many arcade owners to complain about these marathon games.

"What they didn't see was that some could play that long but a lot of other people would try," notes Ed. "So Joe might play for six hours on one quarter, but then all Joe's friends come in and try and be as good as Joe and put in a lot of money. That really contributed to both the game's popularity and its longevity. We actually made a new chip to prevent lurking, but a lot of operators found that with it their earnings went down and wanted it put back to the old way. *Asteroids* would have been successful anyway, but lurking became part of its lore…"

"Sure, there were those who could play forever, but the average player always felt that his failures were his own, that the game was fair, and he could do better next time," adds Lyle. "I think the 'secret' of *Asteroids'* phenomenal success was Ed's near-perfect tuning of the difficulty."

"It came out at a great time, too," says Howard. "Arcades were springing up everywhere. Offices were getting games, doctor's surgeries were getting them… there was an unprecedented demand and everyone in the business sold everything they had. The industry was hot back then. And *Asteroids* is a classic man-against-machine game. It was simple to learn, obvious what you had to do and you could improve quickly, but however good you got, the game was always one step ahead. I used to get into fights with marketing guys who wanted games with more colour, more things on screen, things to be more lifelike. I'd say it was all about gameplay, how fun something is."

"Ladies and gentlemen, after 30 years we are still floating in space…"

DEVELOPER HIGHLIGHTS

BREAKOUT
SYSTEM: ARCADE
YEAR: 1978

LUNAR LANDER
SYSTEM: ARCADE
YEAR: 1979

CENTIPEDE (PICTURED)
SYSTEM: ARCADE
YEAR: 1980