AMSAT® The Radio Amateur Satellite Corporation

FACT SHEET

What is *PHASE 3-D* ?

"Phase 3-D" is the term now being used to identify Amateur Radio's next major satellite effort. It will be the largest, most complex, and most expensive Amateur Radio satellite ever built. An international team of volunteers, from over a dozen countries on five continents, has been assembled and are now laboring diligently to complete the new satellite in time for a launch aboard an Ariane launch vehicle of the European Space Agency, hopefully sometime in 1998. While the individuals on the Phase 3-D International Development Team come from diverse technical and managerial backgrounds, they share a single tie that binds them all together. Each has an avid interest in the future of space communications.

The very first Amateur Radio satellites launched in the early 1960s made up the "Phase 1" group and were typified by OSCARs 1 and 2. These satellites carried only low power beacons designed to last just a few weeks. The "OSCAR" designation, (short for *O*rbiting *S*atellite *C*arrying *A*mateur *R*adio) is only given to Amateur Radio satellites that successfully achieve orbit.

Later AMSAT spacecraft such as OSCARs 6, 7 and 8, carried the "Phase 2" designation. These satellites were built to last for a period of a year or more. Several Phase 2 satellites have since been built and launched, including a number of digital packet radio satellites. These satellites (often called "PACSATS") are designed to receive non-commercial computer messages uploaded by Amateur Radio Operators for storage and later downloading by operators in other parts of the world. A distinguishing characteristic of the Phase 2 satellites, however, is their relatively low Earth orbit, allowing amateurs only limited satellite access time and greatly restricted real-time communications distance capabilities.

The "Phase 3" part of the Phase 3-D identifier puts it in the largest and latest class of Amateur Radio satellites. The Phase 3 program was begun in the mid-1970s to partially alleviate many of the orbital limitations of previous satellites. These satellites typically yield real-time, worldwide voice coverage for their users by employing a highly elliptical, *Molniya*-style orbit first pioneered by the Soviet Union. Phase 3 satellites appear to "park" over one spot on the Earth for up to several hours at a time. This orbital configuration virtually eliminates the "hurry up" style of satellite operation one needed to use the earlier Amateur Radio satellites.

The first Phase 3 satellite, Phase 3-A, was lost on launch due to a booster failure. Both Phase 3-B and Phase 3-C satellites were successfully launched and became OSCARs 10 and 13 respectively. Phase 3-D, however, will be much more than a mere replacement for OSCARs 10 and 13, both of which are now rapidly nearing the end of their useful lifetimes.

Phase 3-D will feature a combination of higher power transmitters as well as higher gain receivers and antennas. Also, unlike current Phase 3 satellites (and if all goes as planned) Phase 3-D's antennas will always point Earthward. This means significantly stronger signals will come from the satellite, and lower transmit power and simpler antennas will be needed to get a usable signal to the satellite. These improvements are specifically aimed at bringing satellite operation easily within the reach of *every* Amateur Radio Operator on Earth.

Phase 3-D will contain receivers and transmitters for all Amateur Radio satellite frequency bands from 21 MHz to 24 GHz that are currently authorized for use by the International Telecommunications Union. Thus, Phase 3-D will help perpetuate the amateur's proven ability for both pioneering and perfecting new communications modes at ever higher frequencies.

Many of the communication technologies that are taken for granted today by the average consumer, such as AM and FM broadcasting, broadcast television, international shortwave and satellite communications, as well as cellular telephone services, can all trace their technical roots to experiments first done by Amateur Radio Operators. What's more, the birth of dependable international geosynchronous satellite communications as well as the work now being done by commercial companies experimenting with low-Earth, "PACSAT-style" communication technologies, can be *directly* linked to the pioneering work first done by AMSAT's volunteers.

But, anything as capable as Phase 3-D doesn't come cheaply. Even with most of the labor donated by unpaid volunteers, present estimates place the final cost of building and launching the satellite at between four and five million US dollars. Worldwide efforts to raise contributions from Amateur Radio Operators have proceeded quite well. However, accumulating the necessary resources needed to complete and launch Phase 3-D has required significant funding from sources outside of Amateur Radio.

AMSAT is very proud of its tradition of excellence and the contributions it has made to the advancement of space communications, space education and the space sciences. Phase 3-D will be Amateur Radio's premier vehicle to continue a quest that began with the very birth of radio...a search for new communications technologies for generations yet unborn.

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