SPACEFLIGHT

Low-cost boosters lower their sights
CAMARILLO

American Rocket (Amroc)
and Space Services (SSI),
which had originally planned
to operate low-cost commer-
cial launch vehicle services
this year, have been forced to
lower their sights, reports
Tim Furniss.
Amroc hopes to test a
component of its planned
Industrial Launch Vehicle
(ILV) later this year. SSI may
launch its Conestoga lA
booster early next year. Both
companies are finding the
realities of fund-raising diffi-
cult. Amroc has only recently
recalled its 80 employees after
laying them off because of the
effect of the stockmarket
crash on some of its investors.

Despite the investment of
Houston Industries in Space
Services, the company
appears to have some way to
go yet. It is five years since its
last Conestoga test flight, and
Conestoga 1A is merely an
uprated version of this
booster.
Amroc's ultimate aim is the
ILV-1, the baseline config-
uration of which has recently
been changed. ILV-1. is now a
four-stage vehicle using 22
identical hybrid motors,
rather than the 19 planned
originally. It is capable of
placing 1,360kg into 216km-
high circular polar orbit or
1,814kg into a similar equa-
torial orbit. The first ILV-1
commercial delivery of three
satellites into orbit is now
scheduled for mid-1989 at the
earliest.

The first stage is a single
oxidiser tank with 12 hybrid
motors around its circum-
ference. The motors use solid
fuel, primarily polybutadiene
rubber. The second, third, and
fourth stages are mounted
above the first stage in a clus-
ter of motor tank units.

Amroc produces these
motors at Camarillo, and has
tested them at the US Air
Force Astronautics Labora-
tory at Edwards Air Force
Base. The USAF has also
granted permission for Amroc
to operate * ILV-1 from
Vandenberg Air Force Base.
Before the ILV-1 flies,
however, test flights of a more
modest nature will take place.
The first, this year, will
involve a single ILV prop-
ulsion module with an inte-
grated liquid-oxygen tank. It

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will have a thrust of 31,750kg.
This 16m-long booster will lift
a 99kg Strategic Defence
Initiative (SDI) payload to an
altitude of 160km on a sound-
ing rocket type mission. A
second SDI mission may
follow.
The next test will be of a
new 23m-long interim booster
called Slingshot. This is a
three-module version with a
Star 48 upper stage which will
place an SDI payload weigh-
ing 272kg into low Earth orbit
from Vandenberg in 1989. If
the market demands it, Sling-
shot may become the first
active commercial vehicle,
says Amroc, and it has in fact
taken priority over the ILV-1.
Negotiations to fly out of
Cape Canaveral are also
taking place. Delivery of
340kg into low Earth orbit is
possible from this east-coast
launch site.

Amroc has teamed with
Globesat of Logan, Utah, to
form Orbital Express, a
venture to market low-cost
launches of several small
satellites simultaneously for
$995,000 each. A dedicated
ILV-1 launch was to cost
between $5 million and $8
million.

Both Amroc and Space
Services see the US
Department of Defence, and
particularly the SDI Office, as
major potential customers.
Space Services' Conestoga 1A
launch from Wallops Island
will place a 317kg military
payload into low Earth orbit.
The major SSI launch vehi-
cle is to be the Conestoga II,
which will be able to place
1,814kg into low Earth orbit
from Wallops Island.
In a marketing effort which
mirrors Orbital Express,
Space Services has linked up

American Rocket
has revised the
design of its
Industrial Launch
Vehicle fleftj.
Space Services has
outlined a family of
Conestoga boosters
fbelowj

with the British company NIS
Space to offer flights of recov-
erable capsules.
Conestoga II comprises two
Morton Thiokol Castor IV
boosters which act as the first
stage. The second stage is
another Castor IV sitting
between the first-stage boost-
ers. The next stage is a half
Castor IV. There will be a
choice of final stages, but the
stage to be marketed on
Conestoga II is a Star 37FM
motor.
Later versions are the
Conestoga IV-0, which will
have seven Castor IV motors
as the first and second stages,
a full-size motor for the third
stage, and a half Castor IV
replacing the Star motor. A
geosynchronous Conestoga
IV-1, which will have Star
37FM and Star 27 motors as
the fifth and sixth stages,
could place 2,780kg into
geostationary orbit.
The first Conestoga to fly,
however, will be the Cone-
stoga lA. This is a single
Castor IV first stage, a half
Castor IV second stage, and a
Star 37FM third stage. The
last Conestoga launch from
Matagorda Island, Texas, on
September 9, 1982, was of
a single Castor IV stage
"to demonstrate engineering
objectives."

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