AVIONICS

USAF eyes F-15 visuals

AKRON

An advanced, limited field-of-
view, visual system for F-15
simulators has been developed
by Rediffusion and Goodyear
in response to a request from
the US Air Force. Evaluation
was completed earlier this
year, and purchase decisions
are expected soon. Lack of a
visual system has been identi-
fied as a major deficiency of
F-15 simulators.

The pair have been working
intensely on the project since
1982, when the USAF became
interested in low cost visual
systems for its A-10, F-15, and
F-16 simulators. Goodyear is
prime contractor on all USAF
F-15 simulators, which are
fixed base machines currently
equipped with a five degree-
of-freedom g-seat, g-suit, and
a wide range of aural cues.
Adding Rediffusion's soph-
isticated CT-5A visual system
and a 20ft diameter dome
greatly increases the training
ability, particularly in air
combat and air-to-ground
attack modes. It is hoped
that the latter feature will
encourage the USAF to
choose the equipment for
training its F-15 Dual Role
Fighter pilots. This would
be a separate competition,
however, and is not part of
the current decision.

A complete, eight-projector
CT-5A system, comprising
image generators made in
the USA by Evans and
Sutherland, and calligraphic
projectors made by Re-
diffusion, was considered too
expensive for the USAF's
needs. A compromise has
therefore been achieved, in
which the number of
projectors is reduced to four.
This results in a field-of-view
limited to 160° in azimuth by
60° in elevation instead of the
full 200° by 90°. But to
increase the effective field of
view, the visual area is move-
able, and is automatically
adjusted to match the pilot's
line of sight.
For occasions when the
primary area of interest
migrates outside the field of
view, during air combat for
example, a laser designator
produces a dot on the dome
indicating target location.
The pilot is thus able to con-
tinue tracking his target until
it returns within the field of

Image quality has improved dramatically over the last few years. These F-15s, because they are lead aircraft, are modelled in very high detail. Formation lights, markings, moveable undercarriage and speed brake are depicted, along with transparent canopy and selectable afterburner. Visu-als are produced by Rediffusion CT-5A image generators. Improvements over the original CT-5 system include 50per cent extra channels, providing considerably more surfaces

view, when the aircraft image
is renewed. This, says Good-
year, is a unique feature of the
simulator.

Despite its limited field of
view, Goodyear claims that
adding visuals improves the
simulator to the extent that
91 per cent of the F-15's abili-
ties are accurately repro-
duced, compared with 69 per

cent on the standard machine.
This figure came out of an
evaluation carried out by 48
F-15, F-16, and A-10 pilots
from all over the USA, in
which 14 separate air superi-
ority and air-to-ground mis-
sions were flown. "No other
dome-type simulator gives
this sort of dynamism," says
Goodvear.

A gaming area 300 n.m.
square has been designed, a
the centre of which is a replica
of Seymour Johnson Air
Force Base. The base marks
the beginning of a 20 x 100
n.m. corridor of finely detailed
terrain which closely matches
navigation maps. Terrain-
following can be practised
among rolling hills, complete
with special effects located at
the southern end of the cor-
ridor which include bomb
explosions, SAMs, anti-
aircraft fire and moving vehi-
cles as well as fixed features
such as an airport, and
bridges. A railway train and
patrol boat provide dynamic
targets. Solar effects are
also included. Heat-seeking
missiles can be tricked
into flying towards the sun,
and occulation is produced
as aircraft pass in front
of it.

Further data bases will also
be available, based on
material produced by the
USAF for cruise missile and
Pershing 2 guidance. In prac-
tice, this means that pilots
will be able to fly the F-15
simulator almost anywhere in
the world.

The evaluation programme,
which was carried out at the
Goodyear factory at Akron,
Ohio, was assisted by a
$200,000 contract from the
USAF, which also loaned an
F-15 simulator for the pro-
gramme. Each of the three
companies involved has also
contributed substantial fund-
ing of its own.
Goodyear's first simulators
were produced for the US
Navy in 1957, for training
crews to fly its airships. It won
the contract to supply 11 F-15
simulators to the USAF in
1973, since when it has deliv-
ered ten machines. An update
programme is under way, in
which the Harris 6024 com-
puters are replaced with
Gould 32/8780s having twice
the speed and capacity. Good-
year is currently negotiating
the supply of the 12th and
13th simulators.
• Rediffusion has won con-
tracts worth $4-5 million to
supply a Boeing 757 advanced
cockpit procedures trainer
and Novoview SP3T visuals
to Northwest Airlines. The
latter will be integrated with
Northwest's Singer-Link 757
simulator.

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