S-Band Weather Satellite Receiver

Microwave Communications Innovation and Consultation

Project: WEFAX **PI: Dr. H. Paul Shuch, Chief Engineer, Microcomm (paul@microcomm.net)**

Key Features:

- Portable system for reception of S-band WEFAX signals from geosynchronous orbit
- Downconverter with integral low-noise amplifier
- VHF intermediate frequency compatible with legacy TIROS receivers
- Small parabolic reflector with high efficiency, linearly polarized feed
- ISA-card interface with A/D converters and synch signal derivation
- Personal computer display and printout of weather facsimile images

First commercial S-Band WEFAX Receive System, circa 1975

Approach:

Throughout the 1960s and early 1970s, several generations of polar orbiting environmental satellites were deployed to provide meteorological monitoring of Earth. They employed VHF FM Automatic Picture Transmission (APT) downlinks in the 135 MHz band to simple receivers driving mechanical facsimile printers. A new generation of microwave weather satellites, operating from geosynchronous orbit, began to emerge in the 1970s. This project sought to upgrade legacy APT stations by developing low-cost microwave downconverters and antennas to drive existing receivers.

Partners:

- National Oceanic and Atmospheric Administration
- National Environmental Satellite Service
- Geological Survey of Canada

Schedule Milestone and Deliverables:

1975 (TRL 4)
- Validated first commercial microstrip receive circuit modules (mixer, preamplifier, bandpass filter, local oscillator) for 1691 MHz converter

1976 (TRL 5)
- Demonstrated modular downconverter prototype to NOAA/NESS

1977 (TRL 6)
- Manufactured first integral downconverter assembly
- Prototype demonstrated at IEEE International Microwave Symposium

1980 (TRL 7)
- Delivered first complete receive system to GSC (w/ analog display)

1984 (TRL 8)
- Prototyped and published FAXBoard ISA digital display for IBM PC

TRL = 8

Rev. 12 May 2005

Keywords: Downconverter, Weather Satellite, Facsimile, WEFAX, S-Band, SMS, GOES, Meteosat, Geosynchronous