FLIGHT SUMMARY REPORT

Flight Number: 93-127

Calendar/Julian Date: 25 June 1993 • 176

Sensor Package: Wild-Heerbrug RC-10
Dual Hycon HR-732
Electro-Optic Camera System (EOC)

Area(s) Covered: Virginia/Maryland

Investigator(s): Handley, USFWS;
Frisch Commonwealth of Virginia

Aircraft #: 708

SENSOR DATA

Accession #:	04581	04582
Sensor ID #:	034	038
Sensor Type:	RC-10	HR-732
Focal Length:	12" 304.66 mm	24" 609 mm
Film Type:	High Definition Aerochrome IR SO-131	High Definition Aerochrome IR SO-131
Filtration:	cc.10B	cc.10B
Spectral Band:	510-900 nm	510-900 nm
f Stop:	4	8
Shutter Speed:	1/150	1/75
# of Frames:	182	163
% Overlap:	60	60
Quality:	Excellent	Excellent
Remarks:	Camera clock offset 7.18 seconds from navigation data	Camera clock offset 7.59 seconds from navigation data

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SENSOR DATA continued

Accession #:	04583	-----
Sensor ID #:	039	111
Sensor Type:	HR-732	EOC
Focal Length:	24" 609 mm	-----
Film Type:	High Definition Aerochrome IR SO-131	-----
Filtration:	cc.10B	-----
Spectral Band:	510-900 nm	-----
f Stop:	8	-----
Shutter Speed:	1/75	-----
# of Frames:	119	-----
% Overlap:	60	-----
Quality:	Good	-----
Remarks:	Camera clock offset 7.35 seconds from navigation data	

Airborne Science and Applications Program

The Airborne Science and Applications Program (ASAP) is supported by three ER-2 high altitude Earth Resources Survey aircraft. These aircraft are operated by the High Altitude Missions Branch at NASA-Ames Research Center, Moffett Field, California. The ER-2s are used as readily deployable high altitude sensor platforms to collect remote sensing and *in situ* data on earth resources, celestial phenomena, atmospheric dynamics, and oceanic processes. Additionally, these aircraft are used for electronic sensor research and development and satellite investigative support.

The ER-2s are flown from various deployment sites in support of scientific research sponsored by NASA and other federal, state, university, and industry investigators. Data are collected from deployment sites in Kansas, Texas, Virginia, Florida, and Alaska. Cooperative international scientific projects have deployed the aircraft to sites in Great Britain, Australia, Chile, and Norway.

Photographic and digital imaging sensors are flown aboard the ER-2s in support of research objectives defined by the sponsoring investigators. High resolution mapping cameras and digital multispectral imaging sensors are utilized in a variety of configurations in the ER-2s' four pressurized experiment compartments. The following provides a description of the digital multispectral sensor(s) and camera(s) used for data collection during this flight.

Camera Systems

Various camera systems and films are used for photographic data collection. Film types include high definition color infrared, natural color, and black and white emulsions. Available photographic systems are as follows:

- Wild-Heerbrug RC-10 metric mapping camera
  - 9 x 9 inch film format
  - 6 inch focal length lens provides area coverage of 16 x 16 nautical miles from 65,000 feet
  - 12 inch focal length lens provides area coverage of 8 x 8 nautical miles from 65,000 feet
- Hycon HR-732 large scale mapping camera
  - 9 x 18 inch film format
  - 24 inch focal length lens provides area coverage of 4 x 8 nautical miles from 65,000 feet
- IRIS II Panoramic camera
  - 4.5 x 34.7 inch film format
  - 24 inch focal length lens
  - 90 degree field of view provides area coverage of 2 x 21.4 nautical miles from 65,000 feet

The U.S. Geological Survey's EROS Data Center at Sioux Falls, South Dakota serves as the archive and product distribution facility for NASA-Ames aircraft acquired photographic and digital imagery. For information regarding photography and digital data (including areas of coverage, products, and product costs) contact EROS Data Center, Customer Services, Sioux Falls, South Dakota 57198 (Telephone: 605-594-6151).

Electro-Optic Camera System

The NASA-Ames High Definition Electro-Optic Camera System (EOC) is an experimental sensor under development by the High Altitude Missions Branch at NASA-Ames Research Center. The system captures high resolution digitized images from a solid-state video camera and stores the imagery on magnetic tape. System characteristics are as follows:

CCD Video Camera

IFOV:	0.2 mrad
Ground Resolution:	15.8 feet (4.81 meters at 65,000 feet)
Total Scan Angle:	13.96°
Swath Width:	3.3 nmi (6.2 km) x 2.7 nmi (4.9 km) at 65,000 feet
Spectral Coverage:	400-900 nm
Frame Size:	1280 pixels x 1025 pixels
Lens (Interchangeable):	28 mm
Shutter Speed:	Selectable
Aperture:	f/2.8
Filtration:	4 and 6 position filter wheels (4 and 6 spectral filters) Polarizing Filter
Tracking Capability:	Tilt 45° fore and aft

Data Collection

Frame Rate:	1 image every 3 seconds
Frame Overlap:	90% (to 40% w/6 filters)
Data Storage:	Tape Cassette
Capacity:	5.0 Gbytes

For further information contact Ted Hildum at NASA-Ames Research Center, Mail Stop 240-6, Moffett Field, California 94035-1000.

For specific information regarding flight documentation, sensor parameters, and areas of coverage contact the Aircraft Data Facility, NASA-Ames Research Center, Mail Stop 240-6, Moffett Field, California 94035-1000 (Telephone: 415-604-6252). Additional information regarding ER-2 acquired photographic and digital data is also available through the Aircraft Data Facility.

CAMERA FLIGHT LINE DATA
FLIGHT NO. 93-127

Accession # 04581

Sensor # 034

Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	Cloud Cover/Remarks
		START	END		
A - B	8461-8470	15:33:44	15:38:02	65000/19800	10% cumulus (frames 8461-8463)
C - D	8471-8484	15:45:30	15:51:42	"	Clear
E - F	8485-8498	16:01:15	16:07:26	"	10-20% scattered cumulus (frames 8485-8488)
G - H	8499-8505	16:20:29	16:23:19	"	10% cumulus (frames 8502-8505)
I - J	8506-8511	16:31:13	16:33:35	"	Minor-10% cumulus (frames 8506-8509)
K - L	8512-8527	16:38:57	16:46:03	"	Minor-10% cumulus (frames 8512-8521); 10% cumulus (frame 8527)
M - N	8528-8543	16:49:44	16:56:51	"	Minor-10% cumulus (frames 8528-8531);
O - Q	8544-8554	17:07:46	17:12:29	"	Minor cumulus (frames 8544-8548)
R - N	8555-8570	17:17:21	17:24:27	"	30% cumulus (frame 8555); minor-10% cumulus (frames 8556-8558); minor cumulus (frames 8569-8570)

CAMERA FLIGHT LINE DATA
FLIGHT NO. 93-127

Accession # 04581

Sensor # 034

Check Points	Frame Numbers	Time (GMT-hr, min, sec) START	Time (GMT-hr, min, sec) END	Altitude, MSL feet/meters	Cloud Cover/Remarks
T - U	8571-8581	17:29:53	17:34:37	65000/19800	Minor cumulus (frames 8571-8572 and 8579-8581)
M - V	8582-8597	17:41:36	17:48:41	"	10-30% cumulus (frames 8582-8583); minor cumulus (frame 8584)
L - W	8598-8619	18:04:15	18:14:10	"	20% cumulus (frames 8609-8619)
X - Y	8620-8642	18:23:04	18:33:27	"	Clear

CAMERA FLIGHT LINE DATA
FLIGHT NO. 93-127

Accession # 04582

Sensor # 038

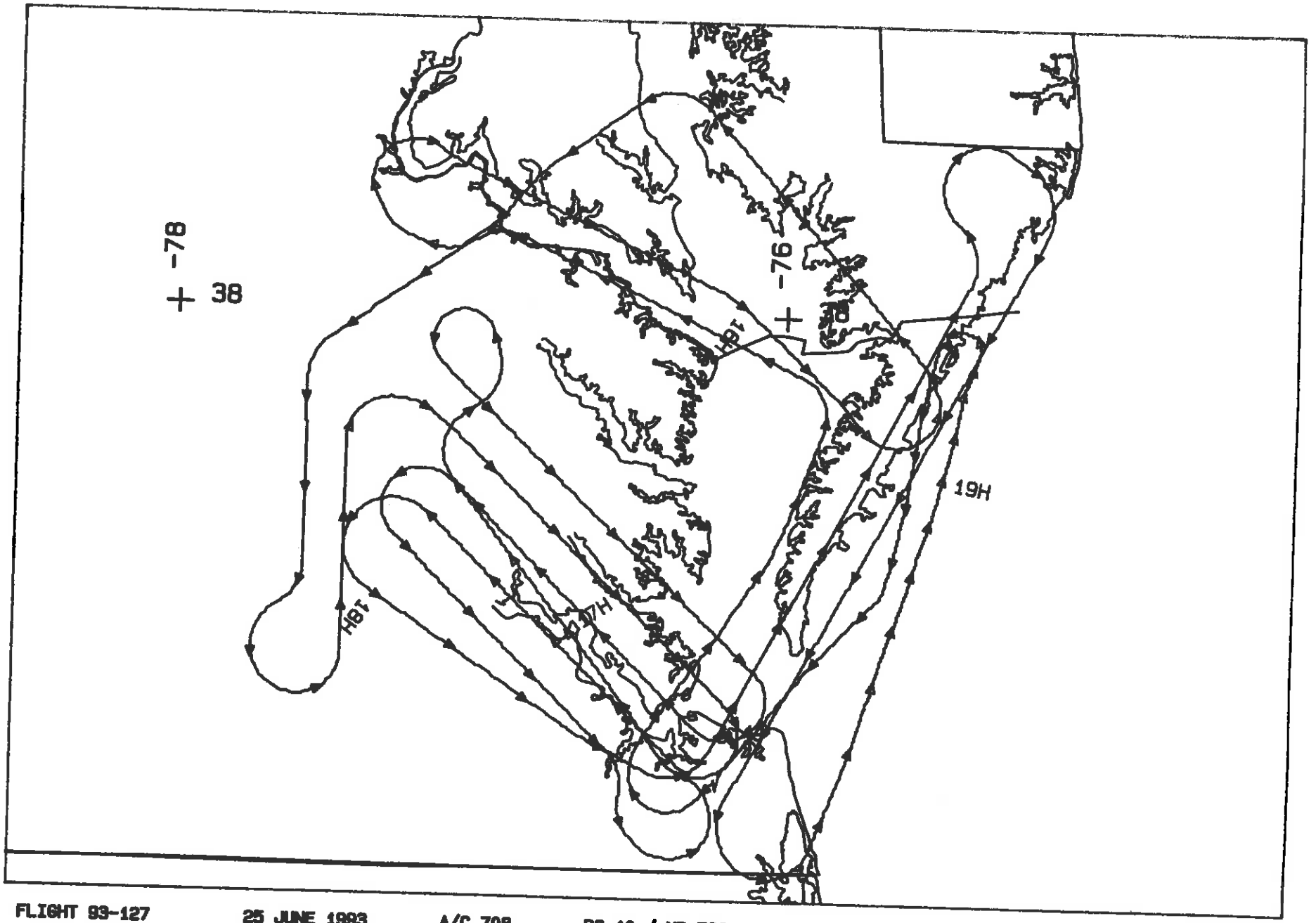
Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	Cloud Cover/Remarks
		START	END		
A - B	0001-0020	15:32:57	15:37:40	65000/19800	Minor-10% cumulus (frames 0003-0005); minor cumulus (frames 0009-0010)
C - D	0021-0047	15:45:05	15:51:30	"	Clear
E - F	0048-0074	16:00:52	16:07:15	"	10% cumulus (frame 0048); minor-30% cumulus (frames 0050-0054)
G - H	0075-0086	16:20:15	16:22:57	"	Minor-10% cumulus (frames 0081-0086)
I - J	0087-0097	16:30:47	16:33:14	"	Minor-10% cumulus (frames 0087-0092)
K - L	0098-0127	16:38:37	16:45:43	"	Minor-10% cumulus (frames 0099-0102); minor-20% cumulus (frames 0103-0112); minor cumulus (frames 0119-0120)
M - N	0128-0158	16:49:23	16:56:43	"	Minor-10% cumulus (frames 0128-0133); minor cumulus (frames 0148-0150)
O - P	0159-0163	17:07:28	17:08:26	"	Minor cumulus (frames 0160-0163); emulsion defect and stepwedge overprint (frame 0161)

CAMERA FLIGHT LINE DATA
FLIGHT NO. 93-127

Accession # 04583

Sensor # 039

Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	Cloud Cover/Remarks
		START	END		
R	0001	17:17:15	———	65000/19800	20% cumulus
S - N	0002-0025	17:18:58	17:24:35	"	Minor cumulus (frames 0011-0012, 0016-0018, and 0022-0023
T - U	0026-0045	17:29:42	17:34:20	"	Minor-10% cumulus (frames 0026-0027); minor cumulus (frames 0044-0045)
M - V	0046-0076	17:41:25	17:48:45	"	10-30% cumulus (frames 0046-0048); minor cumulus (frames 0050-0051, 0070-0071, and 0075)
L - W	0077-0119	18:04:05	18:14:20	"	10% cumulus (frames 0082-0084); 10% cumulus (frames 0089-0091); minor cumulus (frames 0093-0095 and 0114-0119); minor-20% cumulus (frames 0099-0111); stepwedge overpring (frame 0119)



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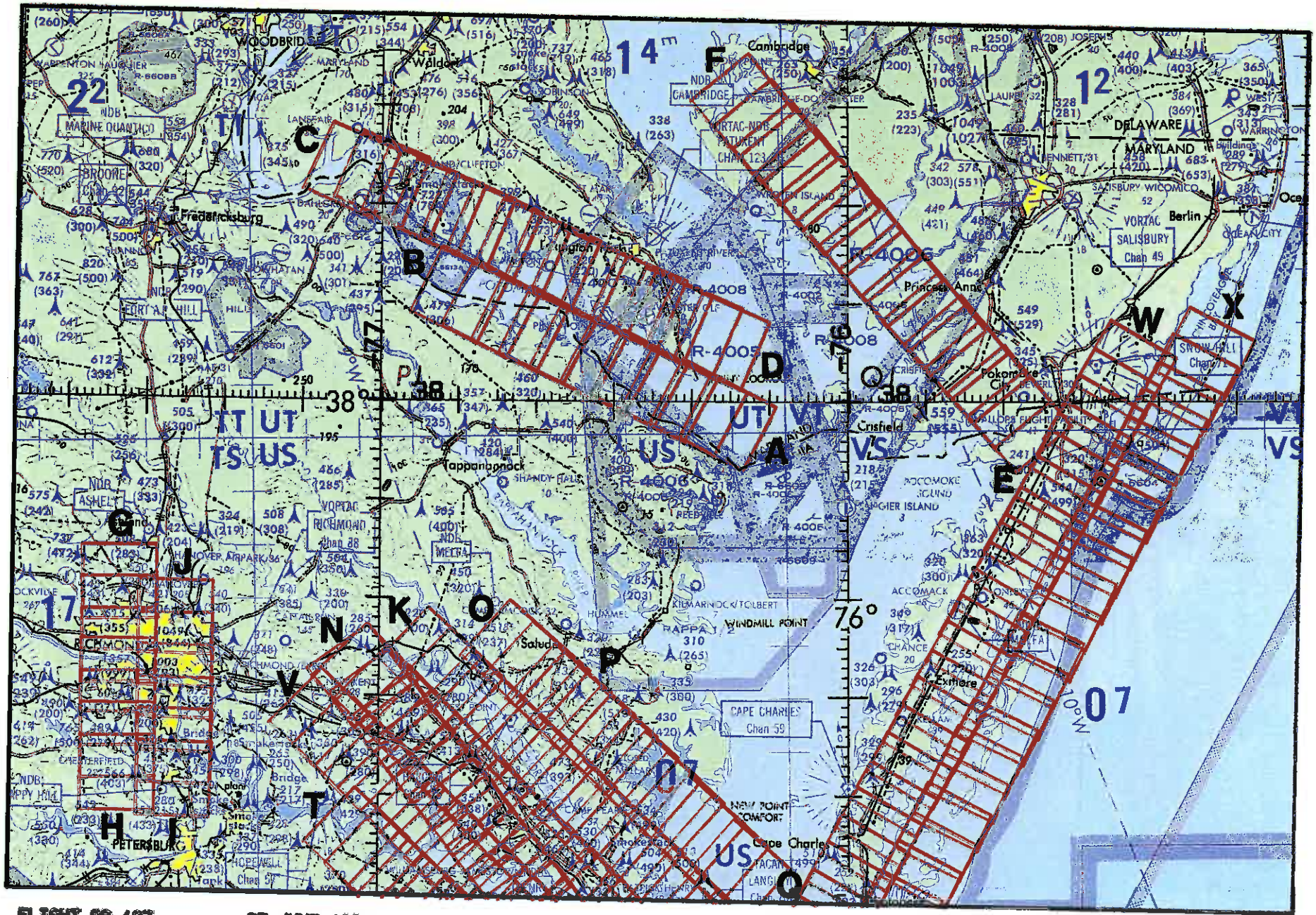

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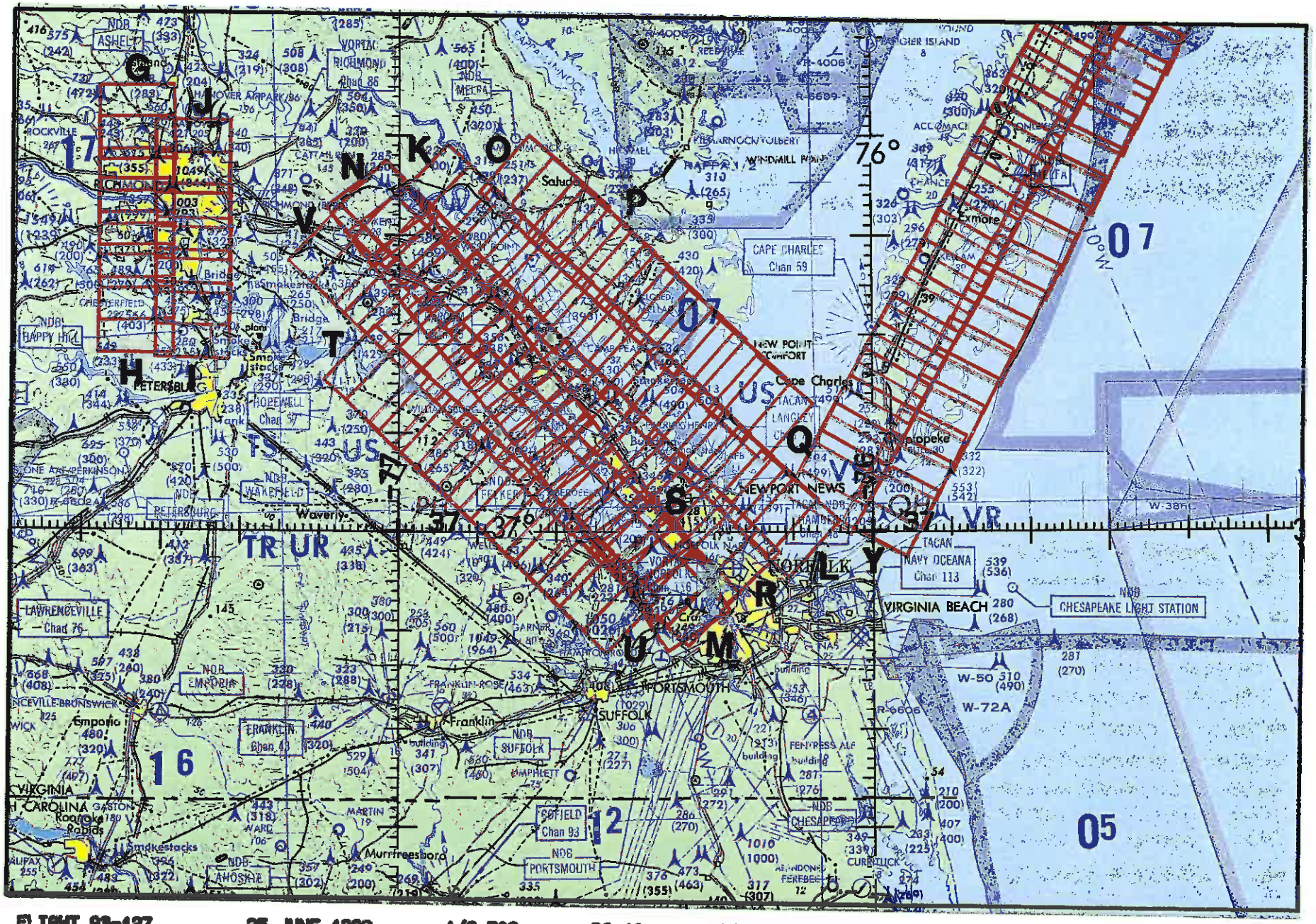
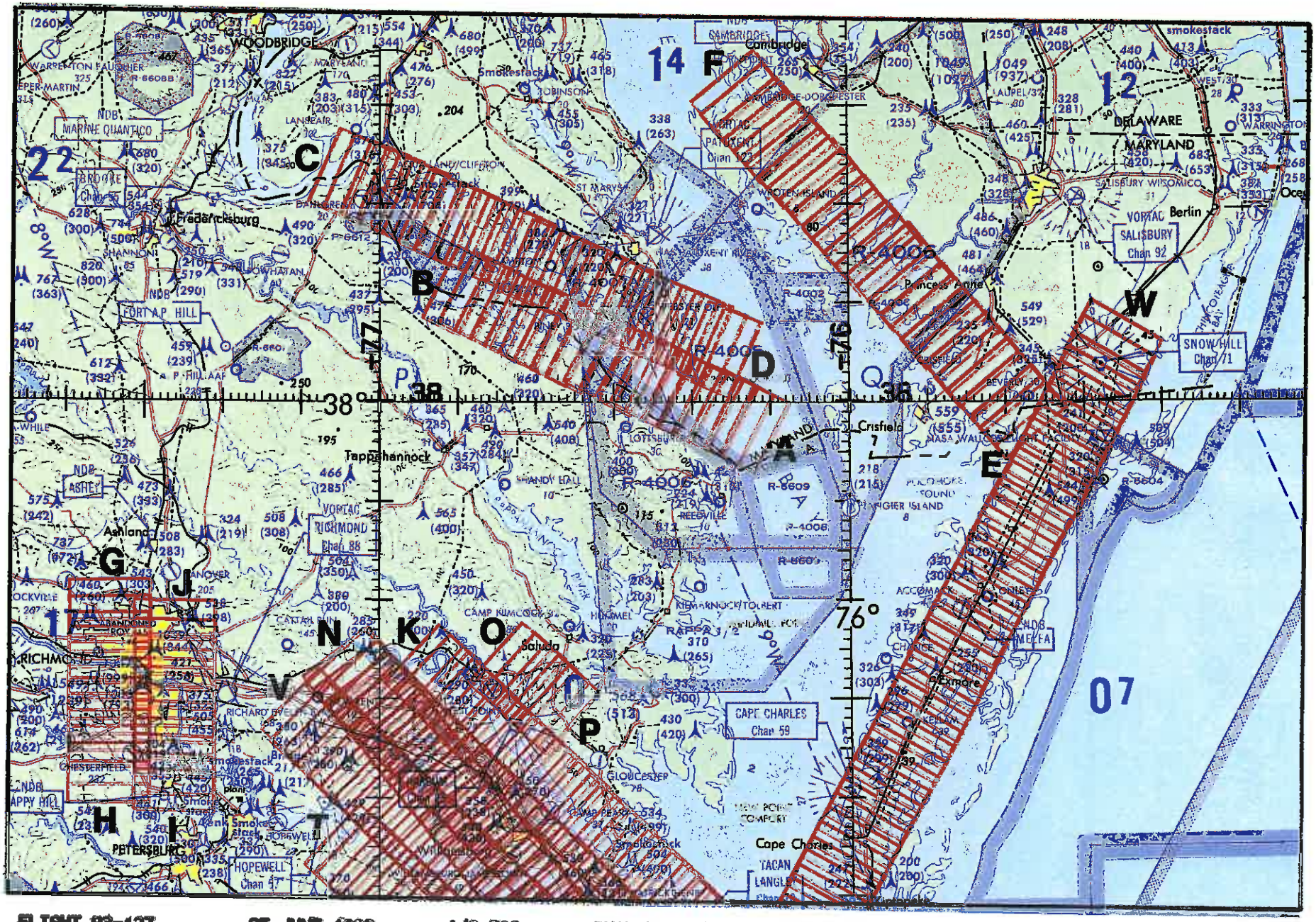
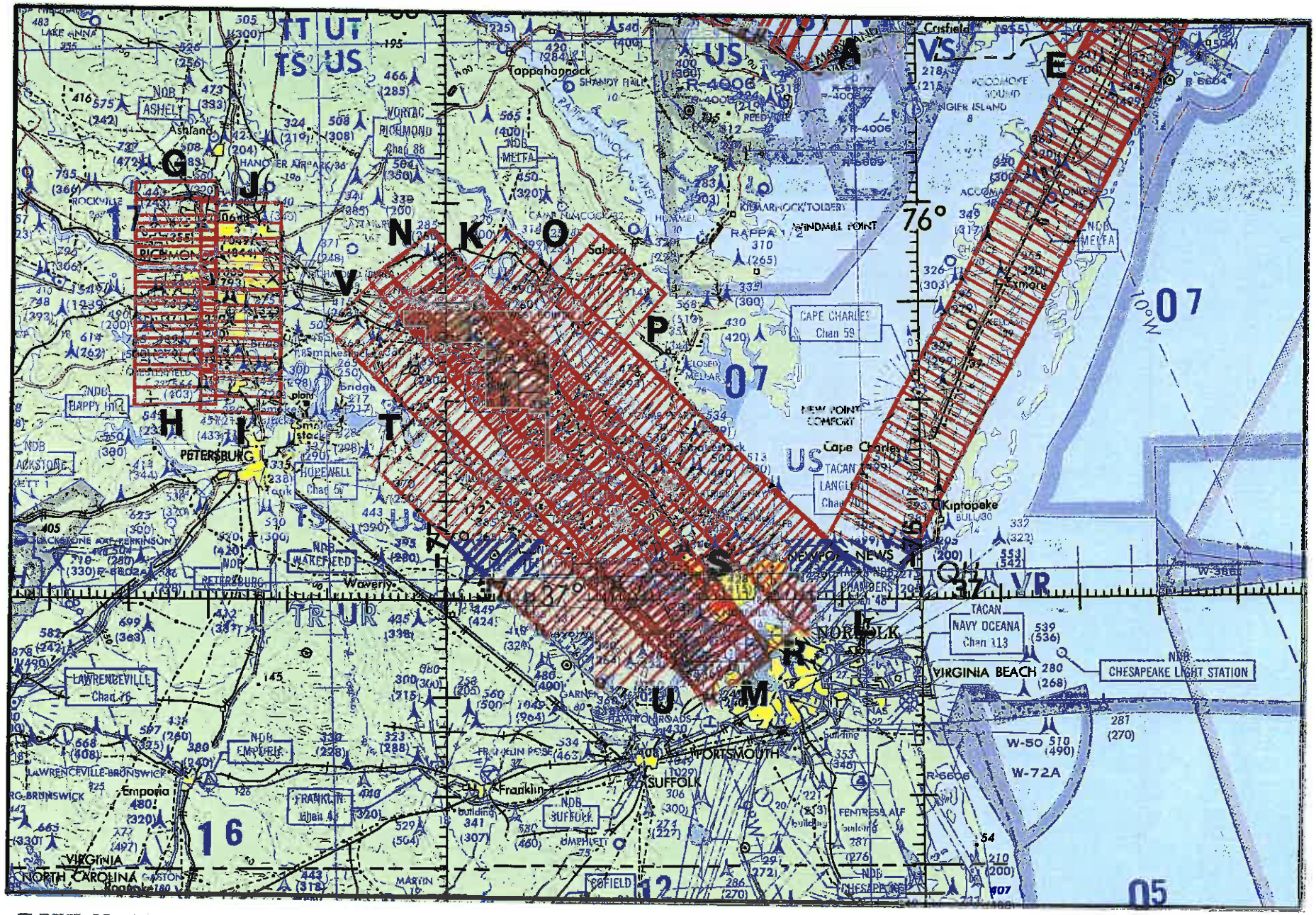


FLIGHT 93-127 25 JUNE 1993 A/C 708 RC-10 ONC G-21



FLIGHT 93-127 25 JUNE 1993 A/C 708 DUAL HR-732 ONC 6-21



FLIGHT 99-127 25 JUNE 1999 A/C 708 DUAL HR-732 ONC 6-21