

Things in Space

That should interest HAMs

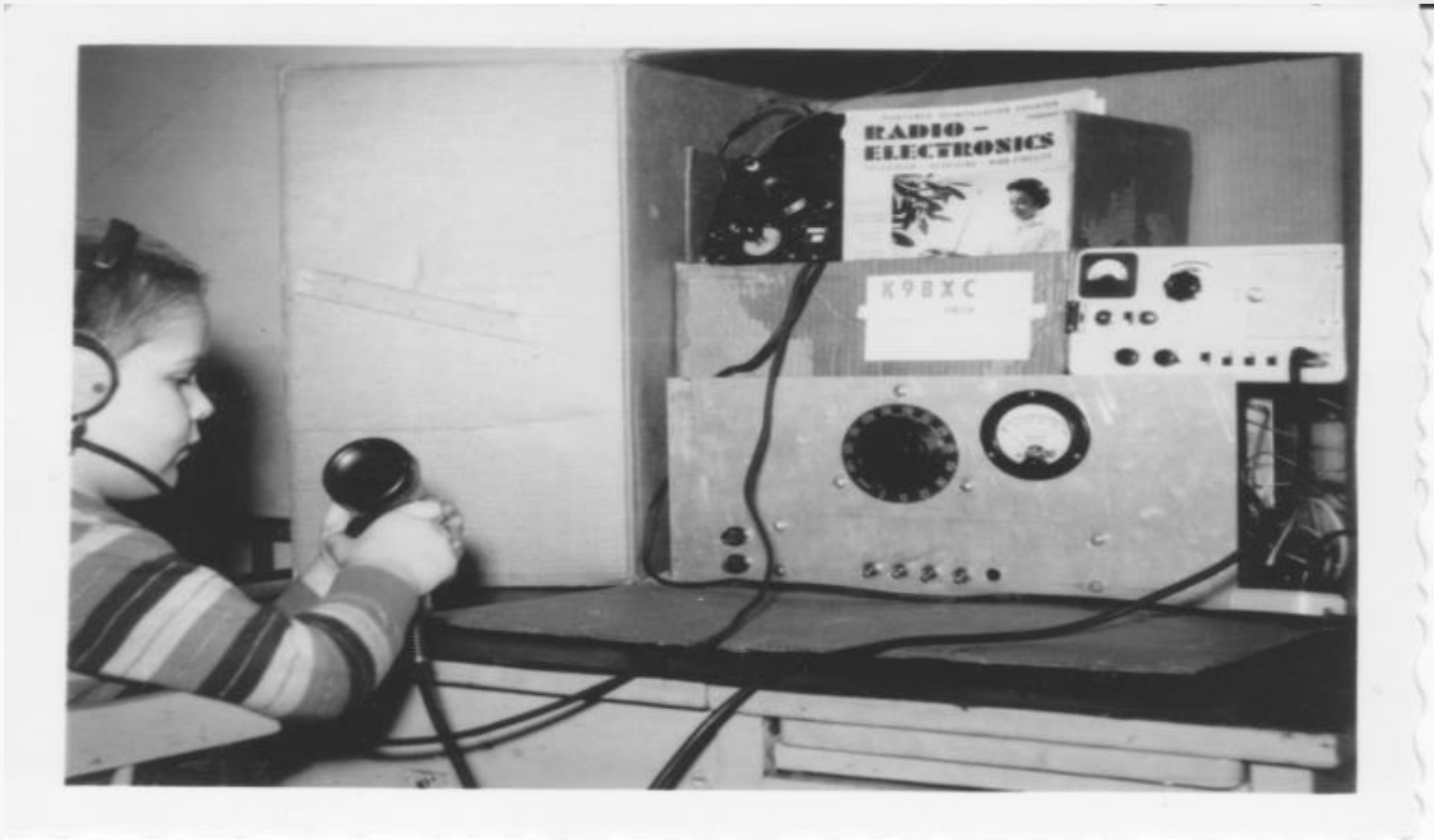
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Welcome

Intro

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Agenda

Natural stuff
Manmade stuff
How to use this info

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Natural Stuff

Stars

Moon

Moving stuff

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Sun

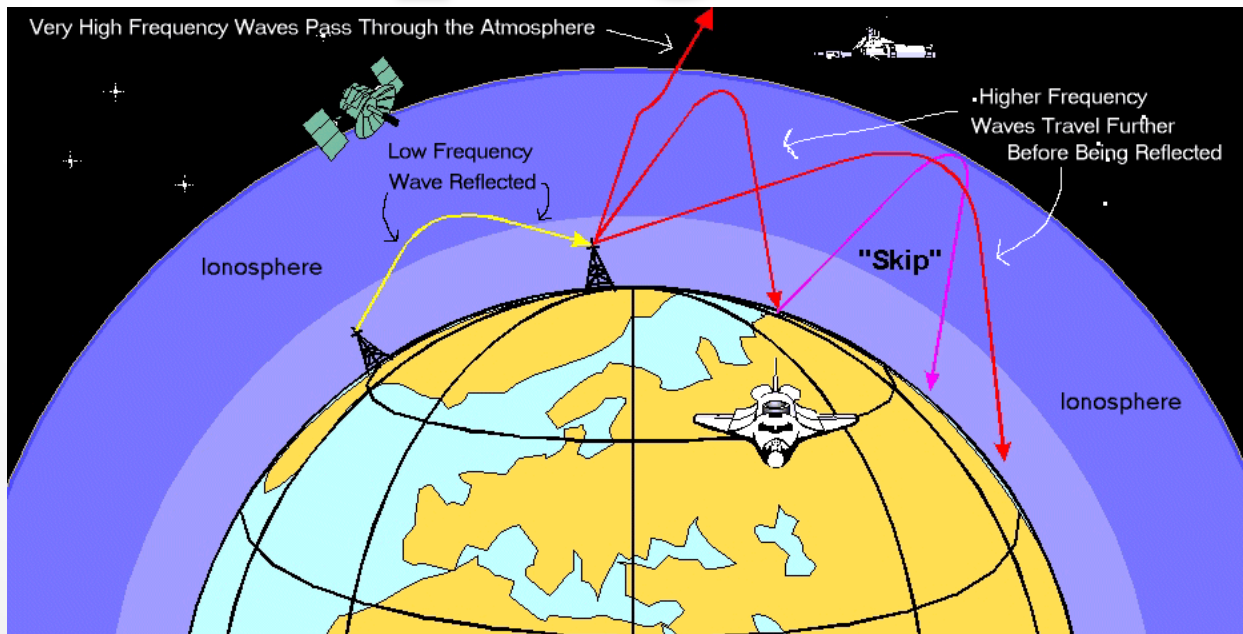
Ionospheric Propagation

Aurora

Plasma @ 21cm/1.42 GHz

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Ionospheric Propagation



Ionospheric Propagation

3 main properties

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Ionosphere

Reflection $< I = < R$

Absorbtion

Pass thru

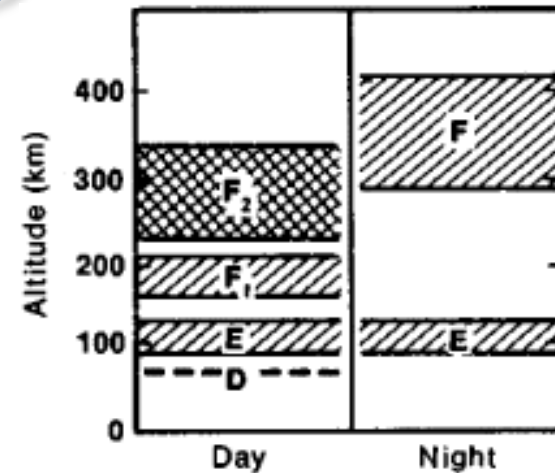
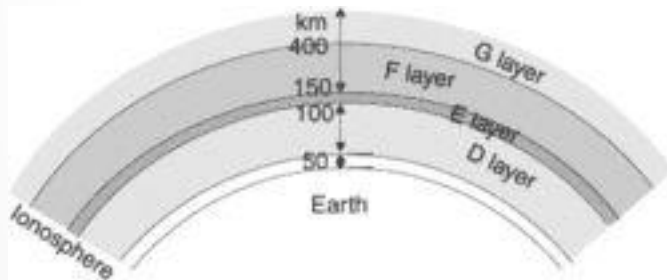
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Ionospheric Propagation

HF – 11 year cycle (sun)
MUF – distance/frequency

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Ionospheric Propagation



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Aurora

CME and Seasonal impact

NOAA Solar website

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Other Plasma

EPHS BERT project
EPHS (Stanford) SID

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BERT to right



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BERT hazard



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BERT details

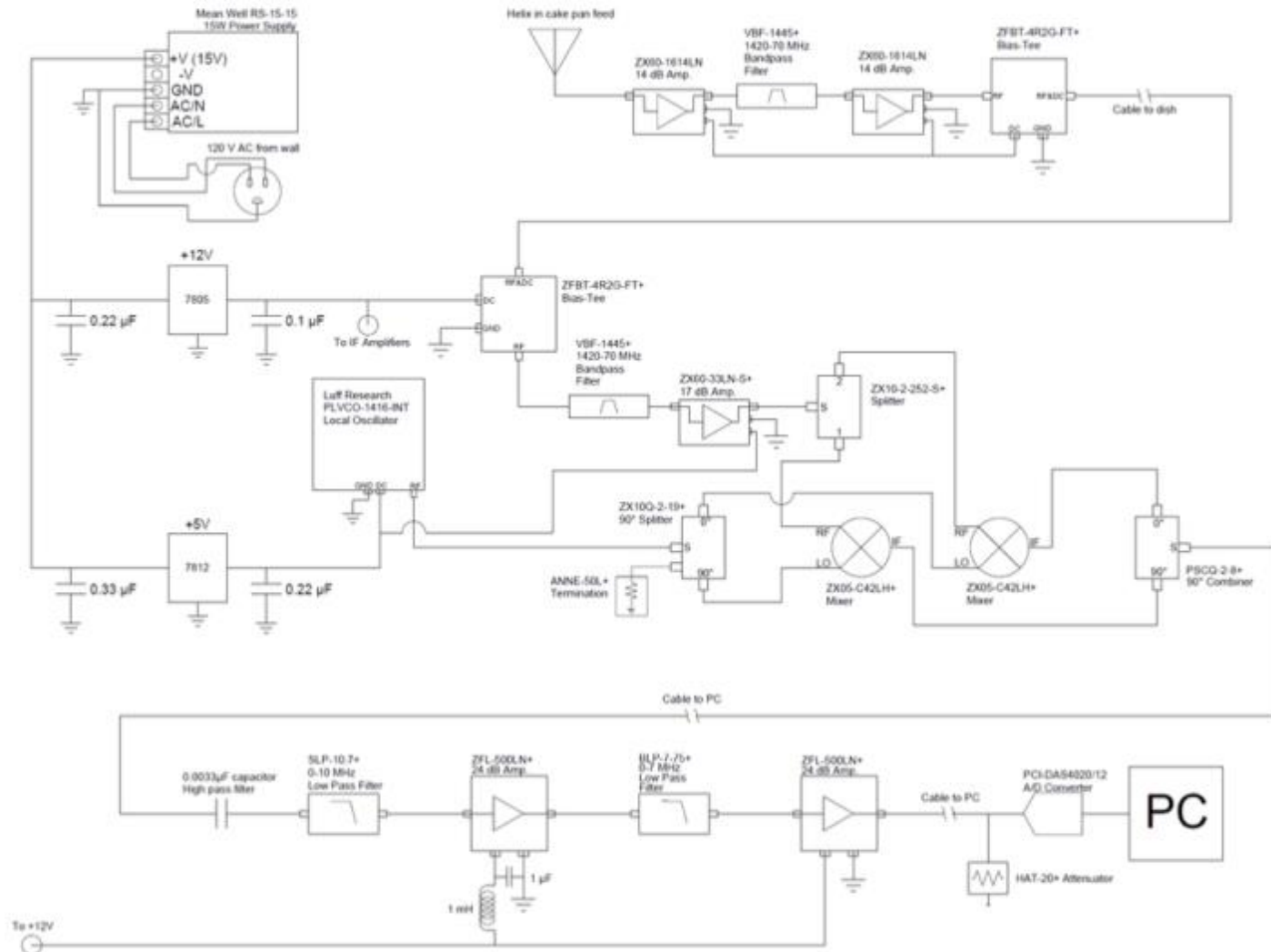
EVARC help

Construction

Hardware

Software

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“MOON”

Big Passive VHF Reflector
Huge array antennas
Gain LNAs – POWER

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“MOON”

Still POWER

Le\$\$ elaborate equipment

Weak Signal Software

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“Moving Stuff”

Comets/Meteors/Planets

Predictable

Weak Signal Software

LTO projects

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LTO

Little Thompson
Observatory

@ Berthoud HS

Jupiter receiver 24 MHz
Asteroid TV “Listening”

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Man-made stuff

ISS
Satellites

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ISS

HAMs in Space APRS/Packet/SSTV

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Satellites

History
Lexicon
Equipment

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“History”

Sputnik/Echo

AMSAT

other “SAT” organizations

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“History”

AO-7

Still working
40+ years in space

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Current “Birds”

US, Europe, Middle East,
Japan & now China.

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Lexicon

Acronyms & Terms
Technical Space Stuff

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Hang On

Here we go!

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AOS/LOS

Acquisition & Loss Of Signal Apex

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Footprint

What we see
(Between 2 stations)

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High/Low Orbit HEO/LEO

200 – 20,000 miles

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Pass Predictors

Software – satpc32,
amsat.org, satview.org

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AMSAT Online Satellite Pass Predictions - SO-50

[View the current location of SO-50](#)

Date (UTC)	AOS (UTC)	Duration	AOS Azimuth	Maximum Elevation	Max El Azimuth	LOS Azimuth	LOS (UTC)
07 Nov 15	12:31:33	00:13:30	183	29	99	43	12:45:03
07 Nov 15	14:11:41	00:14:02	235	34	318	25	14:25:43
07 Nov 15	15:55:46	00:09:49	288	7	328	14	16:05:35
07 Nov 15	17:42:16	00:03:05	342	1	354	7	17:45:21
07 Nov 15	19:23:41	00:08:22	348	5	27	59	19:32:03
07 Nov 15	21:03:30	00:13:14	338	23	32	114	21:16:44
07 Nov 15	22:43:54	00:13:56	322	46	243	166	22:57:50
08 Nov 15	00:27:21	00:05:59	284	2	272	233	00:33:20
08 Nov 15	11:19:30	00:09:27	146	7	105	62	11:28:57
08 Nov 15	12:56:39	00:14:24	205	71	147	34	13:11:03

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Azimuth/Elevati on

2-axis rotators

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Uplink/Downlink

Like X-band repeater

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Linear vs Non-Linear

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Inverting/Non- Inverting

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Digital Modes Telemetry APRS

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Doppler Shift

Like moving train,
but with RF

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Doppler Shift

More impact on UHF
than VHF

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Half vs Full Duplex

Why?

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Grid Squares

Maidenhead

Long/Lat in

letters/numbers – e.g.,

DM79

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2° Longitude x 1° Latitude

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Awards

VUCC

Rovers – Woof!

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“Equipment
Needed?”

Surprise! Transceiver
& Antenna

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Equipment

- Expensive
- On a budget \$

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Equipment

Multi-Mode XCVR

Yagi/Eggbeater

LNA Pre-Amps

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Equipment

Dual-axis Rotator

Hardline

Lots of compute

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Equipment

Multiple Displays
Software – CAT

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Equipment

2 Cheapo HTs (V & U)

+

Arrow or Elk ANT

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Equipment

< \$150

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Equipment (me)

Dual-Band HT

Handheld dual-band antenna, duplexer

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How to Use This Info

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More Info

amsat.org

G6LVB.com, YouTube

Local friendlies

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How to Program HT for SO-50

A Dual-Band HT
is best

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SO-50 w/ HT

6 channels, CTCSS,
shift UHF (downlink)
for doppler

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SO-50

Channel	Rx	Tx	PL
SO-50A	436.805	145.850	67.0
SO-50B	436.800	145.850	67.0
SO-50C	436.795	145.850	67.0
SO-50D	436.790	145.850	67.0
SO-50E	436.785	145.850	67.0
SO-50F	436.780	145.850	67.0
SO-50 ON		145.850	76.0

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50-50 w/ HT

More:
Headset,
splitter/digital
recorder

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Now what?

HT, antenna, pass
prediction
(time/track)

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Show & Tell

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You are ready

Squelch – wide open
Point, Listen & Track
Then, transmit

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You are ready

But – What does an
exchange ‘sound’ like?

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QSO

Pass is short 4-14 mins
Many trying to use
'channel'

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QSO

(I am here)

N6UA, DM79

<Phonetics Please>

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QSO

(calling station heard)

W5PFG, 59 in DM79

N6UA

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QSO

(wrap-up)

QSL, W5PFG in EM21,
73, N6UA

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QSO

Keep it short & sweet
Unless – channel is
not busy

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QSO

Most of all,
HAVE FUN!

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Summary

Natural stuff

Manmade stuff

How to use this info

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Q & A

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