

# McIDAS History and Future

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26 September 2023

# McIDAS

## Man computer Interactive Data Access System

50<sup>th</sup> anniversary in October 2023, current versions:

- ⊗ McIDAS-**X**
  - ⊗ A**X** then **X** Window System
- ⊗ McIDAS-**V**
  - ⊗ Visualization using **V**isAD
- ⊗ McIDAS is one of the oldest, continually supported software packages still in use today
- ⊗ Today is my 45<sup>th</sup> anniversary at SSEC
  - ⊗ Involved with McIDAS project throughout

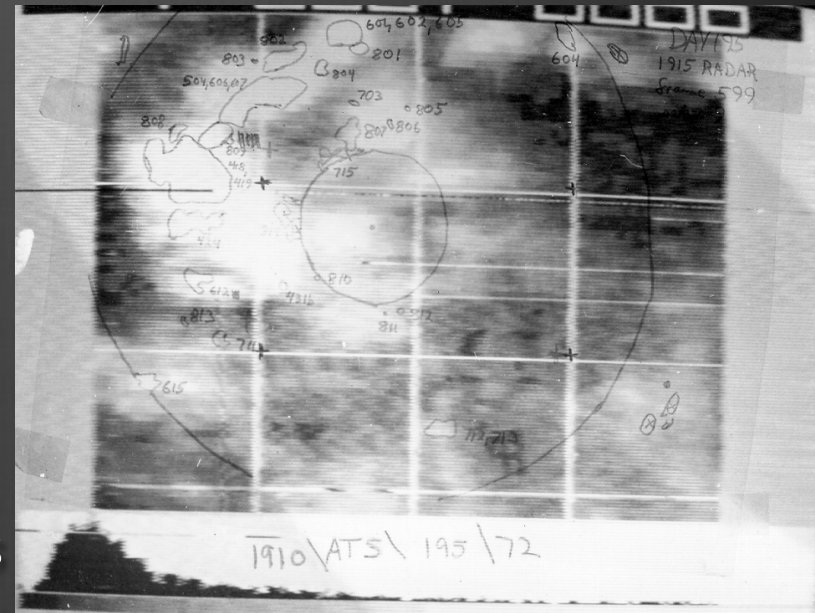
# What else began in 1973?

- 🎬 The birth of **hip-hop** in the Bronx
- 🎬 The soap opera “**The Young and the Restless**” first aired
- 🎬 First **cell phone call** made



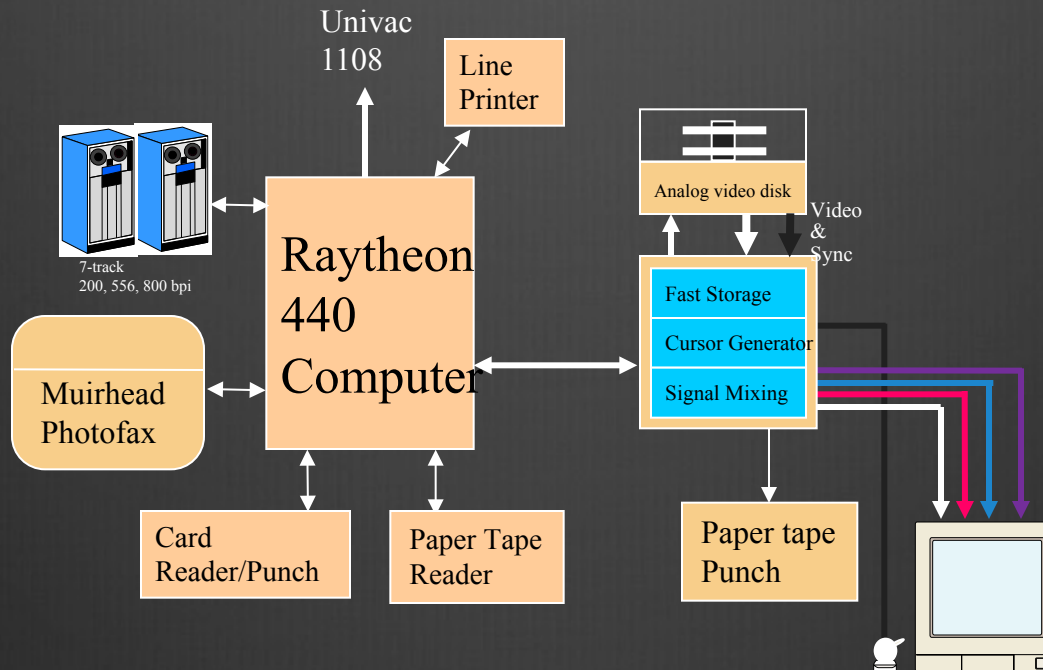
# McIDAS History

- ❁ **1960s**: Prof. Vern Suomi was striving to exploit the geostationary satellites for time domain information
- ❁ McIDAS was initially developed with the goal to mass produce the cloud drift winds
- ❁ For the last **50 years**, McIDAS has evolved through 5 generations of hardware/software as an internationally renowned system





# Windco - McIDAS Prototype (1971-1973)



# Windco - McIDAS Prototype Workstation



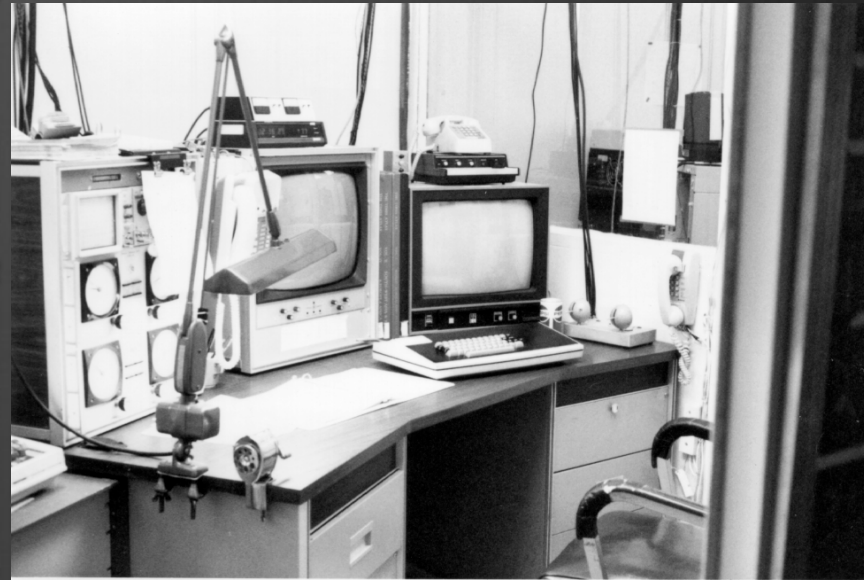
# Oldest Core Code Circa 1974

```
FUNCTION RACRAE(IYRDY,IHMS,RAC)
C RACRAE PHILLI 0174 NAV: CONVERTS CELESTIAL LONG TO EARTH LONG
C $ FUNCTION RACRAE(IYRDY, IHMS, RAC) (DAS)
C $ CONVERT CONVERT CELESTIAL LONGITUDE TO EARTH LONGITUDE. FN VAL IS
C $ IN REAL*4 DEGREES.
C $ IYRDY = (I) INPUT YEAR AND JULIAN DAY (YYDDD)
C $ IHMS = (I) INPUT TIME (HHMMSS)
C $ RAE = (R) INPUT CELESTIAL LONGITUDE (DEGREES)
C $$ RACRAE = NAVIGATION, CONVERT, LONGITUDE
C
C
DOUBLE PRECISION TIMDIF,RAHA,SOLSID,SHA
SHA=100.26467D0
IRAYD=74001
IRAHMS=0
SOLSID=1.00273791D0
RAHA=RAC-SHA+TIMDIF(IYRDY,IHMS,IRAYD,IRAHMS)*SOLSID/4.0D0
RAE=DMOD(RAHA,360.0D0)
IF(RAE.LT.0.0)RAE=RAE+360.0
RACRAE=RAE
RETURN
END
```

# McIDAS

## Significant Milestones

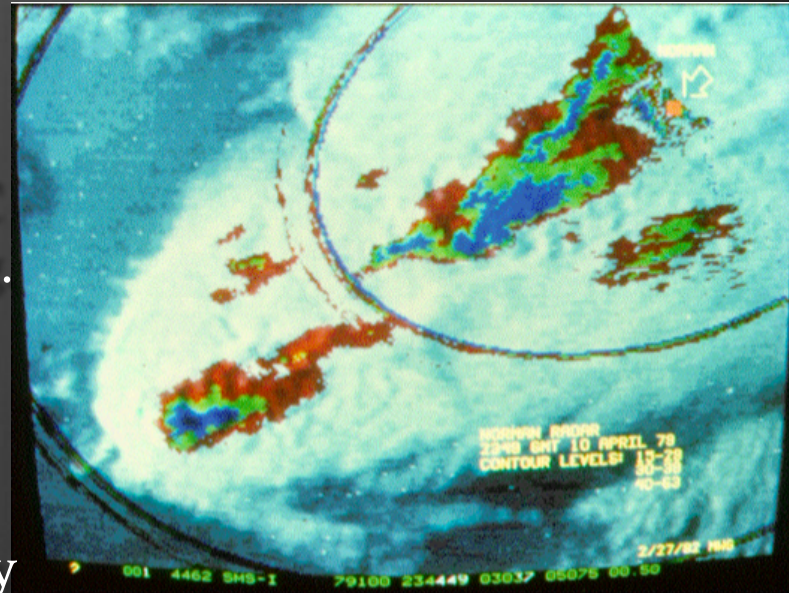
- ❶ **12 October 1973:** McIDAS was first used in a research project by Dave Martin
- ❷ **1977:** McIDAS installed at WTVT in Tampa, FL; active site until 2013!
- ❸ **1978:** Cloud-drift winds were manually generated from five geostationary satellites for a year as part of the First GARP Global Experiment (FGGE)



# McIDAS

## Significant Milestones

- ④ **1979**: Congressional delegation visited SSEC to learn about advances in severe storm forecasting in wake of tornadoes in Wichita Falls, TX
- ④ **1982**: McIDAS installed at NSSFC to aid in severe weather forecasting.
  - ④ Mesoscale Discussions began in 1986, partly in response to the availability of timely analyses
- ④ **1982**: Port to mainframe; funded by People's Republic of China

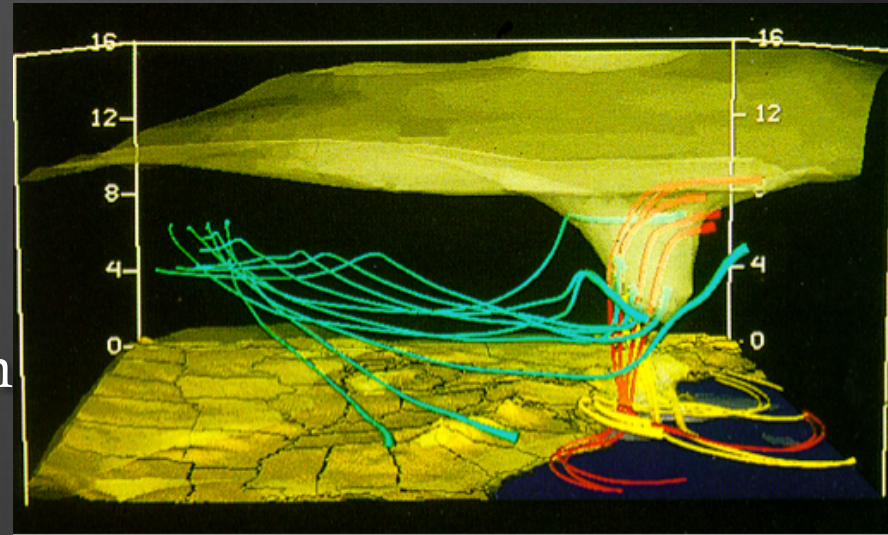




# McIDAS

## Significant Milestones

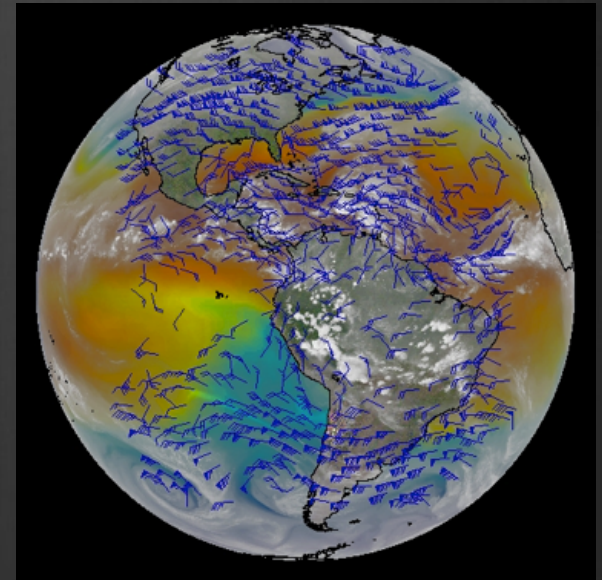
- ❶ **1982**: Interactive Flash Flood Analyzer (IFFA) based on McIDAS installed at NOAA
- ❷ **1989**: McIDAS Users' Group formed
- ❸ **mid-1980s**: McIDAS installed at Cape Canaveral and Johnson Space Center in support of the space shuttle
- ❹ **late-1980s**: Installed at NHC



# McIDAS

## Significant Milestones

- ❶ **1992**: McIDAS-X, Unix-based system
- ❷ **1994**: CIRA RAMSDIS – GOES satellite data into NWS
- ❸ **mid-1990s**: Abstract Data Distribution Environment (ADDE)



# McIDAS-X Current Chapter



# McIDAS-X

## Introduction

- Ported code from mainframe and DOS- and OS/2-based computers to IBM AIX workstations
- Released April 1992
- A distributed system as opposed to previous mainframe

SSEC Announces

## McIDAS-X Version 1.0

McIDAS for the UNIX environment will be available April 15, 1992 for:

- IBM RISC System/6000 workstations
- SGI Personal Iris workstations

**Features:**

✓ multiple McIDAS sessions	✓ animation to 15 frames/second
✓ variable frame size	✓ X Window fonts for text
✓ 7-bit image display	✓ sharing of UNIX and OS/2 area files, grid files and MD files
✓ image roam	✓ X-terminal support
✓ most McIDAS-OS2 applications	


**Minimum workstation requirements:**

<u>IBM RISC System/6000</u>	<u>SGI Personal Iris</u>
24 MB of RAM	24 MB of RAM
600 MB hard drive	600 MB hard drive
X Windows, Release 3 or later	X Windows, Release 3 or later
AIX operating system, V 3.1.5 or later	IRIX operating system, V 4.0 or later
color display	color display
keyboard and mouse	keyboard and mouse
TCP/IP	TCP/IP
Motif Window Manager	Motif Window Manager

**Cost:**

<u>Single user</u>	<u>Multiple simultaneous users</u>
\$20,000 (\$10,000 for Federal Government)	\$40,000 (\$20,000 for Federal Government)

*McIDAS-X will be ready for use on Sun Microsystem workstations later this year!*



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# McIDAS-X

## Keys to Success

- ⊗ Port to Unix
- ⊗ ADDE (Abstract Data Distribution Environment)
  - ⊗ Efficient data access from remote servers
- ⊗ McIDAS-X Reglue
  - ⊗ Better integration with Unix and X Windows System

Resulted in the longevity of McIDAS-X

Reliability, Stability

Solid infrastructure





# McIDAS-V

## Motivation in 2006

- ⊗ McIDAS-X software (currently written in Fortran 77 and C) had a long heritage resulting in limited extensibility potential
- ⊗ New visualization concepts could not be incorporated
- ⊗ Forthcoming environmental satellite data would not be utilized efficiently (GOES-R & JPSS operational systems)
  - ⊗ At that time, we thought there would be a hyperspectral sounder on GOES-R
  - ⊗ McIDAS-X was great for visualizing the imager instruments, but not the sounders (AIRS, CrIS, IASI)

# McIDAS-V

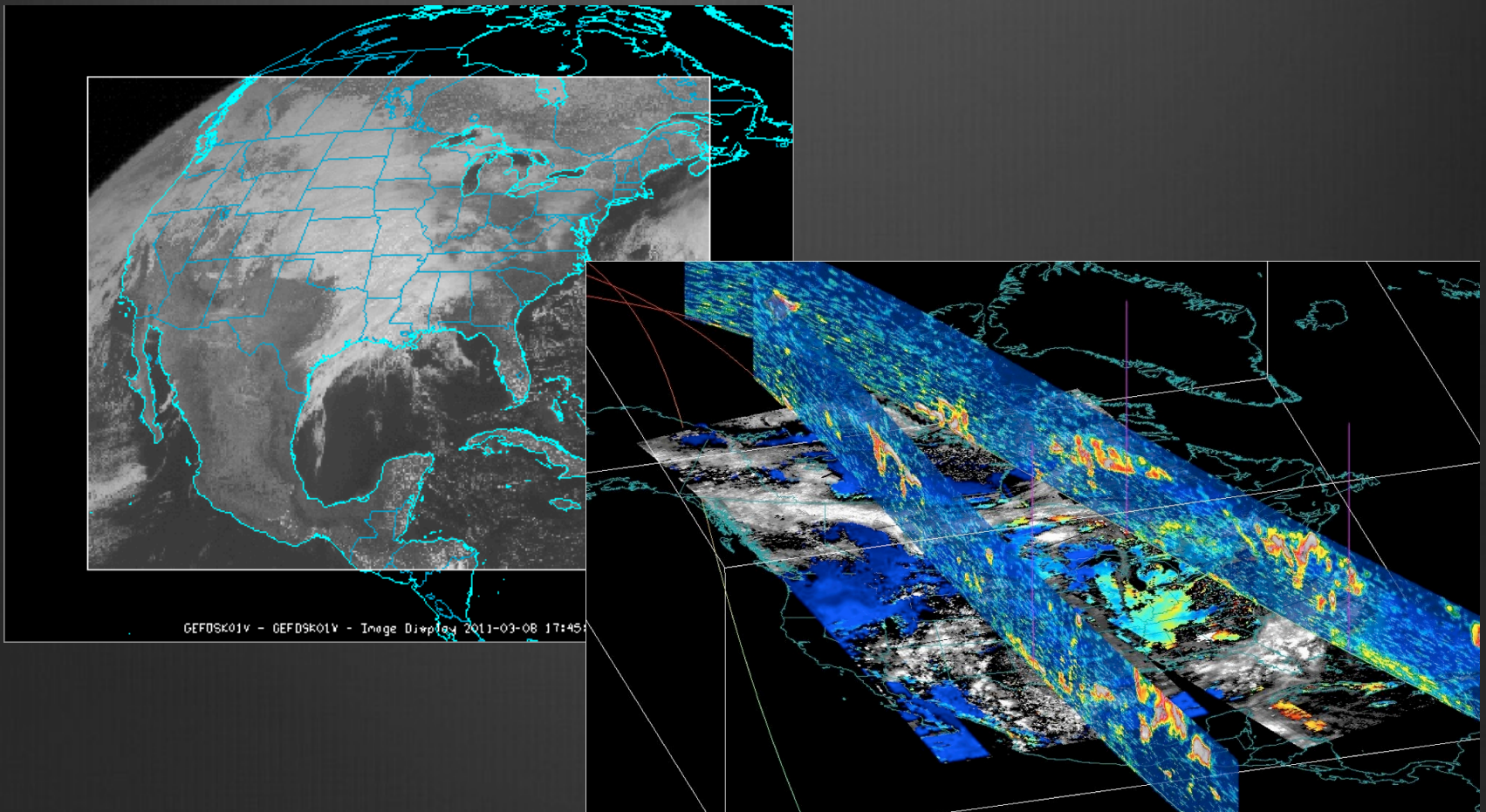
## Goals

- ⊗ McIDAS-V shall be a **powerful and versatile software system** for environmental data processing, analysis and visualization
- ⊗ McIDAS-V shall **support existing and evolving needs of scientific research** and algorithm/applications development for new programs, such as NPOESS and GOES-R as well as for retrospective data, such as that from GOES and POES
- ⊗ McIDAS-V shall **support data fusion and algorithm interoperability** from existing and future sources
- ⊗ The **McIDAS team shall continue to fully support the MUG and McIDAS-X** functionality as users transition to McIDAS-V
- ⊗ McIDAS-V **shall support operational users** by providing tools and interfaces that enable a natural transition path for research results into operations
- ⊗ McIDAS-V shall be **used to educate students** in remote sensing and physical sciences, and students must be integrally involved in its development, evolution and use

# McIDAS-V

## Innovative

Develop new capability in visualization and data analysis  
Move beyond 2D to 3D





# McIDAS-V

## Milestones

- ⊗ **2003**: Whittaker and Santek present a McIDAS-V plan to the SSEC Directors
- ⊗ **2006**: Investigations of a “new approach” to data analysis and visualization
- ⊗ **2007**: Collaboration with Unidata to advance VisAD and IDV as the basis of McIDAS-V
- ⊗ **2008**: McIDAS-V becomes an “alpha”
- ⊗ **January 2009**: beta 1
- ⊗ **January 2010**: beta 5
- ⊗ **September 2010**: V1.0



# McIDAS-X

## Future

- ⊗ **Stay in tune with user's needs**, efficient and enhanced visualization, advanced scripting, additional functionality
- ⊗ More support and compatibility with Python
  - ⊗ Fewer Fortran and C programmers
  - ⊗ Important for new ADDE servers to incorporate more data types
  - ⊗ Keep current with changes in Python and migrations to languages of the future
- ⊗ Keep an eye on future graphics (visualization) packages
  - ⊗ X Window Systems is 40-year old technology
    - ⊗ McIDAS-X dependency is isolated
- ⊗ Cloud computing

# McIDAS-V

## Future

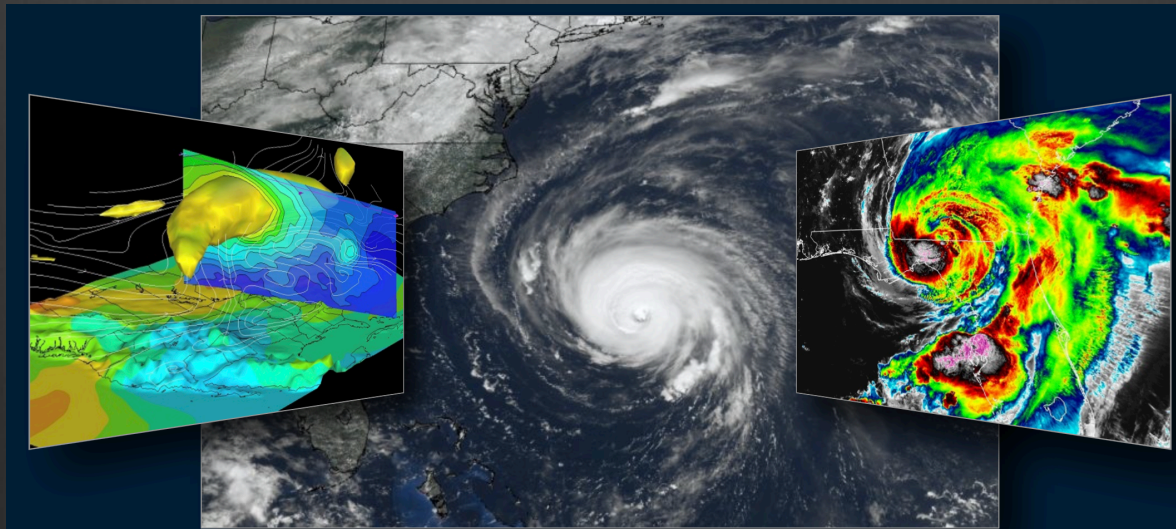
- ⊗ Stay true to mission and goals
- ⊗ Continue to investigate unique functionality for visualizing and fusing data
- ⊗ Improve interface to data
- ⊗ Stay relevant with changing technology
  - ⊗ Replacement for Java3D
  - ⊗ Cloud computing
  - ⊗ Interoperability with other software and systems

# McIDAS-X and -V

## Next release

McIDAS-X - Q4 release of 2023.1

McIDAS-V - Q4 release of Version 1.9



**McIDAS**

Ingest, Decode, Analyze, Display

Weather Satellite, Radar, Text, Grid, Obs