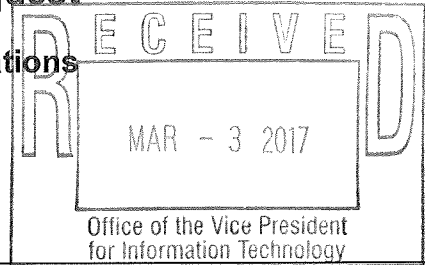





#1704

NDSU Technology Action Plan Request

I. Action Plan Introduction and Authorizations



NDSU ORGANIZATION OR UNIT North Dakota State Climatologist, AES			
TITLE OF PROJECT Wonders of Weather Observation Form			
Project Duration (3 years maximum)		From: June 2017	To: December 2017
Type of Project (Check one)		New <input checked="" type="checkbox"/>	Previously Submitted <input type="checkbox"/>
Renewal <input type="checkbox"/>			
Total Technology Fee Request: \$900			
Project Director (Must be NDSU faculty or staff) Adnan Akyuz, Ph.D. ND State Climatologist		Campus Address: 304 Morrill Hall Phone: 231-6577 Fax: E-mail: Adnan.Akyuz@ndsu.edu	
Name (Type or Print)		Signature	
Project Director Adnan Akyuz, Ph.D., State Climatologist			
Unit Head Kenneth Grafton, Dean, CAFSNR			
IT Division Consultant James Ross		Signature 	
		Date 3/3/17	
		3/3/17	
		3/3/17	

Executive Summary (maximum of 175 words)

I am creating a new General Education Course called Wonders of Weather (WOW) this Fall. Currently the course is under review by the General Education and Campus Curriculum Committees. This class will reveal the mystery of the wonders of every-day weather. Through hands-on experimentation, observations, and discussion of day-to-day weather, students curious about weather and its impacts will come to understand the natural forces structuring the Earth's atmosphere and its weather patterns that directly impact lives of all sharing the Mother Earth.

One of the most important components of the course is the Meteorological Observations, an innovative approach to give the students a glimpse of how the global weather data are collected through hands-on experimentation by making daily observations. The students will be provided a set of thermometers that measures dry bulb and wet bulb temperatures. This instrument will be available at NDSU Bookstore and will be a part of the classroom material package. The students will make the following observations:

- Air temperature: 28.5°C for example
- Cloud cover: "CLR for clear, FEW for few clouds, SCT for scattered (3/8 to 4/8 of the sky is covered with clouds), BRK for broken (5/8 to 7/8 of the sky is covered with clouds), OVC for overcast (the entire sky is covered with clouds), or OBS for obscured if the sky is hidden by a surface-based phenomena such as fog, smoke, blowing snow) for example)
- Cloud genre: CLR to indicate no clouds or select one of the 10 cloud genres from the menu for example.

- d. Cloud species: CLR to indicate no clouds or select one of the 14 cloud species and 10 varieties and 20 accessory clouds from the menu for example.
- e. Present weather: “No Weather” or select one of the ten weather phenomena from the menu for example.

The students will be required to take and report these observations daily via a dedicated website with their NDSU credentials. Currently, Alex Radermacher, Lecturer, Computer Science at NDSU and his CSCI 413 students are working with James Ross at ITS, NDSU to create a secure web server for the program to reside and linking students NDSU credentials to this form.

I will use the funding to support the Computer Science students who previously put some pilot work on this project.

We will only accept for consideration Technology Action Plan Request forms which are fully completed and signed according to the guidelines listed in the Instructions, pages 1 and 2.

Technology Action Plan Request forms will be opened and reviewed after the submission deadline.

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II. Project Overview

1. How does this project meet student needs?

There is nowhere else such project adopted by any universities in the US. It will be the first and only social cloud collection project that will enhance their learning while they actively participate in one of the most fundamental principles of meteorology. Interaction among other students while they judge submitted photos will make the exercise fun!

2. What audience does this project directly serve? What audience is indirectly served? How many students are affected?

It will directly serve 80 students (freshman, junior, sophomore and seniors) from wide varieties of disciplines from Accounting to Zoology every year through this new course and potentially 160 students in Soil 217 with a total of 240 NDSU students per year. It will indirectly impact local K-12 students as project will create wide range of clouds which will help develop cloud type repository for reuse in K-12 classroom.

3. For projects that target a subset of NDSU's students, please describe the possibility for broader application in the future.

It leads to use of a smart phone application where students can submit photos by just snapping pictures of clouds and submitting to their accounts using their smart phones. We could possibly integrate the previously funded weather observation project to have students submit cloud photos and their meteorological observations (temperature, dew point, relative humidity, and wet bulb temperature) with one application to one site.

4. Describe both the immediate and long term impact of this project.

It will immediately be a fun project that utilizes technology for effective learning. In the long term these photos will be reused as examples of types of clouds they represent. These repositories can be used at NDSU classrooms as well as in K-12 education.

5. Who will pay for ongoing expenses following the technology fee funded portion of this project (e.g., who will replace hardware or software after it has reached its end of life)?

Once the system is set up, there will be no major expense other than maintenance of the page. I am willing to use my local funds and indirect account to accommodate this small expense.

6. Describe how this project will follow NDSU's best practices in information technology. (Please make sure the NDSU IT Division staff you consulted signs in Part I of this form.)

Enterprise Application Development (EAD) and Enterprise Systems (ES), both units of Enterprise Computing and Infrastructure, in the IT Division, uses software frameworks and testing routines to ensure that their products conform to the highest standards accepted industry-wide.

7. What service on campus is most similar to the one proposed here? How does this project differ?

There is no similar project like this not only in NDSU but also in the nation. It is purely original to best of my knowledge.

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III. Project Description (5 pages maximum)

Include information on the background of this project: how did it come to fruition?

There are ten main cloud types, twenty notable species and variations, eight accessory clouds. Cloud identification is one of the fundamental principles of meteorology. If the project is funded and the program is created, it will also be used in Soil 217 that is also taught by the PI. Introduction to Meteorology and Climatology (Soil 217) is also a general education course in Science and Technology. Every spring semester 160 students take the course. In the spring of 2017, there were 43 different disciplines. In the class 17, 21, 31 and 31% of the student population was freshmen, junior, sophomore, and senior respectively. This project proposes an establishment of a web site where students would be able to log in with their NDSU credentials to identify and submit at least 10 main cloud types as required for grades. Students will not only be able to log in and submit photos for the correct category as a participant but also be able to participate as a judge to verify any submitted photo. This project will increase scientific as well as social interaction in the classroom while it will enhance learning with more hands on education.

The web site will be set up by the Enterprise Application Development (Information Technology Division, NDSU). The page will consist of the following components:

1. Log in and authentication
2. Picture upload and cloud classification
3. Verification
4. Grading
5. Archive and repository

The first 4 components will be semester specific and will be overwritten each semester. 5th component is stationary and cloud pictures will be collected and archived by the cloud names. The end users will be able to search cloud pictures by cloud name, cloud type, cloud specie. The archive is intended to be open to public for greater impact. Perhaps the idea becomes popular in the community so that it may lead to a similar page where all grade schools and public may be able to participate in this fun activity. It may also lead to research for what kind of atmospheric conditions favor certain cloud types.

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IV. Milestones

List the date for each project milestone. These milestones should represent the **significant** accomplishments that will be associated with the action plan. For each milestone, please indicate its expected outcome and the means for assessing that outcome. (The table may be extended as needed.)

	<u>Date</u>	<u>Milestone</u>	<u>Expected Outcomes</u>	<u>Means of Assessment</u>
1.	June 2017	Start of the project	Review prototype features	Observation
2.	August 2017	Implement prototype's forms, pages and reports	No critical or major issues	Manual

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NDSU Technology Action Plan Request

V. Supporting Documentation

See Appendix I, Proposed Observation Form that mimics how the web interface will look like.

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NDSU Technology Fee Action Plan Request VI. Budget

(double-click on the form to begin entering data)

1.	NDSU ORGANIZATION OR UNIT North Dakota Agricultural Weather Network
2.	PROJECT DIRECTOR(S) Adnan Akyuz

3. SALARIES AND WAGES			
	Number employed	Number of months	Funds Requested
A. Staff			
B. Graduate students			
C. Undergraduate students	4		\$900.00
4. TOTAL SALARIES AND WAGES			\$900.00
5. FRINGE BENEFITS			
6. TOTAL SALARY, WAGES AND BENEFITS			\$900.00

7. EQUIPMENT	
A.	
B.	
C.	
D.	
E.	
F.	
G.	
H.	
8. TOTAL EQUIPMENT	
\$0.00	

9. MATERIALS AND SUPPLIES	
A.	
B.	
C.	
D.	
E.	
F.	
G.	
H.	
10. TOTAL MATERIALS AND SUPPLIES	
\$0.00	

11.	TOTAL TECHNOLOGY FEE REQUEST	\$900.00
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12.	MATCH (Describe in Match Section)	
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13.	TOTAL PROJECT EXPENDITURE	\$900.00
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NDSU Technology Action Plan Request

VII. Budget Justification

Estimated Labor:

Most of the required resources for this project will be from computer science students' hourly labor. Ninety hours of labor should be sufficient to complete the task. It includes time to complete the program and trouble-shooting during the implementation period.

Costs (labor, labor contingencies):

Ninety hours of labor with \$10 per hour would be \$900 of total cost is estimated.

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NDSU Technology Action Plan Request

VIII. Budget Match

1. Attempted Budget Matches: PI requests no salaries in this project and his involvement in this project is the in-kind match for the budget requested.
2. Actual Budget Matches: PI's 0.5-month salary.
3. Additional Budget Match information: The PI will meet with the software and the Computer Science Instructor who is assigned for this task periodically for to make sure that the project is shaping to address the needs and is on time.

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Appendix I Proposed Observation Form

AGRI 115: Wonders of Weather (WOW)

Temperature*

Next

Enter the current temperature in degree Centigrade to the nearest 5/10th of a degree. For example: 2.5, 12.5, etc.(Please do not include °C after the number. It will automatically be added in the output table)

Temperature (°C)

Required

Cloud Cover*

Next

Radio button menu items:

- CLR (No Clouds)
- FEW (Few clouds visible: 0 to 2/8 of the sky is covered)
- SCT (Scattered: 3/8 to 4/8 of the sky is covered)
- BRK (Broken: 5/8 to 7/8 of the sky is covered)
- OVC (The entire sky is covered with clouds)
- OBS (Obscured: Sky is obscured or hidden by surface-based phenomena, such as fog, blowing snow, smoke and so forth, rather than by cloud cover)

Required

Note: Only the 3-letter identifier will be in the output table
Text in the parenthesis can be available via “mouse-over” to the students.

Cloud Genre*

Next

Check-box menu items:

- No Cloud (CLR)
- High Clouds
 - Cirrus (Ci)
 - Cirrostratus (Cs)
 - Cirrocumulus (Cc)
- Midlevel Clouds
 - Altostratus (As)
 - Altocumulus (Ac)
- Low Clouds
 - Cumulus (Cu)
 - Stratus (St)
 - Stratocumulus (Cc)
- Multilevel Clouds
 - Cumulonimbus (Cb)
 - Nimbostratus (Ns)

Required

Note: Only the abbreviations in parenthesis will be in the output table

Species & Varieties*

- No Cloud (CLR)

Species

- humilis
- mediocris
- congestus
- fractus
- stratiformis
- lenticularis
- castellanus
- nebulosis
- fractus
- floccus
- uncinus
- spissatus
- calvus
- capillatus

Varieties

- radiatus
- translucidus
- opacus
- duplicatus
- undulatus
- asperatus
- lacunosus
- Intortus
- vertebratus
- Pileus

Accessory Clouds & Supplemental Features

- pileus
- velum
- pannus
- praecipitatio
- mamma
- virga
- arcus
- tuba
- incus

Other Unusual Features

- Kelvin-Helmholtz Waves
- Contrail
- Distrail
- Pyrocumululus
- Antropocumululus
- Fallstreak Hole
- Horshoe Vortex
- Noctilucent
- Sonic Cloud
- Cap and Banner Cloud
- Condo Cloud

Next

Required

Present Weather*

Next

Check-box menu items:

- No Weather (0)
- Fog or mist (1)
- Rain or drizzle(2)
- Thunder (3)
- Snow (4)
- Hail (5)
- Freezing rain or drizzle (6)
- Dust-storm or Sand-storm reducing visibility to $\frac{1}{4}$ mile or less (7)
- Smoke or haze (8)
- Blowing snow (9)
- Tornado (10)

Required

Note: Only the number in parenthesis will be in the output table

Summary

Date-Time*	Temperature	Cloud Cover	Cloud Genre	Cloud Species and Varieties	Present Weather
Aug 28, 10:15	28.0°C	SCT	Cu, Ac, Ci	humilis, duplicatus, lacunosus	3, 8

SUBMIT

*Server time

Submit Photo

Cloud Tag (Genre, optional specie/variety)

Upload

Optional

Submit Photo

Cloud Tag (Genre, optional specie/variety)

Upload

Select one

- Cirrus (Ci)
- Cirrostratus (Cs)
- Cirrocumulus (Cc)
- Altostratus (As)
- Altopcumulus (Ac)
- Cumulus (Cu)
- Stratus (St)
- Stratocumulus (Sc)
- Cumulonimbus (Cb)
- Nimbostratus (Ns)

Select one

- humilis
- mediocris
- congestus
- fractus
- stratiformis
- lenticularis
- castellanus
- nebulosus
- fractus
- floccus
- uncinus
- spissatus
- calvus
- capillatus

Select all that applies

- radiatus
- translucidus
- opacus
- duplicatus
- undulatus
- asperatus
- lacunosus
- intortus
- vertebratus
- Pileus
- pileus
- velum
- pannus
- praecipitatio
- mamma
- virga
- arcus
- tuba
- incus
- Kelvin-Helmholtz Waves
- Contrail
- Distrail
- Pyrocumulus
- Antropocumulus
- Fallstreak Hole
- Horshoe Vortex
- Noctilucent
- Sonic Cloud
- Cap and Banner Cloud
- Condo Cloud

Optional

Output Table: AGRI 115

Name	Date-Time	Temperature	Cloud Cover	Cloud Genre	Cloud Species and Varieties	Present Weather
Adnan Akyuz	Aug 28, 10:15	28.0°C	SCT	Cu, Ac, Ci	humilis, duplicatus, lacunosus	3, 8
Jim Ross	Aug 28, 13:01	30.0°C	CLR	CLR		0
Eric Christenson	Aug 28, 20:20	25.5°C	FEW	Ci	uncinus, Horshoe Vortex	0

Class Participation Rate

75%*

*Calculated based on the ratio of number of students submitted observation to number of students in the class

Output Table: Adnan Akyuz

Date-Time	Temperature	Cloud Cover	Cloud Genre	Cloud Species and Varieties	Present Weather
Aug 28, 10:15	28.0°C	SCT	Cu, Ac, Ci	humilis, duplicatus, lacunosus	3, 8
Aug 29, 15:30	28.0°C	SCT	Cu, Ac, Ci	humilis, duplicatus, lacunosus	3, 8
Student Participation Rate				100%*	

*Calculated based on the ratio of number of days this student submitted observations to number of possible days to the current day.